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Editorial

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Professor Dr. Md. Sana Ullah
Editor
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Contents

State Of Our Rehabilitated Elderly People In Old Homes.

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Abstract : The world is getting older every minute. According to a report of the United Nations, the old-age dependency ratio (ratio of people ageing above 65 per 100 people ageing between 15 and 64) has been on a rampant rise over the years. In the year 2005 this ratio was 11.3, in 2010 it was 11.7, and it is expected to grow further- by 2020, it will reach 14.4 while by 2030, it will be touching a total of 18(hackernoon.com, 2028). It becomes a global issue. Every country is experiencing ageing population growth and will be affected proportionately by it. Regardless of the region, population ageing affects various aspects of daily life- healthcare, pension, retirement, housing, transportation and so much more. Though presently Bangladesh is enjoying demographic dividend, ageing population is increasing tremendously every year. Due to improved quality of life, the number of people over 65 years is increasing rapidly. The situation is an emerging challenge as the elderly may have special needs and their requirement for care-giving services may differ from person to person. Bangladesh, unfortunately, does not have a social welfare system. As a result, there will be huge problem for inadequate resources specially in health and medical services. Due to more elderly population, Bangladesh will see the demographic structure undergoes a slow change from the present pyramid structure. There is a growing trend towards nuclear family in our country. In many cases, the children are going and living abroad. This trend may drastically affect the elderly parents in a dilemma regarding financial and social support. Beside, nutrition and health status of elderly people, adequate food, safe water, proper sanitation facilities and maintaining hygienic standards at the few number of Old homes may collapse because of increasing number of elderly people. The present study is a descriptive one focusing on the facts and figures and the opinions of the elderly people living in two old homes of Dhaka city. Our new generations have to be responsive, informed and attentive about their duties and responsibilities towards the elderly people. Taking proper care of the elderly is our ethical concern and obligation.

Key words: elderly; ageing; old homes, demographic dividend

Introduction

A large part of our population is of old age. They play a vital role in the society. Their number is rapidly rising in most of the countries. All over the world proportion of elderly are increasing where numbers of children are decreasing. The statistical data of Bangladesh representing the number of aged population has increased from 1.38 million to 7.59 million from the year of 1974-2001[1].

The nuclear family is increasing in Bangladesh day by day and older people left alone living separately from their family and becoming vulnerable. This condition demands more health and welfare services and more provision to the elderly support system [2]. The old people are being considered as a problem in many countries. Old age is one of the vulnerable situations in a natural process of life. In this stage, people experience decreased physical strength and deteriorating health conditions with age related disease. Because of the growing concept of single and nuclear family system, they are to live alone or stay in old home. As such their life is becoming much pathetic and miserable Though not expected, rehabilitation of the elderly people has become a part and parcel in our society. The system of joint family has already become extinct and the socio economic condition has been detaching the older people from their families. Moral degradation and feeling of loss of emotions are making the older ones living in old homes. In addition, the imbalance of income and expense also plays a vital role.

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When a family faces this problem, the older people who once was the earning member now becomes burden to all. Humanity and feelings take a little place then. The family feels to make the older detached from them. The old homes or rehabilitation centers have been established out of this need of giving shelter to the helpless, detached older people.

Old age is one of the vulnerable situations in a natural process of life. In this stage, people experience decreased physical strength and deteriorating health conditions with age related disease. All over the world proportion of elderly are increasing where numbers of children are decreasing. According to World Population Ageing Report 2013, World's old –aged population of 60+, 65+ and 80+ years were respectively 840628 millions, 570459 millions and 120199 millions. The statistical data of Bangladesh on old-aged population show an increase from 1.38 million in 1974 to 7.59 million in 2001[3]. Bangladesh is the seventh largest populated (152.51 million) and most densely (1015 person live per square kilometers) country[4]. Furthermore, the nuclear family is increasing in Bangladesh day by day and older people left alone living separately from their family and becoming vulnerable. This condition demands more health and welfare services and more provision to the elderly support system[5].

Purpose of the Research

The purposes of the research are:

> to know the lifestyle of the older people in old homes.
> to identify problems that the older people face in the old homes.
> collecting information about the condition of the old people in their family.
> reasons for their coming to the old homes.
> identifying the problems these people are facing and giving some recommendations to solve problems.

Literature review :

Who are elder: The definition :

It is difficult to define the elder people. Not even the social workers could specify when a person becomes old. But traditionally those who are of sixty or above years can be identified as old. Though socio economic condition of many countries make people grow older before the above cited age.

Most developed countries of the world have accepted the chronological age of 65 years as a definition of 'elderly' or older person, but like many westernized concepts, this does not adapt well to the situation in under developed or developing countries. While this definition is somewhat arbitrary, it is many times associated with the age at which one can begin to receive pension benefits. At the moment, there is no United Nations standard numerical criterion, but the UN agreed cutoff is 60+ years to refer to the older population (WHO,2002).However, this age limitation varies from one country to another and also from one profession to other profession.

According to the general criteria of UNICEF, the people of Asia Pacific Ocean classify the old people aged sixty years and above .An old age is natural reality of human being. There are different opinions about it. But scientists view it considering physical, mental , behavioral, social , cultural and other aspects of human beings. Mark Twain said, "Age is an issue of mind over matter. If you don't mind, it doesn't matter[6]."

The government of Bangladesh has set up six free shelters called Shanti Nibash, one in each divisional headquarters providing food and shelter for elder residents. The Bangladesh Association for

the Aged and the Institute of Geriatric Medicine with financial help of the Government has also established a Senior Citizen's home where various services are provided to elderly people.

A number of homes have been established through private initiative. There are a number of old homes located in and around Dhaka. In Gazipur, Dhaka a big old home has been established by private initiative. Some of these homes provide recreational facilities as well as basic services. A study of old homes in Dhaka shows that 47% of the residents are there because they have no one to look after and over 60% are male[7.] In Bangladesh the number of existing Old homes is much less than the demand. In addition, many elderly people living in Old home face a considerable social stigma, primarily because this is very new concept in our culture. However, the economic and social reality is that many elderly people will have no choice but to stay in old homes. Old age allowance was introduced in Bangladesh in the Fiscal Year (FY) 1997-1998 and the main objective of this allowance is ensuring socio-economic development and social security for the elderly; increase dignity of elderly within family and community. Aim of the allowance is to strengthening of mental health through grant for Medicare and increase of nutritional support for elderly people of Bangladesh. The age of 65 years for male and 62 years for female whose yearly average income not exceeding 10,000 BDT are considered eligible for the old age allowance. The total budget in FY 1997-1998 was 125.00 million BDT and monthly allocation for 100 taka per person and total beneficiary were 40,311. That amount of grant per head has been increased in the present FY 2015-2016. Bangladesh government allocated BDT 14,400 million and the total beneficiary is 3 million, each beneficiary getting 400 BDT per head per month[8]. However, Bangladesh has pension policies to ensure social security on old age for retired government employees only. According to Public Service Retirement Act 1974b now the retirement age of government employee of Bangladesh is 59 years[9].

In Bangladesh traditional family patterns are breaking down which change norms and values such as respect to elderly people in the family and the community. As a result vulnerability of the elderly people is increasing. The vulnerability is in terms of food consumption, shelter, community and social attitude[10].

The establishment of Old Home by government and private initiative throughout the country is a demand of the time.

Rahman A.S.M Atikur[11] wrote in his book that in the social context of Bangladesh old age is a significant and worrying social problem. The problem is extreme for the socio economic condition of the country. Rather than the health matter, worklessness and financial insecurity is extreme and much active at this stage. Beside, the rich older people are more victim of cultural issues of the mind. The writer in his book also established that the rural elders remain more in mental peace than the urban ones. The writer here focused upon how the government can take initiative and also instructed on non-governmental steps.

Another researcher Mia Abdul Jobbar[12] in his research mainly narrated about the older females who were victim from childhood of gender discrepancy and distresses. The writer here cited many case studies ,where the reality of an extreme cruel state of situation has been picturized. Though the writer in his book identified different social, and health problems, but he did not give any direction in taking initiatives. He mainly gave importance on health problem of the old women. He ignored the other problems like economical, social, psychological-cultural etc .

Islam Md. Jahidul[13] in his book on Outline of Human Rights very aptly depicted the roles of international organizations towards alleviating the stresses and sufferings of the old age people. He also emphasized that in future our society will also be more proactive in rehabilitating the elders in our country.

Research Method

Accuracy of research in social sciences remains all the times questionable. However, if the sample selection, data collection, questionnaire preparation etc. are done as per the rules, we may expect the research up to a certain standard. For this research, social survey methods have been followed. Analysis of data has been done quantitatively with the help of pie-chart development mainly.

Research Area

Selection of an area is important in a research. Because selection of research area is the beginning of a research. We decided to remain confined in Dhaka city. Further, we have decided to select two old homes – one government, and the other is private. Finally we selected Probin Hitoishi Shongho at Agargaon and Apon Nibash at Uttarkhan of Uttara, Dhaka.

Sampling

Sampling is a method. As the population in these two old homes is not that much large, so we decided to select a total of 31 elders. Out of 31 persons, 13 persons from Probin Hitoishi Shongho and 18 persons from Apon Nibash for information. While interviewing them, I was cordial and concerned about their time and mentality. Their interview with their personal opinion helped me a lot to complete the research.

Data Analysis

Presentation of the data obtained is one of the tasks of the research.
The data have been analyzed in the following tables and pie-charts.

Table 1: Age distribution of the respondents.

Age	Numbers(N)	Percentage(%)
55-60	4	12.90
61-65	8	25.81
66-70	7	22.58
71-75	6	19.35
76-80	4	12.90
81-above	2	6.45
Total	31	100

The table 1 shows that minimum number of respondents (2) fell in the age bracket of 81 years and above. On the contrary, highest number of elders belong to 61-65 years of age; followed by 66 to 70 years. It is also interesting that   a quite big number of people (12.90%) belonged to the age bracket which is normally not considered as elderly people. These people are medically not sound at all.

Pie-chart- 1
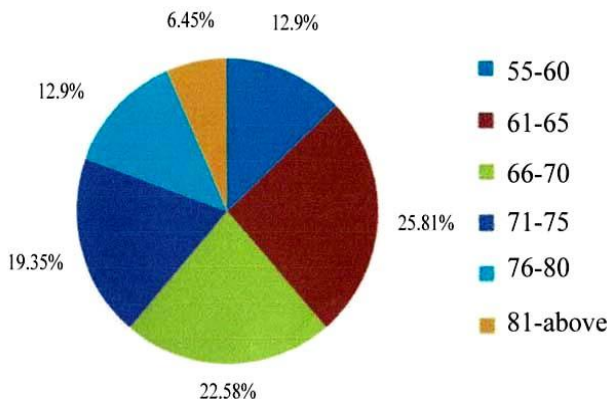
Table 2 : Gender of the interviewees

Gender	Number(N)	Percentage
Male	10	32.26%
Female	21	67.74%
Total	31	100

From the above table, it is seen that among the respondents in the study area, almost one-third are male and two third are female respondents. More women have taken shelter in the old homes. It indicates how much our female elders are helpless in our society. Our society is a patriarchal society. So male members probably are taking advantage of it. In other words, there are more women than men in old age.

Pie-chart- 2
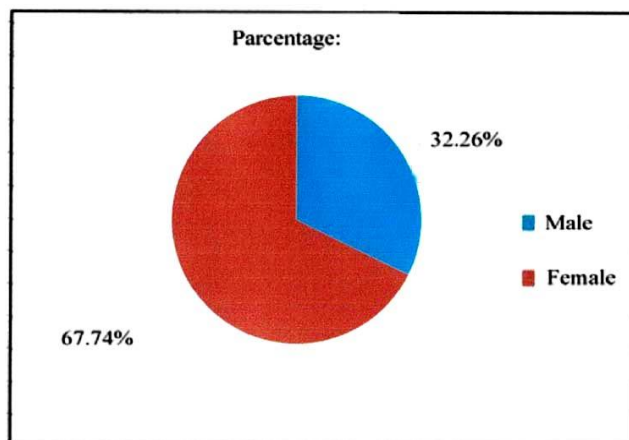
Table 3 : Religious Identity of the Old Homers

Religion	Number(N)	Percentage
Islam	28	90.32
Hindu	02	6.45
Others	01	3.23
Total	31	100

From table 3 it can be seen that out of the interviewees, 90% belonged to Islam religion. This is quite expected in a country where almost 90% of the population is muslim.

Pie-chart- 3
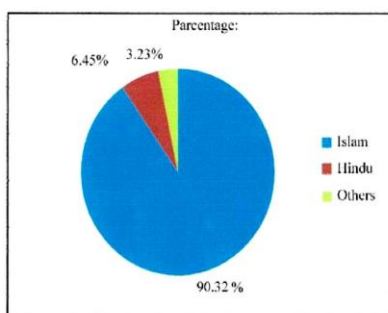
Table 4 : Marital Status of the elders

Marital Status	Number	Percentage
Married	30	96.77%
Unmarried	01	3.23
Total	31	100

Table 4 indicates that out of the sampled respondents, only one person is unmarried. To the researcher, it seemed to be justified as a few number of people are seen unmarried in our society; though we do not have any specific data on the unmarried persons in Bangladesh.

Pie-chart- 4
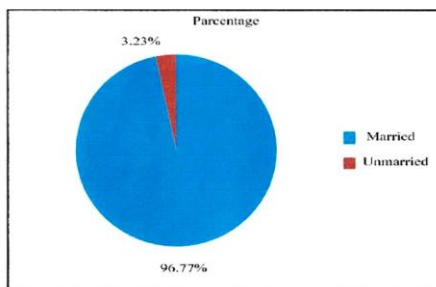
Table 5 : Number of Family Members of the Old Homers.

Members	Number	Percentage
1-2	1	3.23
3-4	11	35.48
5-6	13	41.94
7-8	6	19.3
Total	31	100

It is seen that almost 77% of the respondents had 3 to 6 family members and about 20% had 7 to 8 family members. This finding probably nullifies the common belief (or expectation) of our parents, mainly of rural area or of shanties, that the number of more children in a family means a secured old age as more children give more support during old age.

Pie-chart- 5
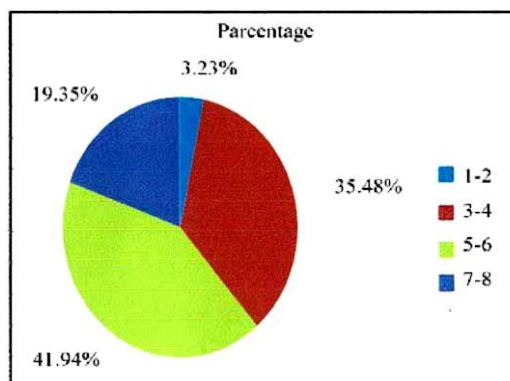
Table 6 : Whether the old homers want to live in old homes

If wanted to Live	Number	Percentage
Yes	4	12.90
No	24	77.42
No comment	3	9.68

Probably no one expects to pass on his/her old days lonely far from own family. Everyone has a dream to remain surrounded by family members during those helpless days. Almost 77% of our respondents did not want to stay in the old homes. The other persons (23%) who said they wanted to stay in the old homes or no reply to the question, answered with a very gloomy face and with a big sigh. A sad picture during our whole survey work. It has been further seen that almost 58% of the respondents willingly did not come to the old homes. Their family members compelled them for some reasons to be rehabilitated here.

Pie Chart - 6
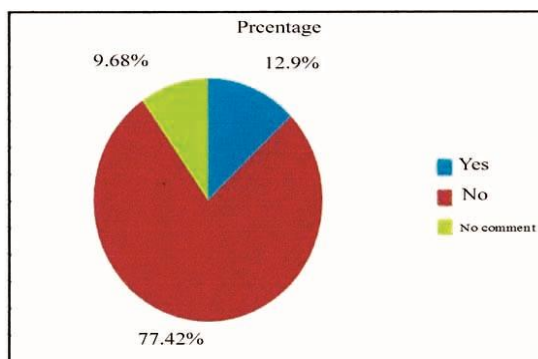
Table 7 : How long the respondents are living in the Old homes

Duration	Numbers	Percentage(%)
0-12 months	3	9.68
13-24 months	4	12.9
25-36 months	6	19-35
37-47 months	8	25.81
48-60 months	3	9.68
61 & above	7	22.58
Total	31	100

From the above table 7, it is found that almost 45% of the respondents were staying in the old home for more than 2 years to less than 4 years. We have found at least 7 (about 23%) elderly people who were staying 5 years or more. Many of them complained that their family members do not even visit them in the old homes.

Pie Chart - 7
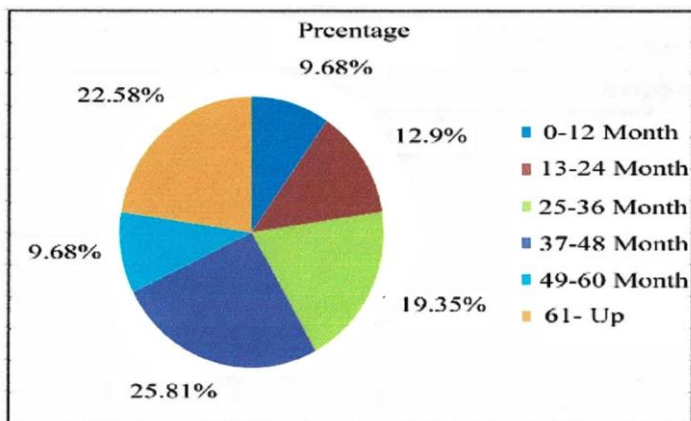
Table 8 : Opinions about the Environment of Old homes by the Respondents

Environment	numbers	Percentage(%)
Good	22	70.97
Bad	5	16.13
Both	4	12.93
Total	31	100

It is good to learn from the old homers that the overall environment of the old homes is good. About 71% of them said that they are satisfied with services provided by the authority. However, 13% said the overall environment is not up to their expectation.

Pie Chart - 8
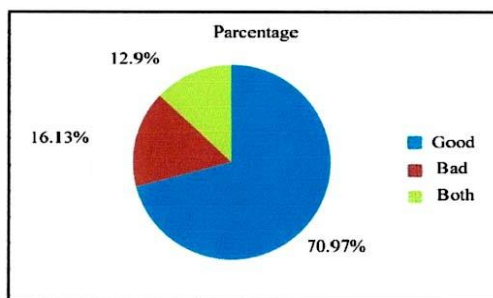
Table- 9 : Respondents' Opinion about "if They will Encourage other Old persons to Come in the Old homes"

Opinion	Number	Percentage(%)
Yes	3	9.68
No	28	90.32
Total	31	100

The hard truth comes out when we find 90% old home residents did not expect at all anyone to come here at their old age time. However this is a hard reality in their life that they were fated to be there.

Pie Chart - 9
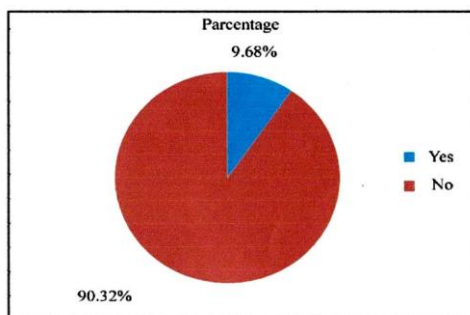
A question was put to the respondents that if they are willing to get back to their houses. Indeed it was a painful question to them. Initially we assumed that 100% will show their eagerness to go back to their respective houses. But the following Table shows that almost 68% said they want; the rest i.e. 32% said "no". It is quite evident in their faces the sign of abhorrence regarding their family members.

Table:10 Respondents' Willingness to Return to Family

Willingness to go back	Number	Percentage(%)
Yes	21	67.74
No	10	32.26
Total	31	100

Pie Chart - 10
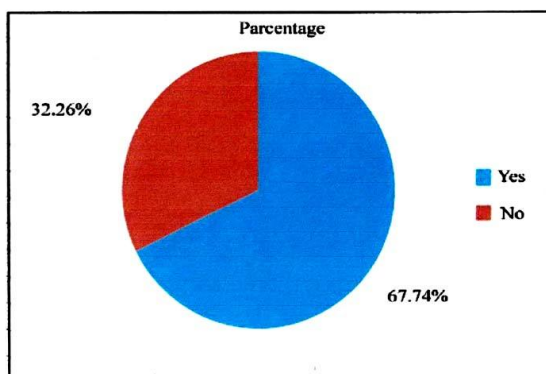
Results of the Research
Though the above section of the study explained the findings from the analysis of the data, nevertheless it was decided to summarize the important findings in this section for ready references.

It has been found that most of the old homers belong to the age which officially has been declared as the 'old age'. However, we found some members who are much below the age of 60 years. These people are physically inactive and not to speak of economic activities, no type of activities are possible by them. it is seen that among the respondents, almost one-third are male and two third are female respondents. It probably indicates how much our female elders are helpless and neglected in our society. Our society is a patriarchal society. Male members probably are taking advantage of it.

 97 percent of the old people were married and they have families. How pity is it that they are now being deprived of love and affection from their families. These people are absolutely frustrated with the attitude and behavior of their family members; and they had no way but to come to the old homes. 77% of the respondents had 3 to 6 family members and about 20% had 7 to 8 members in their families. This finding probably nullifies the common belief (or expectation) of our parents, mainly of rural area or of shanties, that the number of more children in a family means a secured old age as more children give more support during old age.

Probably no one expects to pass on his/her old days lonely far away from own family. Everyone has a dream to remain surrounded by family members during those helpless days. Almost 77% of our

respondents did not want to stay in the old homes. The other persons who said they wanted to stay in the old homes, answered with a very gloomy face and with big sigh. This was a very heart touching moment and both the interviewer and the interviewees were without any words for certain time. It has been further seen that almost 58% of the respondents willingly did not come to the old homes. Their family members compelled them for some reasons to be rehabilitated here. It is found that almost 45% of the respondents were staying in the old home for more than 2 years to less than 4 years. We have found at least about 23% elderly people who were staying 5 years or more. Many of them complained that their family members do not even visit in the old homes.

The authorities of these old homes were asked about the services they provide, the problems they faced, and also how do they overcome the problems they face. According to the authorities, they are trying to serve their guests to their best. It is good to learn from the old homers that the overall environment of the old homes is good. About 71% of them said that they are satisfied with services provided by the authority.

This research has got some interesting information. Normally it is our belief that mainly the old homers are coming from the lower or lower- middle class families. It has been seen that, not only the persons of poor family background of the society has come to these old homes, but people belonging to higher society levels also have been living there. Some highly educated persons like doctors, engineers ,bankers, high officials also have been found living there. People of good economic background are mainly staying at the Jora Biggan Protisthan and Probin Hitoishi Shongho. On the other hand, people who came from lower level achelon, are mostly living in Apon Nibash. All these people are helpless here.

Conclusion

The root causes of vulnerability of elderly are medical, economical, emotional and social issues Increase in medical costs, pressure on social security and unemployment are main challenges of elderly facing in Bangladesh. Because of long term of experiences, wisdom, and academia, the senior citizens are the assets of the nation. It is the responsibility of everyone to take care of them. One positive outcome of population ageing- is creation of new care markets. Therefore there is a growing need of experienced caretakers. All the people of the society are the custodians of these helpless people. However, the requirements of the senior citizens are not being fulfilled by the society as per their expectation. Custodians must take care of their guests. While policymakers are still racking their brains to come up with the most suitable solution for this raging issue, but in practice it is found that a small kitten is given birth out of giant policy and with meagre insufficient financial budget.

Recommendations

The number of old people are increasing day by day. An integrative effort must be planned out involving different concerned and related Ministries and departments to solve their problem. Some recommendations have been outlined in the following points:

1: Bring back our lost or ruined values which keep binding our families and the society. The people must be made aware about this problem. They should be made realized that some day they will also face the same situation.

2: The social rituals and religious values should be restored and practised.

3: To take initiatives to ensure their security of good physical and mental health, economical, residential, treatment issues.

4: The non -govt. organization will work in collaboration withe governments to help them.

5: An individual ministry should be established, like the youth and women division and ministry.

6: Government incentives to hold the tradition of joint families.

7: Create a strong network locally, nationally and internationally to make liaison to individuals and donor agencies and others to help the older people.

8: Arranging some small and easier economic activities for the comparatively healthier old homers. To sanction fund for them, NGOs may take the responsibility of imparting them proper training and salary.

9: The govt should take different initiatives so that the older people remain well

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Early Warning Dissemination System for Flood: Bangladesh Perspectives

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Abstract: The study has been conducted with the objective to assess the existing flood early warning dissemination system (FEWDS) in Bangladesh and to recommend some suitable improvements in the existing system based on review of literature, interaction with stakeholders of various organizations involved in flood forecasting & dissemination and also analysis of feedback from the flood affected people of the study area in Bangladesh. The existing flood forecasting & dissemination system has been studied to assess the present activities and future expectations. The recommendations for active participation by all related organizations have been made in this study. Study has been conducted by surveying the opinion of flood vulnerable communities of the selected area so that all elements of the FEWDS would provide as a useful flood warnings tools to all potential users.

At the grass-root level of Bangladesh, no effective flood early warning dissemination system has been developed. The Flood Forecasting and Warning Center (FFWC) of Bangladesh Water Development Board (BWDB) have been disseminating the flood early warning messages nationally since 1972. But, due to various reasons, people of the flood prone areas don't get these warning messages properly. Hence improving flood early warning dissemination system is very important to reduce flood risk & damages at the community level. With a view to improving the existing flood early warning dissemination at the community level, a scoping study has been conducted in the flood prone area within the Meghan river basin in Bangladesh. The study carried out the gaps of existing flood early warning dissemination and also recommended measures for the improvement of existing early warning dissemination system at the community level. This study was involving literature review, cross-sectional study, discussion with involved stakeholders, content analysis. The approach of the study was participatory. At the institutional and community level, the tools of qualitative methodology, such as Focus Group Discussion (FGD), Key Informants Interview (KII) etc. were adopted to conduct the study. The findings of the study have also been categorized into 'community findings' and 'institutional findings'. In community findings the community people were expressive to the need of timely early warning and risk information specific to their respective areas. In the institutional level, it has been realized that most of the members of the Upazila and Union Disaster management committees are not aware regarding the national source agency responsible to disseminate flood early warning message to the local disaster management committees.

Keywords: Communities; Flood context in Bangladesh; Flood prone areas & warning dissemination; Opinion of people & stakeholders; Improving existing warning dissemination system.

Introduction

Dissemination of flood forecasts to the affected end-users is an important link in any flood forecasting & warning dissemination system. The flood forecasts should be disseminated in a timely and in understandable manner. Moreover, the affected people, who are mostly uneducated, poor, and simple should believe the forecast should act appropriately. Behavioral aspects of the affected people also

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play an important role in the success of any Flood Early Warning Dissemination System (EFWDS). British Market Research Bureau (BMRB) carried out numbers of post-event and annual public response surveys in England and Wales, for effectiveness of early flood warnings.[1] That an appropriate response to warnings may depend on the information in the warning, the way it is disseminated, whether recipients trust the source of the warning and perceive the threat, environmental clues (e.g. observing heavy rain and floods), personal attitudes (including previous experience), and social networks. Their study was on for a greater understanding of the public's behavioral response to flood warning information and for effective and reliable ways of enhancing this response.[2] Despite several advances in the flood forecasting system in Bangladesh, the existing system often underperforms because the warning, dissemination, and response of the end-users are unsatisfactory.[3] The present study has been taken up with the objective to assess the existing Flood Forecasting and Warning Center (FEWDS) of Bangladesh and suggest suitable improvements in this system based on review of literature, interaction with officials of various organizations involved in flood forecasting & dissemination and also interaction with the flood-affected people. Bangladesh is a flood-prone country and extreme floods inundate more than half of the country's land mass almost every year. The country is in the lowest ridge of Hindu Kush Himalayan region, which makes the country hydrologically very diverse, complex, and unique. Economy, environment, ecology, livelihood and development are affected by devastating floods every year. Various structural measures such as flood embankments, channel improvements, river training works, coastal embankments and nonstructural measures such as floodplain zoning, flood forecasting and early warning systems have been adopted in the country to minimize the flood risk & Losses.[4]
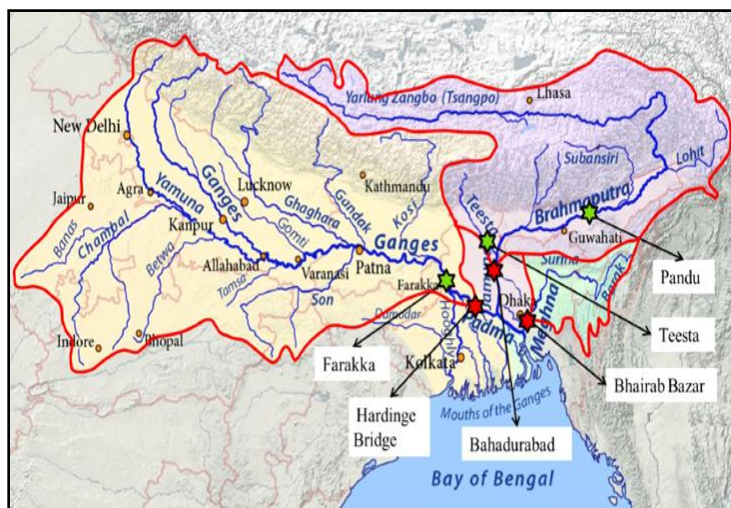
Figure 1: Ganges-Brahmaputra-Meghna Basin

Masood, BWDB, 2015

Bangladesh is a flat deltaic country located at the lower part of the basins of three large alluvial rivers, the Ganges, the Brahmaputra and the Meghna (fig. 1). It includes 57 trans-national rivers and a total river basins area of 1.7 million km^2. These features combined with high rainfall result in one-fifth to one-third of the country being flooded during monsoon.[5] Therefore, non-structural methods are gaining popularity in mitigating flood disaster and vulnerability to floods. One of the most important non-structural methods to prevent and reduce flood damages is to develop an effective Early Warning Dissemination System for the people at risk. Bangladesh has been working for promoting the effective early warning system since long.

Objective

To review on existing common strategies and practice of flood early warning dissemination system in community level.

To identify the gaps of existing flood warning dissemination process at community level.

To choke out the proper way of disseminating effective flood early warning messages to the community level.

Importance of the Study

The importance of having effective flood early warning systems is widely accepted as one of the component to manage disaster risk. The Hyogo Framework for Action (2010 – 2015) made early warning a Priority for Action and the post 2015 framework for Disaster Risk Reduction is expected to continue this focus "Continuing to further strengthen early warning systems and tailoring them to users' needs, including social and cultural requirements. A people centered early warning system comprises four key elements: knowledge of the risks; monitoring, analysis and forecasting of the hazards; communication or dissemination of alerts and warnings; and local capabilities to respond to the warnings received. Ultimately an early warning system will only be effective if all components are effective. Communication and dissemination component has been recognized as the component which lacks sufficient attention and results in a huge gap between the information produced by national level forecasting agencies and the information that is actually received and acted upon by the flood affected communities.

The main objective of flood early warning dissemination system is to provide information and warnings so that actions can be taken to protect lives and properties and reduce people's suffering and economic losses caused by the event that people are being warned about. Flood Early Warning Dissemination System aims at providing improved Flood forecasting and warning services to empower vulnerable people, at grass-roots level to cope more effectively with Flood disasters. Flood forecast and warning information needs to be provided to end users such as farmers, businessmen and other groups affected by Flood in a timely and understandable format so that they can take action to reduce the negative impacts of floods. The main hurdle is the format of flood warning messages and mode of dissemination. In Bangladesh there is no adequate forecasting and warning system for the natural hazards. It is mainly due to inadequate coordination and feedback, lack of leadership for disseminating meaningful flood warnings to communities and infrastructure manager, inadequate maintenance and upgrading of existing flood forecasting and warning system, limited coverage of the dissemination of warning messages, flood warnings not understandable by many potential end-users, lack of technical manpower and adequate resources. The technical language of flood warning messages is not fulfilling the need of flood affected people regarding their preparatory actions based on flood warning messages. Moreover, dissemination procedure took long time to reach the vulnerable community living in the flood prone areas. The present system of government-issued flood warnings is presented in both a context and a format that are poorly understood by the flood prone inhabitants and also mode of dissemination took long time to reach the affected community. A user friendly flood warning messages and timely dissemination mode can effectively reduce the loss and sufferings flood affected poor people. The effective and timely dissemination is also a challenging task in the flood prone areas of Bangladesh where the communication network is developing slowly and illiteracy is high. A major consequence of flood is the disruption of all forms of the communication network. With the above mentioned hindrances it always a question on people's perception regarding the message in forecasting and warning, and people response on the basis of warning, and issues regarding the sustainability which need to be addressed by the NGO's and concerned stakeholders.

Methodology

The methodology of this study is based on the survey of the opinion of the communities. For this purpose, an easily understandable questionnaire was prepared. A total of 43 questions were placed before the vulnerable communities to get the information regarding the early flood information system. The questionnaire was prepared in Bengali language. A total of 142 questionnaires were collected. These questionnaires were analyzed using Statistical Package for Social Science (SPSS) & Excel Software.

Study Area

A case study has been conducted in a flood-prone area of Bangladesh to determine whether or not the communities were aware of flood and receive early warning of floods. The objective was also to prepare local level authorities to disseminate the warning to the communities as well as to prepare the people for flood-fighting response. The flood vulnerable selected area was Daudkandi Uttar Union, Upazila: Daudkandi, Comilla. The location of the area is shown in *Figure-2*. The intervention area lies in the lap of Meghna Basin. The Char lands of Comilla district constitute some of the severe flood prone areas in Bangladesh. The people of this area are affected by different disasters like as floods, droughts, river erosion, flood etc. Flood is recurring phenomenon in this region of Bangladesh. Both severe and moderate floods affect inhabitants in this area. This district is surrounding by the river Meghna and Gumti. The mobility of these communities is very much restricted to foot and boats during floods. There are no hospitals, clinics, and secondary schools. There are very few primary schools and government services are almost nonexistent in these areas. The char inhabitants are under privileged, hardcore poor, marginal farmers, socially neglected and oppressed. With a view to understanding the flood risk and vulnerability as well as the grassroots level hindrances related to flood early warning prevailing at the community level, specific flood prone areas are selected. The area is Daudkandi Uttar Union under Daudkandi Upazila of Comilla. It is situated in the heart of the river Meghna *(Figure-1).* Other than the Meghna, river Gumti flows across the union. The area of this union is approximately 18.14 sq-km consisting of 11 mauzas and 14 villages. The Upazila has a number of chars (river shore). Almost all out of nine wards (sub-areas of union) are char lands. Approximately 19,852 people live in this union. Flood, riverbank erosion, drought, thunderstorm, heat wave etc. are the common hazard of this Char area. Because of these types of natural hazard, people are tormented by multifaceted difficulties in various aspects.[18]
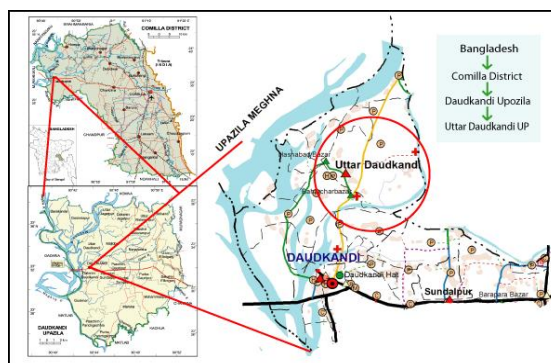
Figure 2: Flood Prone Area & Study Area (Daudkandi Uttar Union) in Daudkandi Upazila
Source: http://www.lged.gov.bd/ViewMap2.aspx?DistrictID=10

The people of North Daudkandi union possess a very poor socio-economic condition in face of multiple natural disasters almost every year. A significant portion of the crops grown by the farmers are washed away. Furthermore, maximum farmers depend on growing Boro rice, though the

productivity of Boro is very low. Other than Boro, people cultivate Amon rice, Aush rice, wheat, jute, onion, peanuts, potatoes, garlic, popcorn; lentil etc.

Literature Review

Flood Context of Bangladesh: In Bangladesh, floods are annual phenomena with the most severe occurring during the months of July and August. Country has experienced several highly damaging floods in the 20th century. Since independence in 1971, Bangladesh has experienced floods of a vast magnitude in 1974, 1987, 1988, 1998, and 2004. Impacts in terms of affected area, estimated economic loss (only direct losses from damage of crop, infrastructures like roads, railways, embankments, bridges etc.) and deaths of human beings during these severe floods. The largest recorded flood (both in terms of depth and duration of flooding) in Bangladesh occurred in 1998 when about 68% of the country was under water for several months. The floods of 1954; 1974; 1987, 1988, 1998, 2004 and 2007 were particularly catastrophic, resulting in large-scale destruction. *Figure 3 & Table 1* show some major floods and corresponding inundation in different years in Bangladesh. Each of these floods caused huge loss to the life and property including agricultural production, disruption of communication and livelihood system, injury, damage and destruction of mobile infrastructure, disruption to essential services, national economic loss, displacement and sufferings of human population and biodiversity.
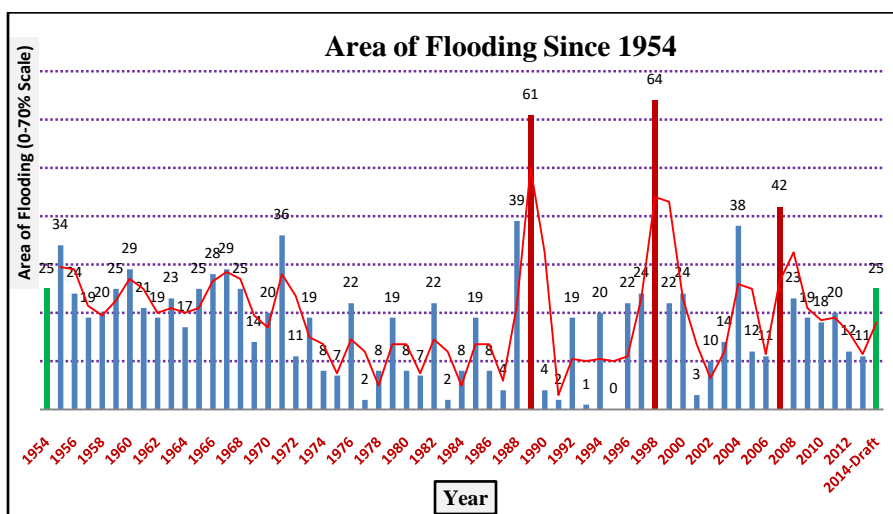
Figure 3: Historical Flood affected areas in Bangladesh
Source: Journal of Geosciene and Environment Protection, [file.scrip.org/html/9-217061_70921.html]

In Bangladesh, control of flood is nearly impossible. But the sufferings of flood can be reduced by increasing response capabilities of flood disaster measurement. While flood disaster management involves structural and nonstructural measures, this is due to resource constraints and lack of national capacity that the structural measures are not feasible for Bangladesh. Such measures are not even viable for the ecosystem. For, the floods do carry some benefits to the agriculture indeed. Therefore, considering the geographic location and socio-economic condition of the country, nonstructural mitigation measures are appropriate for flood disaster management. Flood early warning system, for example, is such an effective measure for flood risk reduction.

Table 1: Some Notable Floods induced Storm Surge [6]

Event	Impact
1974 flood	Moderately severe, over 2,000 deaths, affected 36% of the country, followed by famine with over 30,000 deaths.
1987 flood	Inundated over 57,000 sq-km area, estimated damage US$ 1.0 billion and human death 2055.
1988 flood	Inundated 61% of the country, persons affected 45 million, 2300 deaths, damage worth about US$ 1.2 billion.
1998 flood	Inundated 100,250 sq-km (68%) of the country, 1100 deaths, persons affected 31 million, damaged 500,000 homes, 23,500 km roads and 4500 km embankment, destroyed crops of 500,000 ha of land, damage worth about US$ 2.8 billion.
2004 flood	Inundated 38% of the country, 750 deaths, persons affected 36 million, damaged 58,000 km roads and 3,100 km embankment, crop damage 1.3 million ha, damage worth about US$ 2.2 billion.

Source: Basher (2006)

Disseminating media of FEWDS from Source to Households: The initiatives of the beginning of the century, specially the project 'People Oriented Flood Warning Dissemination Procedure' jointly implemented by FFWC and Bangladesh Disaster preparedness Centre (BDPC) with the assistance of Danish International Development Agency, adopted telephone and fax as important media for disseminating flood early warning from source to district and upazila level. Under the project, the village police and the members of Ansar VDP (Village Defense Party) were involved as messengers to convey early warning message from upazila to union and village level. However, after the emergence of cell phones, the projects which were implemented have been incorporating cell phones as an important communication medium in disseminating flood early warning. The project 'Community Flood Information System (CFIS)', jointly implemented by River Technology Institute (RTI), Center for Environmental and Geographic Information Services (CEGIS) and BDPC with the assistance of United States Agency for International Development (USAID), disseminated flood early warning from source to the community through cell phone text messages. The government of Bangladesh, in collaboration with Teletalk, experimentally disseminated flood early warning in Shirajganj district during the year 2007. [17]

Concept of Flood Early Warning Systems: Flood warning is the in-advanced information of floods, which may occur in the near future. Emergency activities are intended by warnings about potential dangers of onslaught floods. A warning of a flood event implies an existing threat of danger to life and property, and it invites responsive action to reduce threat.[9]

Early Flood Warning means immediate alert to the vulnerable people in advance about the danger about to happen after detection. Warning of forecasts must reach the users without any delay and with sufficient lead time to permit response actions to take place.[7] The progressive development of forecasting system cannot be a success without success of the dissemination phase of the warning process. In spite of that, due to different reasons, early flood warning dissemination receives less attention than desirable.[8] EFWS has four interrelated stages. The EFWS should include public awareness and understanding of the forecast and warning information system and its economic values. Under this system, selection of concerned organisations is important for effective dissemination. People's participation at the community level is essential in the response of early flood warning.

Community-based EFWS is an important method and is emphasized worldwide. Community-based early warning systems are 'people centered system and empower individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner so as to reduce the possibility of personal injury, loss of life, damage to property and environment, and loss of livelihood. It described that in the official EFWS, in most cases, for various reasons, warning does not reach everyone prior to flooding. Therefore, involvement of communities might be an important tool to establish a successful EFWS. The need for early warning system is recognized by the Govt. of Bangladesh and the same has also been included in the National Water Policy of Bangladesh.[10]

Existing early flood warning dissemination system in Bangladesh: Flood Forecasting and Warning Service (FFWS) of Bangladesh was established in 1972 as a permanent entity under Bangladesh Water Development Board (BWDB). Facing the devastating floods of 1987 and 1988, it was conceptualized that the integrated hydro-informatics- andgeo-informatics-based forecasts and warning dissemination system should be introduced. Amid the devastation of the 1998 flood, BWDB realised that the further improvement of the FFWS was needed, thence a new project entitled 'Consolidation and Strengthening of Flood Forecasting and Warning Services was implemented in cooperation with Danish International Development Agency, during 2000-2004. This project enhanced the capability of existing flood forecasting system of Flood Forecasting and Warning Centre (FFWC), but it was assessed that the dissemination of flood information to the end-users could be improved.[11] A study was made by the FFWC under CSFFWS to assess the response to its information by the people living in the flood-prone areas. The flood-affected people have indicated that they are receiving little information about flood onset through the existing warning dissemination media like TV, newspaper, and radio. The early flood warning dissemination to various government and non-government organizations (NGOs), media groups, and other concerned parties is being done through the FFWC. The FFWC of Bangladesh has the following limitations in the area of EFWDS:

> The lead time of 60 hour is not sufficient for disseminating the information to effect timely response of flood-prone communities because of the limited coordination between associated organizations. Early flood warning messages are prepared in technical   terms of 'Water Level with respect to Danger Level' which is disseminated to the national level and not for community level.[12]
>
> Response of the flood warning messages is not well coordinated by different levels of different organizations. The community of flood-prone areas is not aware of the flood forecasting and warning systems. The present flood warning system can be improved significantly by people's participation and feedback from the involved communities.[13]

Institutions involved in Flood Early Warning Dissemination System: BWDB, under Ministry of Water Resources, maintains FFWC which is the key entity for handling flood forecasts and warning system. Hydrology Directorate of BWDB and the Bangladesh Meteorological Department under Ministry of Defense are prime organisations which furnish hydrological and meteorological data, respectively for the forecasting models.[14] The Disaster Management Bureau (DMB) is an important organization for response and preparedness against the onset of floods under Ministry of Food and Disaster Management.[15] These are some research and development organizations working with floods and flood forecasting. FFWC disseminates the flood warning messages to the national level as well as local level through electronic media, newspapers, and their own websites. FFWC sends the warning message as bulletins to the highest authority of the government, that is, Office of President of the Republic, concerned ministries, DMB, some NGOs, concerned research institutes, and district administrations. Local government and local administration are not considered by FFWC.[16]

Analysis

Descriptive statistical analysis is brief descriptive frequency that summarizes a given data set, which can be either a representation of the entire or a sample of a population. Descriptive statistics are broken down into measures of central tendency and measures of variability (spread). Questionnaire base total responders are 142, survey has illustrated that the age of respondents varied from 18 to 65 years and calculate 100% data distribution system.

Table-2: Suggestions for Improving the Early Warning Dissemination System in the local level

Label	Frequency	Percent
Repeatedly Miking in the area at the eve of Disaster	29	20.42
Distribute Poster	6	4.23
Leaflets in the common gathering place	3	2.11
Provides training to Develop skill volunteers of different DMC	4	2.82
Conduct courtyard meeting with the women folk at the beginning of Disaster seasons on EWS	39	27.47
Prepare and Display Evacuation Plan in the common gathering places	2	1.40
Conduct Workshops/Awareness Programs involving community Leaders	51	35.92
Display/distribute list of emergency places for temporary Evacuation	2	1.40
Early Warning messages to be discussed to the students of educational institutes	6	4.23
Total	142	100.0

Source: Field Survey, 2017

The table-2 shows that 35.92% focused on conducting Workshops/Awareness Programs involving community Leaders, 27.47% Focused on conduct courtyard meeting on EWS with the women folk at the beginning of Disaster seasons, 20.42% of Focused on Repeatedly Miking in the area at the eve of Disaster for Improving the Early Warning Dissemination System in the local level, 4.23% Focused on distribute Poster, 2.11% Focused on Leaflets in the common gathering place, 2.82% focused on Provides training to develop skill volunteers of different DMC, 1.40% Focused on prepare and display evacuation Plan in the common gathering places, and 1.40% Focused on display/distribute list of emergency places for temporary Evacuation to Improving the Early Warning Dissemination System in the local level.
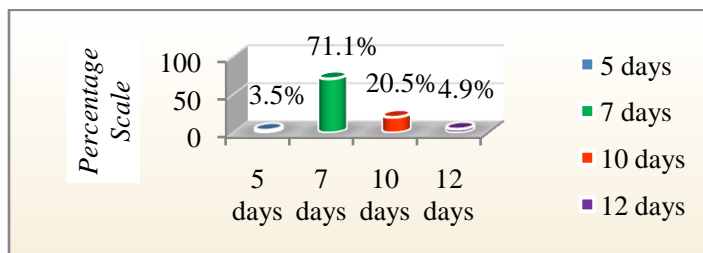
Figure 4: Suggestion about Lead Time for Preparation of Flood
Source: Field Survey, 2017

The Figure 4 graphics clustered cylinder data reveals that according to the Field level survey maximum 71.1% respondents said 7 days lead time for preparation of Flood, 20.5% respondents said 10 days lead time, 4.9% said 12 days lead time & 3.5% said 5 days lead time for preparation of flood.

Table-3: Suggestions for Improving the Early Warning Dissemination System in the local level

Label	Frequency	Percent
5 days	5	3.5
7 days	101	71.1
10 days	29	20.5
12 days	7	4.9
Total	142	100.0

Source: Field Survey, 2017

The table-3 exposed that maximum 71.1% respondents said 7 days lead time for preparation of Flood, 20.5% respondents said 10 days lead time, 4.9% said 12 days lead time & 3.5% said 5 days lead time for preparation of flood.
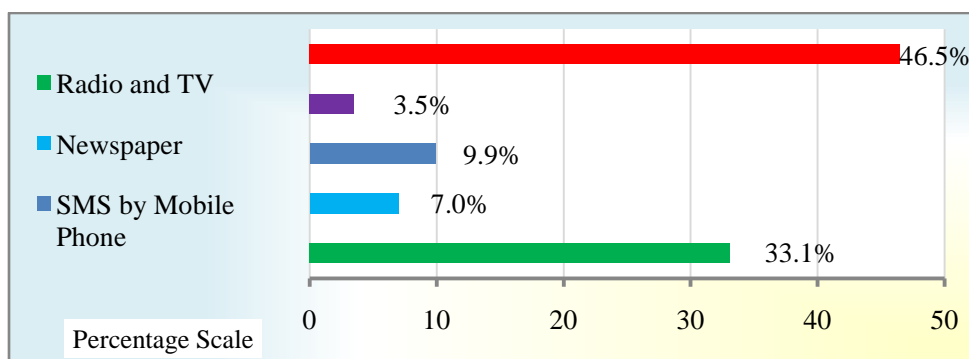
Figure 5: Early Flood Warning will be useful to you if it is disseminated through
Source: Field Survey, 2017

Figure 5 clustered bar data reveals the respondents have been asked regarding the preferred Medias for disseminating the messages to review their level of preference to the Medias available within the area. It is opined from the survey that, maximum 46.5% respondents preferred to local method for early warning dissemination, 33.1% of the total respondents opined to the TV/Radio, 9.9% SMS through mobile phone, 7.0% to the newspaper & 3.5% to the voice mail through mobile phone.
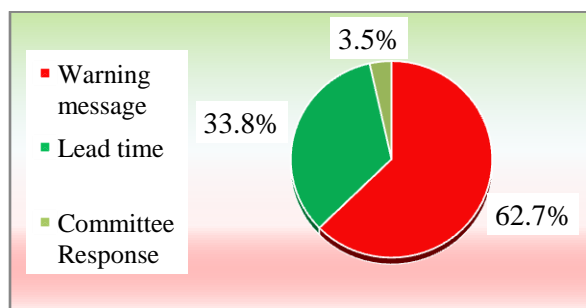
Figure 6: Focus or need improvements according to your observation
Source: Field Survey, 2017

Figure 6 reveal that survey revealed that 62.7% of total respondents opined to focus on warning message, 33.8% opined on lead time and 3.5% opined on committee response to improve EWS.

Discussion

Key Informants Interview (KII): The KII revealed that the content of message of EWS is not proper understandable to the people. The head masters of School opinioned that the message for EWS is not understandable but the PIO, Chairman of U/P and Executive Engineer of FFWC said understandable. The KII revealed that the best way of EWS dissemination for the mass people is to involve the Imam of Mosque, School Teachers. The major suggestion for effective early warning dissemination system are to make effective volunteer groups & effective Union Disaster Management Committee (UDMC) and Upazila Disaster Management committee (UzDMC) and District Disaster Management committee (DDMC) make awareness among the women about early warning system, engage women in EWS, repeatedly Miking in the area at eve of the disasters, conduct workshops, awareness programs with the people about early warning system. There were also some gaps/barriers in improving effective EWS found from KII. They said the EW message is disseminated through Television/Radio, Newspaper but these media are not available in rural areas. There is no local media of dissemination of early warning system, there are no effective volunteer groups in rural area though the government suggested to make volunteer group in disaster prone area, women are the half part of the society but they don't know about early warning system. They are not engaged in EWS for flood management, the UDMC, UzDMC & DDMC are in written statement but not in action.

Focus Group Discussion (FGD): Two guided Focus Group Discussion (FGD) were conducted with the people of Baherchar & Bhazra village under Daudkandi Uttar Union, Daudkandi, Comilla following the pre-developed FGD format as attached in the Appendix-C. One FGD was conducted with the respondents from Baherchar village, held in Daudkandi Uttar Union parishad and another FGD was conducted with the respondents from Bhazra village, held in Bazra Govt. Primary School under Daudkandi Uttar Union. Both the groups were included 10 to 12 members respectively & were selected randomly with their consent irrespective of gender and others demographic profile with all categories and occupations. It has been revealed from the discussion that the most devastating floods were occurred in this area in 1988, 1991 & 1998 and most damaged experienced was agricultural sector with household and communication sectors. Some extended damages were also occurred in fisheries sector. The farmers, day labors, fisheries etc. of those areas face the most difficulties during flood times. It is realized from the discussion that the survey areas are low laying and flood porn area. The people of those areas are not aware of existing Early warning System (EWS). They usually get massage from Flood Forecasting and Warning Centre, BWDB through Radio and Television. There is no local method for EWS. The UDMC and UzDMC have no effective roles regarding dissemination of EWS. Besides these, there are no activities of village volunteer groups. Though every Union has a committee for disaster management named as Union Disaster Management Committee (UDMC) but mass people are unaware of the activities of the committees as their engagement is very low regarding flood awareness. They are also unaware of contingency fund. Though some people got relief during the last devastating flood but most of them did not get it. There is school cum flood shelter in the village of Bhazra for temporary evacuation during flood time. But it's not enough for so many people of this area. On the other hand there is no flood shelter in Baherchar . So the people of that area take shelter on the top of their house, roads, adjacent schools and open high spaces. It has been pointed out from the discussion that there should be improvement in EWS, so that people can move to shelter, save household assets, grow awareness among themselves & increase flood lead time at least 7 days for their preparedness.

The suggestive measures are to include village school/Madrasha teachers & Imam of local mosques in EWS. Because the teachers can disseminate the latest update of flood through the students and Imam of village mosques can announce the massage through the mega media like frequent Miking, Siren & holding meeting with local people and discuss about flood to make awareness.

Findings

The Field level survey was conducted to improve Early Warning Dissemination system through Flood resilient community. The findings of the community discussions are as follows:

Need of Flood Early Warning Dissemination for community people: First and foremost, the community people were expressive to the need of timely early warning and risk information specific to their respective areas. About 70% of the community is not much aware regarding the signal systems of disaster, especially on the flood and accordingly awareness programs should be undertaken on different signals on Early Warning System (EWS) among the community. People primarily want to know when the flood would come, what would be the duration of the flood, what would be the level of flood water, and other related information.

Existence of Flood Early Warning Message: Usually the warning messages are disseminated through Radio, Television & News Paper. But due to Poverty and illiteracy, local people do not have access to media, such as News Papers and mass media.

Understanding of the Early Warning Message at Local Level: The inhabitants of the study intervention areas tend to interpret the increase or decrease of water level differently in their locally adopted ways.

Warning Dissemination Authority and Agents: According to the respondents, people do not have clear idea regarding the authority responsible for disseminating flood early warning message at the community level. There are no trained volunteer groups in the study intervention areas to disseminate the message of flood warning at the family and community level.

Initiatives for improving EWS through community: The community involvement is very important in EWS especially women engagements in EWS help us to Flood mitigation.

Receiving Early Warning Message: Most of the respondents pointed out UNO, PIO, Upazila and Union Parishad Chairman as local authority, institutionally they receive flood early warning message from their higher authority. The PIO of Daudkandi Upzila pointed out that he received e-mail, telephone & emergency official letter related to flood warning during flood season.

Sharing of flood early warning message: According to the instruction of SOD, at the national level, each Government Department will have to communicate flood early warning message to their respective Upazila and Union office for institutional preparedness and response.

Guidelines & Institutions: The institutional response pointed out that as compared to the guideline and instructions for cyclone preparedness in the SOD, there is no clear guideline and instructions for flood early warning as when to call for emergency meetings, when to warn the local people and when to ask them to go for shelter.

Capacity of the DMC's: Most of the members of the disaster management committee's do not have adequate knowledge and skills in disseminating flood early warning message at community level through a community friendly manner.

Recommendations

The existing lead time should be increased from 5 days to 7 days.

Local religious leaders (Imam of Mosque), teachers of educational institutions, members of the Union Parishad, field level officials of the govt. and non-govt. departments and youth volunteers should be involved in the dissemination process as local disseminating agents.

The microphone of the mosques, handmade megaphone, drum; tin sheet biting, warning flag hoisting etc. can be utilized as local accessible communication tools to disseminate flood early warning message at the family and community level.

Training, workshop etc. programs should be initiated to enhance the capacity of the parsons involved in the flood warning dissemination process as Volunteer Groups.

Series of awareness raising sessions should be conducted at family especially with women to raise awareness on flood early warning message.

The local Union council should play a vital role in flood early warning dissemination as local responsible authority.

Local flood danger level should be identified in consultation with the community as an understandable manner for mass people.

Department of Disaster Management (DDM & Flood Forecasting and Warning Center (FFWC) of BWDB should play vital role in disseminating flood early warning message to the local Disaster Management Committees (DMCs) as national disseminating authority.

Multi communication tools such as telephone, cell phone, SMS etc. should be used in disseminating flood early warning message to local Disaster Management Committees (DMCs) especially Union Disaster Management Committee (UDMC).

Union information center should be integrated with the warning dissemination process for ensuring rapid dissemination of flood early warning messages from source to local level.

Numbers of awareness raising programs should be conducted regarding the measures in responding to flood early warning message.

Contingency plan and fund should be prepared for the DMCs so that in emergency situation, the flood early warning message can be disseminated to the community people in time.

Conclusion

Effectiveness and sustainability of the flood early warning dissemination system is a mammoth task, which is large embedded to the active participation of the national and local level responsible agencies. Still, it is felt from the study that existing dissemination system is sustainable and replicable. To ensure that, one of the major tasks of the study would be to bridge a strong sense of commitment through advocacy with the national and local level responsible agents to improve the FEWDS. In addition, the capacity of the local level dissemination authority (i.e. UDMC, UzDMC, DDMC, volunteers) must be enhanced, mass awareness should be raised at the family especially Women and community level on what measures to take on what stages for preparedness and reduce loss of damage. If we take appropriate measures with effective participation combining agencies and co

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Specific macroeconomic Factors and Profitability: A Study on Islamic Banks of Bangladesh

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Abstract: Banking sector in Bangladesh has been highly dominated by Islamic banks since last 20 years. Even the conventional banks have started separate Islamic banking window. This article is an effort to analyze the effect of three macroeconomic factors (GDP growth rate, Inflation, Exchange rate) on Islamic banks profitability in Bangladesh. Panel data of 10 years(2008-2017) have been analyzed to answer the question; do macroeconomic factors have an effect on profitability? In the study Mean, Standard deviation, skewness, kurtusis, R-square, Correlation and regression analysis have been employed. The erudition found a positive effect of change in inflation and negative effect of change in GDP growth rate and exchange rate with the dependent variable ROA.

Key Words: Macroeconomic Factors, Profitability

Introduction

Financial system of Bangladesh has largely been influenced by banking sector. Commercial banks are the major market shareholders in the total financial system. Customers of Islamic banks are different because they don't expect a fixed interest from their savings. Thus a study with Islamic banks is supposed to provide a different result from the conventional one. Further Islamic banks are in the core of concentration of the financial policymakers from the last decade. Some Islamic banks faced hostile takeover during the study period. Beside some suffered from risk of takeover. Constraints lead us to confine the study in selected variables.

While talking about profitability first focus should be put on internal factors such as spending and interest income. Beside these factors there are some macroeconomic variables that also have contribution in designing the profit destination for banks. Real GDP growth rate, Inflation and Exchange rate are on focus in this study. Global uncertainty affects local markets in several ways. The purpose of the study is to analyze the effect of some specific macroeconomic factors on profitability of Islamic banks of Bangladesh. There are eight Islamic banks in operation at present. The study covers all of those bank's profitability data for a period of 2008-2017.

Literature Review

The paper of Beckman(2007) assessedthe effect of macroeconomic variables including real GDP growth rate, volatility in interest rates, and bank specific variables on ROA. Banking system concentration and financial structure indicators were also included in that particular study. The researcher used correlation and regression analysis to reach at a conclusion. They found a positive effect of GDP growth rate and a negative effect of interest rates on banks profitability. [1]

The relationship between macroeconomic variables and profitability has further been studied by Albertazzi and Gambacorta (2009). The researchers found a significant positive relationship between Real GDP growth and Return on Assets evidencing increase in bank's net interest income as a major contributor to ROA. [2]

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Another paper identifying internal and macroeconomic determinants of profitability is of Sufian and Kamruddin(2012). The researchers used a sample of 31 Private commercial Banks of Bangladesh for 10 years. The study found a positive effect of Inflation and a GDP growth on Banks profitability. [3]

A study on effect of macroeconomic factors on profitability conducted by Evans (2014) found that Real GDP, Inflation and Exchange rate have too little effect on bank profitability in Kenya. The author emphasized on banks internal policy making to be vital in determining the profitability. [4]

Another empirical paper published by Ricardo, Joao and Vitor(2017) based on European Banking industry with particular focus on Macroeconomic factors and profitability has found positive correlation between real GDP and profitability. The researchers further concluded that reference rate and perpendicular yield curves can benefit Banks.[5]

An elaborate paperwork conducted by Demirguc and Huizinga(1999) on internal, macro and some legal factors influence on profitability of Banks found positive association between interest rate and profitability. The study was conducted on German banks.[6]

Khrawish, Siam andKhwish (2011) conducted an analysis on Determinants of Islamic Bank Profitability: Evidence from Jordan. The analysis revealed that there are significant and positive relationship between Return on Assets (ROA) and Provision for Credit Facilities + Interest in Suspense / Credit Facilities (PRFCFI/CF), Total Equity / Total Assets (TE/TA) and Total Income / Total Assets (TI/TA) of the Islamic Banking, and there are significant and negative relationship between ROA and the Bank size (Log TA), Total Liabilities / Total Assets (TL/TA), Annual Growth Rate for Gross Domestic Product (GDPGR), Inflation Rate (INF) and ERS of the Islamic Banking. [7]

From several literature reviews it has been proven that results differ from study to study due to the difference in economic region as well as market share of that sample banking industry.

Research Gap: Although most of the research found significant positive association between macroeconomic factors and profitability, but there is no work particularly based on Islamic banks of Bangladesh.

Data collection and Methodology

The paper is coined with secondary data. Profitability data has been collected from the annual report of eight Islamic banks in Bangladesh. Exchange rate, GDP growth rate and Inflation data is collected from World Bank website and Bangladesh economic survey. Panel data of last 10 years i.e. 2008-2017 have been collected and macroeconomic data has been collected for the same period.

To develop a standard linear model to test whether there is a cause and effect relationship between specific macroeconomic factors and profitability at first let the variables be conceptualized. Independent variables are Real GDP, Inflation and Exchange Rate. The dependant variable bank profitability is delegated by Return on Asset. The progressive linear model is thus formulated as:

$$Y_{it} = \alpha Y_{it-1} + {}_+\beta_i X_{it} + \eta_i + \varepsilon_{it}$$

In the above equation

Y_{it}= thedependant variable that is profitability proxied by ROA, α= Portfolio specific sensitivity to risk factor

$\beta_{i\ =}$ Stand alone sensitivity to risk factor

X_{it}= the vector of covariates subsumes macroeconomic variables

η_i= Heterogeneity term

$\varepsilon_{it=}$Error term

At first a gross trend analysis is conducted on the dependent and independent variables to identify the movement of those variables over time. Later regression, correlation and other tests will be done on the collected samples from secondary source. The researcher has used ROA as dependent variable and GDP growth rate, Inflation and Exchange rate as independent variables.

Dependent Variable
ROA

Return on Assets (ROA) is an indicator of how efficiently a company utilizes its total assets. It gives potential stakeholders meaningful insights on how well the company is performing in terms of profit. Numerous studies have been conducted to prove that ROA is the best measure of profitability. Financial analysts and policymakers use ROA widely as a proxy to profitability of a firm. ROA gives best result while comparing among companies as well as comparing data of same institution over years. Due to its wide acceptability the researcher also has used ROA as a representative of Profitability in the study. Thus it is the only dependant variable in this paper. Researchers have also used Net Interest Income, Return on equity, and Net non Interest Income as dependant variable in this type of studies.

Independent variables
GDP Growth rate

Among the macroeconomic factors GDP is recognized as most used indicator of economic activity within a country. It has a direct linkage with supply and demand for loans in financial sector of a country. Other things being held constant GDP has a positive influence on bank profitability. Thus in this article GDP is considered as an influencing variable for analysis. The study covers real GDP growth rate of 2008-2017 for the purpose of analysis.

Inflation

Inflation is another element of importance in macroeconomic factor analysis. If in an economy inflation raises interest rate charged by the financial intermediaries also rises. As a result Interest income by them also increases. The consequence of a change in inflation depends on its nature. If there is a signal before the change occurs interestrates are adjusted accordingly and it leaves a positive impact on profitability of banks. But the reverse case that is an unpredicted inflation may increase non performing loan. But researchers found varying results on the interrelationship between inflation and profitability across different jurisdictions.

Exchange rate

Financial intermediaries are the one with most exposure to exchange rate risk. Commercial banks are not an exception. There is direct and indirect upshot of exchange rate on bank profitability. The direct upshot can easily be understood and addressed. But the toughest is the indirect effect. A change in exchange rate has impact on banks clients as well as on the whole economy. So it is quite uncertain from which direction the stone will be hit. To cope with such aggregate exchange rate risk banks must device appropriate strategy. Thus this is another macroeconomic factor relevant to bank profitability.

Analysis and Findings

As the paper aims at analyzing the effect of specific macroeconomic factors on profitability of Islamic Banks of Bangladesh, the null hypothesis is thus set as below:

$H_{0=}$ Macroeconomic factors have no effect on profitability of Islamic banks of Bangladesh.

$H_{A=}$ Macroeconomic factors have effect on profitability of Islamic banks of Bangladesh.

To decide over the topic a general graphical analysis is done at first.

Figure 1 elaborates the trend of ROA for the banks concerned for 10 years. A relatively stable return growth can be observed from the trend lines. Union bank is an exception as a new member in the market.
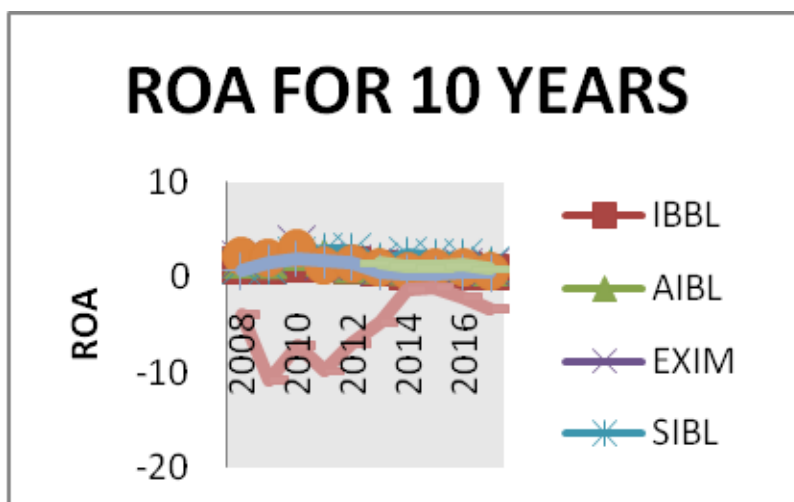
Figure-1: Movement of ROA of Islamic Banks for year 2008-2017.
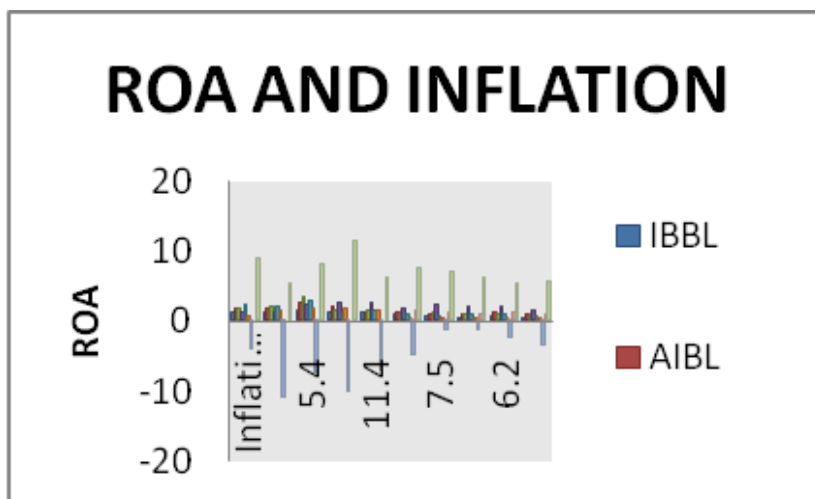
Figure-2: Movement of ROA and Inflation of Islamic Banks for year 2008-2017

From the above figure it can be conferred that with an increase in inflation ROA of banks are also increasing and vice-versa. As all banks have a risk management team which aims at minimizing any possible risk factor for the banks they are very much alert about inflation. And their hard work pays with a benefit from predicted inflation. Although it seems that ICB is having trouble with the change in inflation there are some internal factors too which is a catalyst in this outcome.
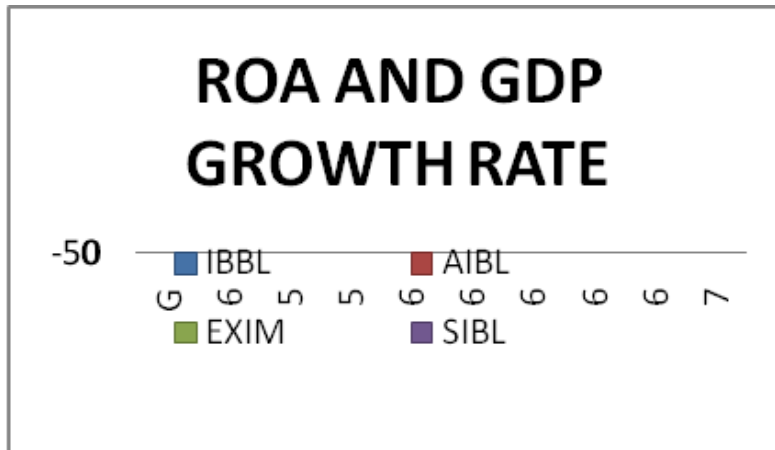
Figure-3: Movement of ROA and GDP Growth Rate of Islamic Banks for year 2008-2017.

Graphs in figure 3 show ROA of different banks with changes in GDP growth rate. The researcher found that there is negative relation between ROA and GDP growth rate. There are some issues to consider here. Impairment of ROA can be out of many reasons. As this is a linear model and correlation between these two factors may be more complex in reality.

Correlation and regression analysis have been done to reach at a concrete decision about the cause and effect relation between the variables considered. Summary of descriptive statistics found are shown in the table below:

Summary Statistics

Variables	Mean	Standard Deviation	Skewness	Kurtusis	Pearson Correlation	R-square	Standard error	N
Y	.1523	.49251	-.281	.327				80
X1	1.945	.22930	.780	-.315	0.253			80
X2	1.829	.10457	-.399	-.352	-0.334	0.153	0.05	80
X3	4.315	.07947	-.775	-.683	-0.412			80

Source: Annual reports of concern banks[8] and World Bank data[9]

In the above table variables are defined as

Y= ROA

X_1= Inflation

X_2= GDP growth rate

X_3= Exchange rate

From the results it has been found that mean results for all the variables are positive and stable. Mean ROA of all Islamic banks in Bangladesh are positive accompanied by a high standard deviation. Only Inflation is right skewed and the rest are skewed to the left. The results mean probability distribution of Inflation leans to right and ROA, GDP growth rate and Exchange rate to left side of the mean of the corresponding variables. Distribution of all as the variables isplatykurtic as the results of kurtosis are

less than 3. This means that the distribution is uniform and will not produce any outlier. But it is also true that the distribution is not flat-topped as reported often.

Further the outcome of the Pearson correlation shows that there is a positive correlation between ROA and Inflation and negative correlation with GDP growth rate and exchange rate. From the literature review part it has been observed that most of the studies found a positive correlation between GDP growth rate and ROA. But the case is different here in Islamic banks of Bangladesh. Islamic banks are actually facing hostile takeover here. So there are some other variables which are causing ROA to decline even there is an increase in GDP growth. Further the country's digital efforts to predict inflation caused the inflation rate risk to put a positive effect on ROA of the banks concerned. Moreover the value of r square is lower. This generally means that the model explains few of the variability of the response data around the mean. Inference drawn from the regression analysis is shown in a histogram and a linear diagram below (Figure 4):
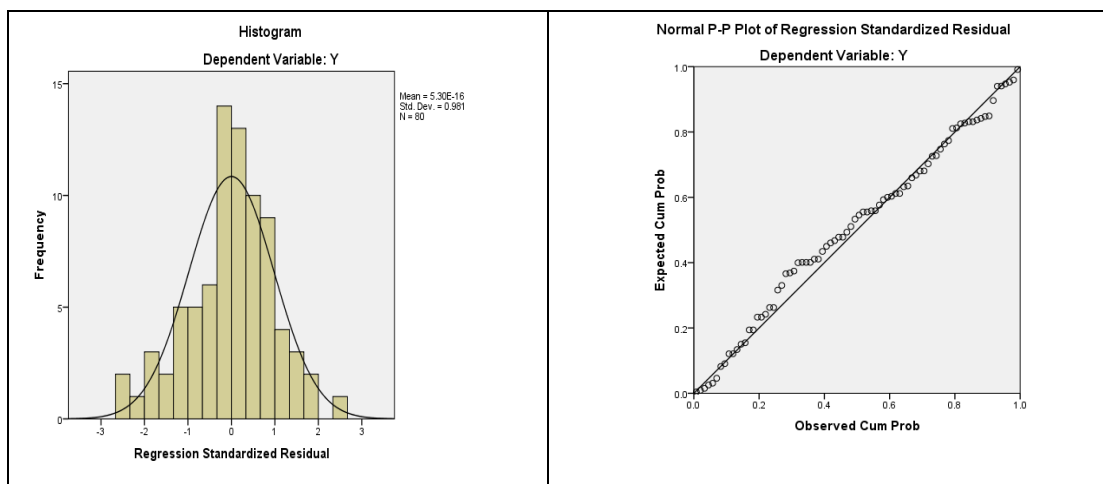
Figure-4: Results from regression analysis.

From the above analysis it can be concluded that the alternate hypothesis is accepted.

Conclusion and Recommendation

This study covers panel data of profitability and some macroeconomic factors for a period of 10 years. It aims at exploring whether there is any effect of macroeconomic variables on profitability of Islamic banks in Bangladesh. A simple graphical analysis is done at first to observe the pattern of the data set. Further correlation and regression analysis has been conducted to reach at a conclusion. The study found a positive association between ROA and Inflation and a negative association between ROA and GDP growth and Exchange rate.

It has been further observed that these macroeconomic factors illustrate a large snatch of ROA of sample banks. Untoward economic condition and shifts in different variables explains drops in ROA. The mass fall in ROA in the year 2013 is addressed by overall worsening of inflation, GDP growth rate and exchange rate. The adverse effect of political and world economic condition may also have been making the situation worse.

Further research could be done affixing other macroeconomic variables such as interest rate, money market rate, country risk premium etc.

Data demur (small N) administered the researcher to focus on a narrow number of regressors. Thus the model explains only the heterogeneity of the outpouring to three non diversifiable risks for the banks.

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A Comparative Study of CLOSET and CHARM for Improving Mining Frequent Closed Itemsets

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Abstract: Frequent item set mining has been well recognized to be fundamental to many important data mining tasks, such as associations, correlations, sequences, episodes, classifiers and clusters. Recently, the increasing prominence of data streams has led to the study of online mining of frequent item sets, which is an important technique that is essential to a wide range of emerging applications such as web log and click-stream mining, network traffic analysis, trend analysis and fraud detection in telecommunications data, e-business and stock market analysis and sensor networks. *CLOSET and CHARM* are two of most popular algorithms to work with frequent closed itemsets. But they have a difference in performing on different types and quantities of data sets. This paper is focused on the performance measurement of these two popular algorithms to mining different types and quantities of data sets. This paper has given the reader a view of graphical representation of performance level of *CLOSET*& *CHARM* algorithm based large data itemsets so that the user can choose the algorithm easily for the application it will be used by the user.

Keywords: Frequently closed itemsets, *CLOSET*, *CHARM*, Data mining.

Introduction

Mining frequent itemset is one of the most important concepts in data mining. It is fundamental problem in many data mining application such as the discovery of association rules, strong rules, correlations, multi-dimensional patterns etc. Frequent pattern often produces a very large number of frequent itemsets and rules which reduces efficiency and effectiveness of mining. There is an interesting alternative, proposed recently by Pasquier et al. , instead of mining the complete set of frequent itemsets and their associations, association mining only needs to find frequently closed itemsets and their corresponding rules [1] .

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Therefore, it is important to mine frequently closed itemsets. There are many algorithms to mine frequently closed itemset. Pasquier et al. proposed an algorithm for mining frequently closed itemsets which is known as *A-close* based on Apropi mining algorithm[2], Pei et al. proposed an algorithm which is called *CLOSET*[3,] Zaki and Hsiao proposed another algorithm *CHARM*[4] , which improve mining efficiency by exploring an item based data structure. In this paper, we have considered *CLOSET* algorithm and *CHARM* algorithm for comparative analyzing and we have gotten comparative result based on different types of parameters.

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CLOSET

CLOSET is based on FP-growth and is just an extension method of that algorithm it is easier for us to implement the algorithm. As we already discussed on FP-growth in details in our background study and all the procedure is just same as in there like as FP-tree construction, CPB generation and from that again tree construction recursively and doing this at last we get the closed frequent itemsets we here just show the algorithm and method of CLOSET. The search for closed itemsets can be improved further by a few optimization techniques as shown below.

Optimization 1 : Compress transactional and conditional databases using an FP-tree structure.

An FP-tree is a prefix tree structures, representing compressed but complete frequent itemset information for a database. Its construction is simple and we already discussed about that in our previous section. The transactions with the same prefix share the portion of a path from a path from the root. Similarly, conditional FP-trees can be constructed for conditional databases. We refer readers to read our precious section for details about FP-tree and the related techniques. There are the following benefits for using FP-tree in the closed itemsets computation.

> FP-tree compresses databases for frequent itemset mining.

> Conditional databases can be derived from FP-tree efficiently.

Optimization 2 : Extracting items appearing in every transaction of conditional database.

If there exists a set of items *Y* appearing in every transaction of the *X*-conditional database, *X U Y* forms a frequent closed itemset if it is not a proper subset of some frequent closed itemset with the same support.

Optimization 3 : Directly extract frequent closed itemsets from FP-tree.

If there exist a single prefix path in an FP-tree, some frequent closed itemsets can be extracted directly from the conditional database.

Optimization 4 : Prune search branches.

Let X and Y be two frequent itemsets with the same support. If

X $\subseteq$ Y, and Y is a closed itemset, then there is no need to search the X-conditional database because there is no hope to generate frequent closed itemset from there.

Algorithm:

Input: Transaction database *TDB* and support threshold *min_sup*;

Output: The complete set of frequent closed item-sets;

Method:

1. Initialization : Let *FCI* be the set of frequent closed itemset
   Initialize *FCI* ← Ø;
2. Find frequent items. Scan transaction database *TDB*, compute
   frequent item list f_list;
3. Mine frequent closed item sets recursively. Call CLOSET
   (Ø,*TDB*,f_list,*FCI*);

Subroutine CLOSET(X,*TDB*,f_list,*FCI*)

Parameters:

X : the frequent itemset if *DB* is an X-conditional database, or Ø if *DB* is *TDB*;
DB : transaction database of conditional database;
f_list : frequent item list of *DB*;
FCI : The set of frequent closed item sets already found

Method:

1. Let Y be the set of items in f_list such that they appear in every transaction of *DB*, insert X U Y to *FCI* if it is not a proper subset of some itemset in *FCI* with the same support.
2. Build FP-tree for *DB*, items already be extracted should be excluded.
3. Applying Optimization 3 to extract frequent closed itemsets if it is possible
4. From conditional database for every remaining item in f_list, at the same time, compute local frequent item lists for these conditional databases;
5. For each remaining item I in f_list, starting from the last one, call CLOSET(iX,$DB|_i$,f_list$_i$,*FCI*) if iX is not a subset of any frequent closed itemset already found with the same support count, where DB_i is the i-conditional database with respect to DB and f_list$_i$ is the corresponding frequent item list. // *Applying Optimization 4*

CHARM

CHARM An efficient algorithm for enumerating the set of all frequent closed itemsets. There are a number of innovative ideas employed in the development of CHARM; these include:

1. CHARM simultaneously explores both the itemset space and transaction space over a novel *IT-tree* (itemset-tideset tree) search space. In contrast most previous method exploit only the itemset search space.

2. CHARM uses a highly efficient hybrid search method that skips many levels of the IT-tree to quickly identify the frequent closed itemsets, instead of having to enumerate many possible subsets.

3. It uses a fast hash-based approach to eliminate non closed itemsets during subsumption checking. CHARM also utilizes a novel vertical data representation called *diffset*[4] for fast frequency computations. Diffsets keep track of differences in the tids of a candidate pattern from its prefix pattern. Diffsets drastically cut down the size of memory required to store intermediate results.

Algorithm:

CHARM (*D*, *min_sup*):

1.$[P] = \{X_i \times t(X_i) : X_i \in I \wedge \sigma(X_i) \geq min\_sup\}$
          2.CHARM-EXTEND ([*P*], *C* = ∅)
          3.return*C*   //all closed sets

CHARM-EXTEND ([*P*], *C*) :

4.**for each** $X_i \times t(X_i)$ in [*P*]
5.$[P_i]= ∅$ and $\mathbf{X} = X_i$

6. for each $X_i \times t(X_i)$ in $[P]$,with $X_i \geq_f X_i$

7. $\mathbf{X} = \mathbf{X} \cup X_j$ and $\mathbf{Y} = t(X_i) \cap t(X_j)$

8. CHARM-PROPERTY ($[P]$,$[Pi]$)

9. **if**($[P_i] = \emptyset$) **then** CHARM- EXTEND ($[P_i]$, C)

10. delete $[P_i]$

11. $C = C \cup \mathbf{X}$ //if $\mathbf{X}$ is not subsumed

CHARM-Property ($[P]$,$[P_i]$):

12. **if**($\sigma(X) \geq min\_sup$) **then**

13. **if** $t(Xi) = t(X_j)$ **then** //Property1

14. Remove X_j from $[P]$

15. Replace all X_i with X

16. **else if** $t(X_i) \subset t(X_j)$ **then** //Property2

17. Replace all X_i with $\mathbf{X}$

18. **else if** $t(X_i) \supset t(Xj)$ **then** //Property3

19. Remove X_j from $[P]$

20. Add $\mathbf{X} \times \mathbf{Y}$ to $[P_i]$//use ordering f

21. **else if** $t(X_i) = t(X_j)$ **then** //Property4

22. Add $\mathbf{X} \times \mathbf{Y}$ to $[P_i]$//use ordering f

Comparison of CHARM and CLOSET

The scalabilities of CHARM and CLOSET are tested using various datasets, CLOSET outperforms CHARM.

As shown in Figure 1, in sparse dataset I20T25100K. a majority of frequent itemsets are closed itemsets. The advantage of CLOSET over A-close is basically the same as that of FP-growth over Apriori. In this dataset CHARM also wins Apriori. Since the support threshold is low and the transaction identification (*tid)* sets for frequent itemsets are relatively small. CHARM is efficient. Bui it is slower than CLOSET.
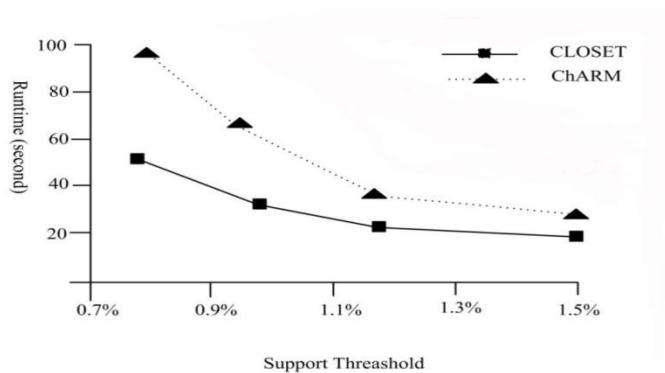
Fig. 1: Scalability with support threshold on sparse dataset T25I20D100K

The advantage of CLOSET becomes significant on dense datasets. The results on dataset ***Connect-4*** is shown in Figure 2. Please note that the runtime in this figure is in logarithmic scale. For example, CLOSET uses only 1690 seconds to find out the complete set of 130,101 frequent closed itemsets, when the support threshold is set lo 33779 (50%).
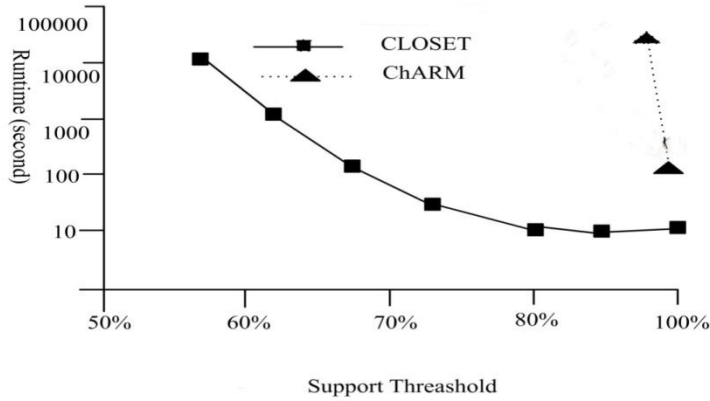

Fig. 2: Scalability with support threshold on dense dataset *Connect-4*

Pumsb is a challenging dataset. The results over this dataset are shown in Figure 3. CLOSET needs only less than 100 seconds to find out that for support threshold 80%.
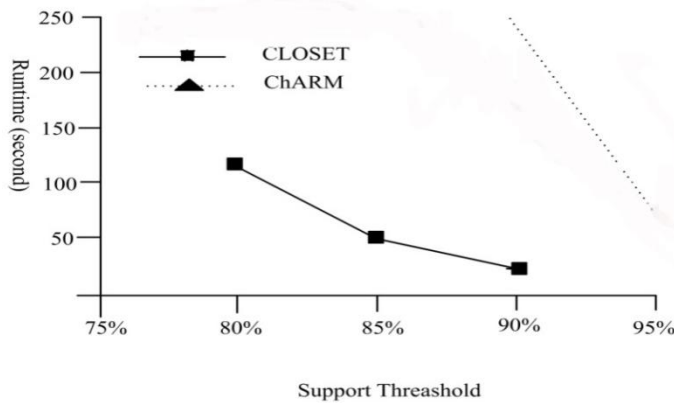
Fig. 3: Scalability with support threshold on dense dataset *pumsb*

In order to test the scalability of CLOSET, we generate the synthetic datasets with size in 2 to 10 times, and replicate the transactions of real datasets 2 to 10 times. We keep the support threshold constant in percentage. The results are shown in Figure 4. The figure shows that CLOSET is scalable with the increase of the number of transactions. It is interesting to see that the runtime of CLOSET over real datasets increases much slower than the sizes of real datasets do. That is because CLOSET scans the transaction databases only twice. After that, the mining is confined to the FP-tree. No matter how many times the datasets are replicated, the FP-tree remains in the same shape With respect to the constant support threshold in percentage.
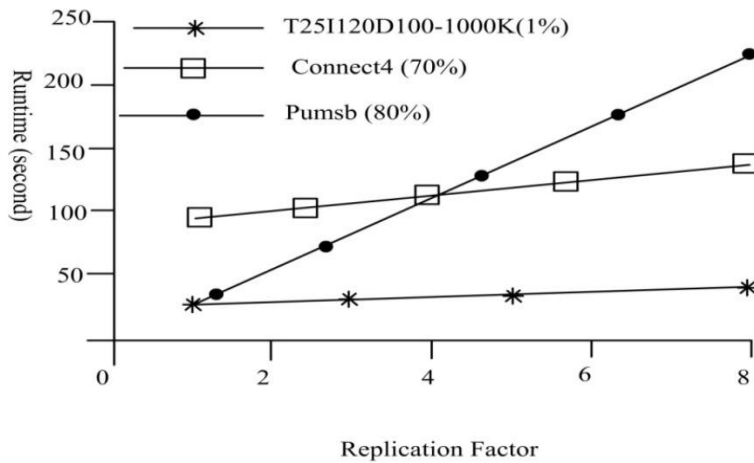
Fig. 4: Size scaleup on datasets.

Conclusion

From our analysis we found that *CLOSET* is efficient and scalable in mining frequent closed itemsets in large databases. It is much faster than *CHARM*. Therefore, it is better to use *CLOSET* than CHARM to mine frequently closed item.

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IOT Based Smart Home Management and Security System

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Abstract: Now-a-days the world is optimizing and becoming more precise by switching from the world of personal computers to laptops to android or ios apps. Human is moving and accepting compact technologies so that, the gap between personages and machines is being reduced to ease the standard of living. The purpose of this project is to design and implement a "Smart Home Management and Security System" which can be control by using android mobile apps. This home security system will secure our valuable resources in our house from the thief. And it also can be controlled the essential and regular of electronic instruments by the android app. The main intent of this project is to design and bring about a technological support for the management and security in the house. The hole system is built by using 4*4 keypad, Servo sg90, SIM 800l module, Laser module, Arduino Mega, MQ6 gas sensor, LM35 temperature sensor, Lipo battery, Case fan, Led light. So this project will help to secure our home from unauthorized access and thief's in a country where the den city of population is high and the rate of criminal tendency is in an alarming situation.

Keywords: Android OS, GSM, Sensor, Wireless Technology.

Introduction

Home security is both the security hardware in place on a property as well as personal security practices. Security hardware includes doors, locks, alarm systems, lighting, motion detectors, security camera systems, etc. that are installed on a property; personal security involves practices such as ensuring doors are locked, alarms activated, windows closed, extra keys not hidden outside, etc.

Literature review

Home automation is becoming popular due to its numerous benefits. Home automation refers to the control of home appliances and domestic features by local networking or by remote control. Artificial intelligence provides us the framework to go real-time decision and automation for Internet of Things (IOT). The work deals with discussion about different intelligent home automation systems and technologies from a various features standpoint. The work focuses on concept of home automation where the monitoring and control operations are facilitating through smart devise installed in residential buildings. Heterogeneous home-automation systems and technologies considered in review with central controller based (Arduino or Raspberry pi), web based, email bases, Bluetooth-based, mobile-based, SMS based.

In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high level interactive C language of microcontrollers; the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. In this system the python script is used and it can install on any of the Symbian.

OS environment, it is portable. One circuit is designed and implemented for receiving the feedback from the phone, which indicate the status of the device [1].

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Home automation or smart homes can be described as introduction of technology within the Home environment to provide convenience, comfort, security and energy efficiency to its Occupants. There are many other projects done on home automation in different countries. They are all different from each other in designs; features, devices, elements and algorithm. They were designed according to specific needs and availability of components in the respective areas. Some of them are cheap; some of them are very expensive. Availability of both hardware and software is necessary to work. After a long searching, we have found a lot of articles. Searching for security purpose articles, we also found some projects done for garage security. These are mainly done in western countries. Many projects are done only for security purpose with Arduino or Raspberry Pi. Again, the projects are done only for controlling home appliances using Arduino or Raspberry Pi [2].

The Home automation system that uses Wi-Fi technology. System consists of three main components; web server, which presents system core that controls, and monitors users' home and hardware interface module(Arduino PCB (ready-made), Wi-Fi shield PCB, 3 input alarms PCB, and 3 output actuators PCB.), which provides appropriate interface to sensors and actuator of home automation system. The System is better from the scalability and flexibility point of view than the commercially available home automation systems. The User may use the same technology to login to the server web based application. .If server is connected to the internet, so remote users can access server web based application through the internet using compatible web browser. The application has been developed based on the android system. An interface card has been developed to assure communication between the remote user, server, raspberry pi card and the home Appliances. The application has been installed on an android Smartphone, a web server, and a raspberry pi card to control the shutter of windows. Android application on a smartphone issue command to raspberry pi card. An interface card has been realized to update signals between the actuator sensors and the raspberry pi card. Cloud-based home appliance monitoring and controlling system. Design and implement a home gateway to collect metadata from home appliances and send to the cloud-based data server to store on HDFS (Hardtop Distributed File System), process them using Map Reduce and use to provide a monitoring function to Remote user [3].

Smart Home Management and Security System

A security system of home (also known as smart security system of home and self-security of home) grounded sensors that are capable its environment and controlled by the user. In this hardware system consists of a hardboard frame, this project basically designed as a house, in the house all the hardware are kept as a security protocol.

**Mechanism of Smart Home Management and Security System**
Parts:

      Arduino Mega

      4*4 keypad

      Servo sg90

      GSM 800l module

      Laser module

      MQ6 gas sensor

      LM35 temperature sensor

      Lipo battery

      Keypad

Case fan

Led light

Buzzer

16*2 LCD Display

Bluetooth Module HC-06

Bread Board

PVC Board

Jumper Wires

## Circuit design and implement working procedure

Figure 1 shows the circuit diagram of the Smart Home Security and management System. The circuit is built around and Arduino mega board, Bluetooth Module, GSM SIM chamber, Servo Motor, Display, Laser Module and a few common components.
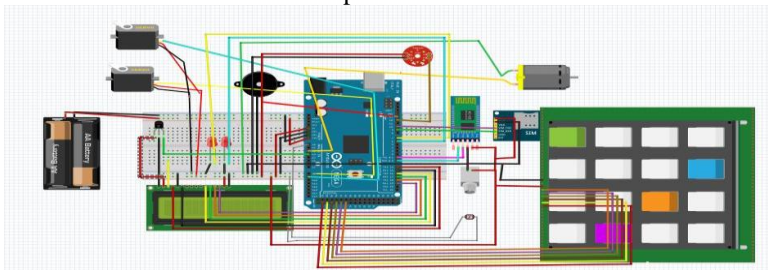
Figure 1: Circuit of the Smart Home Security and management System

Step 1: Design of the Project

The total design format of the project has been shown in the figure 2 with all types of security and management devices. The entire project is implemented in this design. In Room 01 there is one light and fan. In room 2 there is one TV & one AC. We have installed gas & temperature sensor in the kitchen for the most safety. At the left most sight of the house we have the control unit, where we have kept all our connections, Arduino, GSM & Bluetooth. The front door has a security with lock with pin. In the Room 3 we have installed 2 laser sensor which will cover every transit.
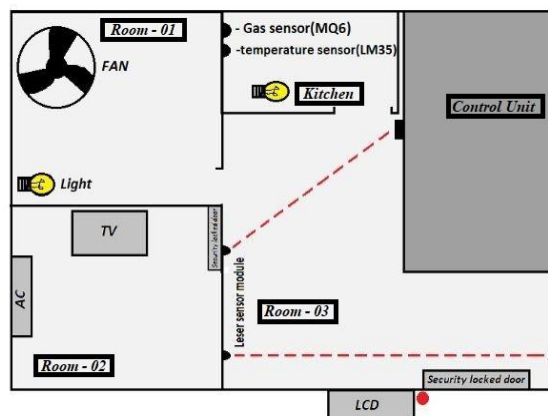
Figure 2: Project Design.

Step 2: Door, Keypad & Display setup

Keypad is for giving the password to the door. It's connected to the servo motor for opening the door. Both servo motor & keypad is connected via Arduino Mega. If anyone gives the wrong pin the system will give a security alert SMS to the owner. All door including internal one will be locked. There will be a huge sound until the right pin is given.

Display is to show the current situation of the door if it is open or locked, the situation of the password. All these instruments are connected through Arduino Mega. The implementation of secured door system has shown in the following figure 3.
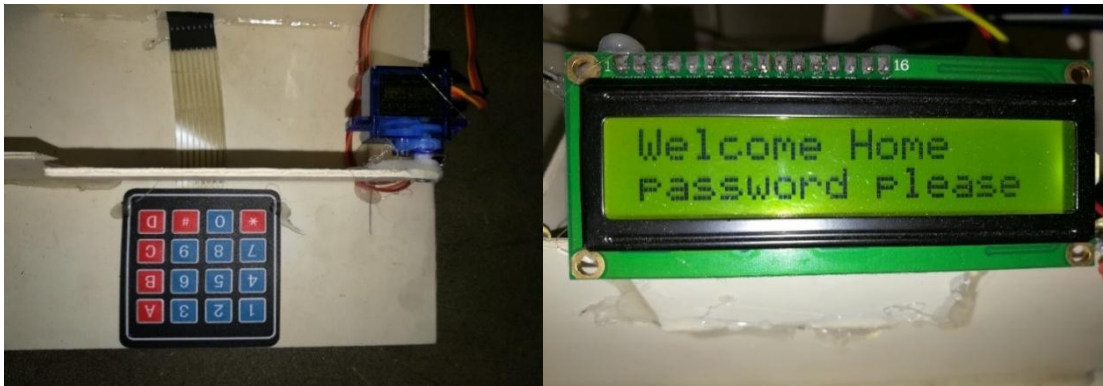

Figure 3: Door, Keypad & Display setup.

Step 3: Install Light, Fan & TV, AC switch

There is separate button for TV, AC, Light and Fan. These things can be directly turn on/off through application. All these things are connected in arduino through jumper wire.In figure 4, the implementation part of home electronics devices as lights, fans, ACs areshown .

Figure 4: AC, TV, Light and Fan.

Step 4: Installing Gas, Heat & Laser sensor

These instruments are for safety. If any one of this activated there will be a siren, a red indicator in the entire house. The user will get a safety SMS in his personal cellphone.

Figure 5: Gas, Heat and Laser sensor

In figure 5, the security and management controlling sensors like gas sensor,heat sensor are shown clearly.

Working procedure of our project

Firstly, we designed a house model, through hard board where we will install all the instruments & sensors. Then we started installing all the sensors. Our project is separated into two parts. One is security system & another is management system. Security system includes laser, heat, gas, GSM sensor & door lock security. All these sensors are connected through the Arduino mega. There is a LCD display at the front door which will give the user message about the door is opened or not. The door is connected through servo motor, which will help to move the door. There is a keypad is connected for giving pin. Then we connect the gas & heat sensor with the arduino through jumper wire. Then we connect the laser sensor and its receiver.

Management system includes controlling light, AC, fan & TV. We installed a Bluetooth module to connect the system with the android app. We created six button in the app.

1st button is for all the instruments.

2nd button is for fan

3rd button is for light1

4th button is for light2

5th button is for AC

6th button is for TV

Step 6: Application Instructions

The application is generated through MITapp inventor:

Just after getting started, app asks to enable the Bluetooth unless and until the Bluetooth module HC-06 is not connected. The app will not be able to move the robot.

All the icon are showing what they are for. 1st button is for the master control. It will turn off/on the all facilities in the house. 2nd button is for the fan. 3rd&4th button is for two lights. 4th button is for air condition and 5th button is for television. The last button is Bluetooth button to connect the app with the system.

There is a display field where the distance from the Ultrasonic sensor is continuously displayed in centimeters.

Lastly, an OK button is provided so once the robot stops and there are no further directions to be given user can click the button which will disconnect paired Bluetooth module.
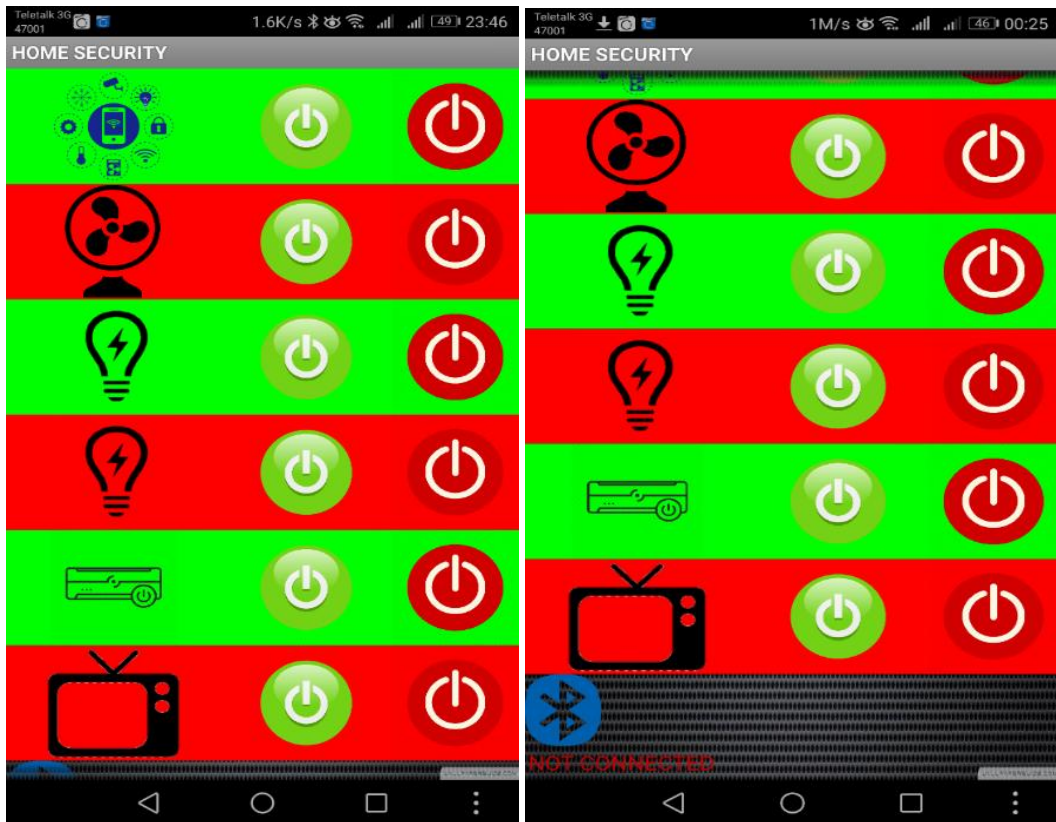
Figure 6 : Android Application

Future Enhancement

Range of connectivity can be increased by using Wi-Fi. As of now we are using Bluetooth module which can be replaced by Wi-Fi module. And can extend range by installing routers on short distances. Additional features can be added like to handle sensors & door security by voice commands, this is achieved by adding speech recognition module.

There can be human detector instead of LM35 laser module so that the owner can get the exact data.

We can also include a headset with a full-color display and a master control room.

With few additions and modifications, this system can be used in every general house so to increase the safety of the house. This system will reduce the waste of electricity. We are also thinking of adding a water control in the system. In future we caninterface sensors to this system so that it can monitor some parameters and we can improve the efficiency using Internetof Things (IOT) technology.

Currently the app is only for android. We are working for the ios version of this app.

Conclusion

The project we have undertaken has helped us gain a better perspective on various aspects related to our course of study as well as practical knowledge of electronic equipment and communication. We became familiar with software analysis, designing, implementation, testing and maintenance concerned with our project. The extensive capabilities of this system are what make it so interesting. From the convenience of a simple cell phone, a user is able to control and monitor virtually any electrical devices. This makes it possible for users to rest assured that their belongings are secure and that the television and other electrical appliances was not left running when they left the house to just list a few of the many uses of this system. The end product will have a simplistic design making it easy for users to interact with. This will be essential because of the wide range of technical knowledge that home owner shave.

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3. https://pdfs.semanticscholar.org/bb96/81c8eee98b14dc102909e0768c320e0aa9e0.pdf
4. https://www.youtube.com/watch?v=dRCnccv_dVE
5. https://electronicsforu.com/electronics-projects/smart-home-security-system
6. https://www.slideshare.net/AdadChrif/home-security-alarm-system
7. https://www.electroschematics.com/arduino-gsm-home-security-alarm-system/
8. https://www.elprocus.com/gsm-based-home-security-system-working-with-applications/
9. https://pdfs.semanticscholar.org/1fb9/8779c7a999cbd68fc7f8cc023a258354d670.pdf

Design and Performance Analysis of a Dual Converter (AC/DC & DC/AC) with Reduced Switching System

Syed Abdullah-Al-Nahid[1], Tafsir Ahmed Khan[2], Md. Abdul Based[3]

Abstract: The electrical power is categorized into Alternating Current (AC) power and Direct Current (DC) power. However, most appliances require AC power to run which is mostly available because of the generations of power companies inform of AC power. When the situation of storing electrical power comes into account, it becomes impossible to store the AC power because of its nature. In contrast with that, it is always easier to store DC power for future use. So, the conversion of these electrical power in both ways is very essential for the continuation of appliances like IPS, UPS, etc. without any interruption. In these types of devices, the conversion process always requires using many switching devices and systems which eventually increases the cost of the conversion system as well as degrades the AC power quality by the injection of harmonics in the AC power system. In this work, a new methodology is proposed and implemented for the dual conversion (AC-DC & DC-AC) of electrical power with reduced switching systems. Without implementing inverter and rectifier separately unlike traditional design, these two converters are mounted together to eliminate the use of switching systems previously required. A Hall Effect current sensor with a half-wave rectifier and voltage comparator (using OP-AMP) circuit is used to acquire information about the status of the main power supply. A timer (CD4047BCM) IC with OP-AMP based non-inverting amplifier is used to drive the gates of the inverter circuit. A full-wave bridge rectifier along with a step-down transformer is mounted together with MOSFET based inverter to store the electrical power into a battery when the power is available from the power companies. The whole work is implemented and simulated in Proteus 8.5 software.

Keywords: Dual Converter, Inverter, Shift Register, Rectifier, Filter.

Introduction

Today we live in a modern world. Day by day it is going to be upgraded. Man made many kind of technology for their demands. Technology makes our life easier and more comfortable. For running this technology, we require power, specifically the electrical power which is the most important thing in our modern life. Electricity is a power which can convert another from, such as motion, heat, light, electromagnetic field, etc. Generally, we used two types of electricity alternative current and direct current[1]. There are various kind of instruments which only run by direct current or alternating current. Mostly we use alternative current but it has a problem, there is no system for storing alternative current. The direct current is that kind of current which can be stored easily. At present days there are many kind of the sector where we need power continuously. But if we use only alternative power then it will be not possible because it cannot be stored. So we need a converter which can make AC to DC and DC to AC when required. This is possible by using dual converter. The dual converter is a

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converter which can convert AC to DC and DC to AC[2-3]. There are many kind of similar technology just like that such as IPS and UPS [3]. A DUAL converter with reduced the switching system is design and its performance is simulated in this work. This circuit is very low cost and size also small. Thismethodology of dual conversion will be able to make traditional devices as like as IPS and UPS circuits more efficient.
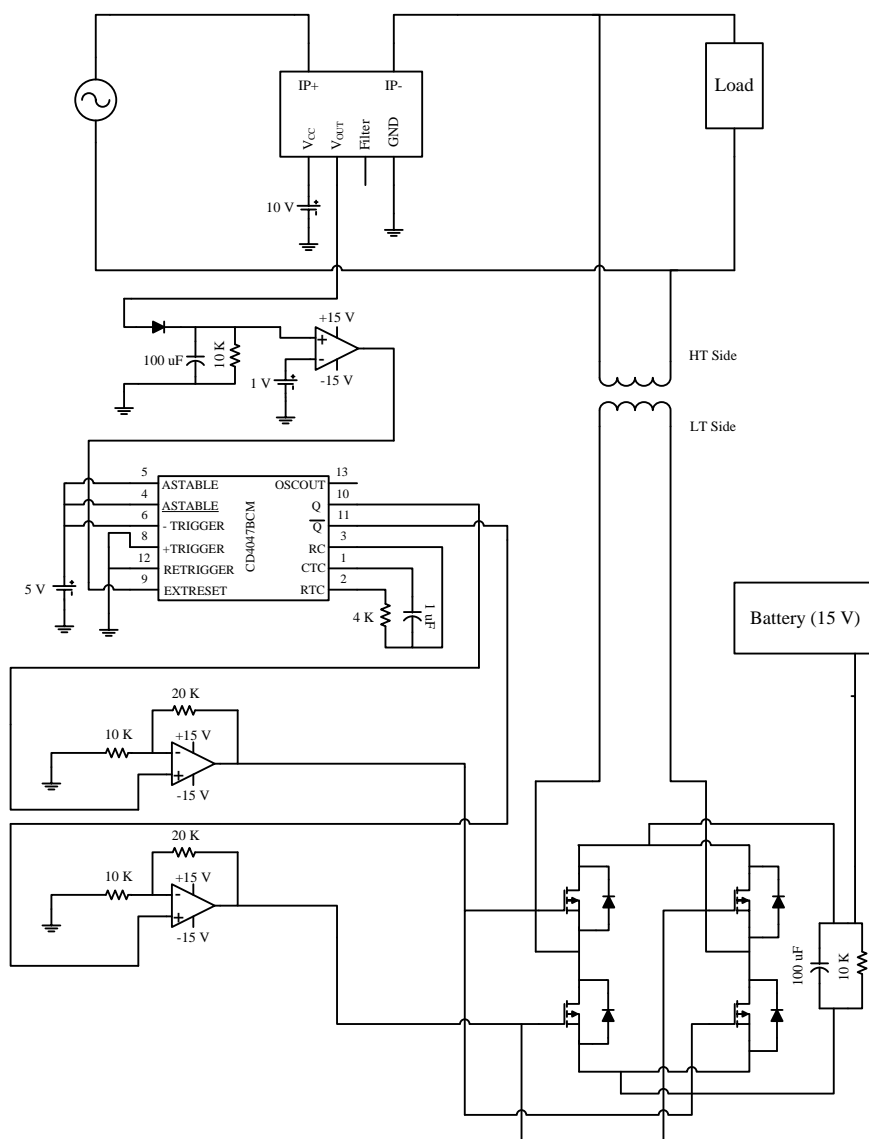
Proposed Model
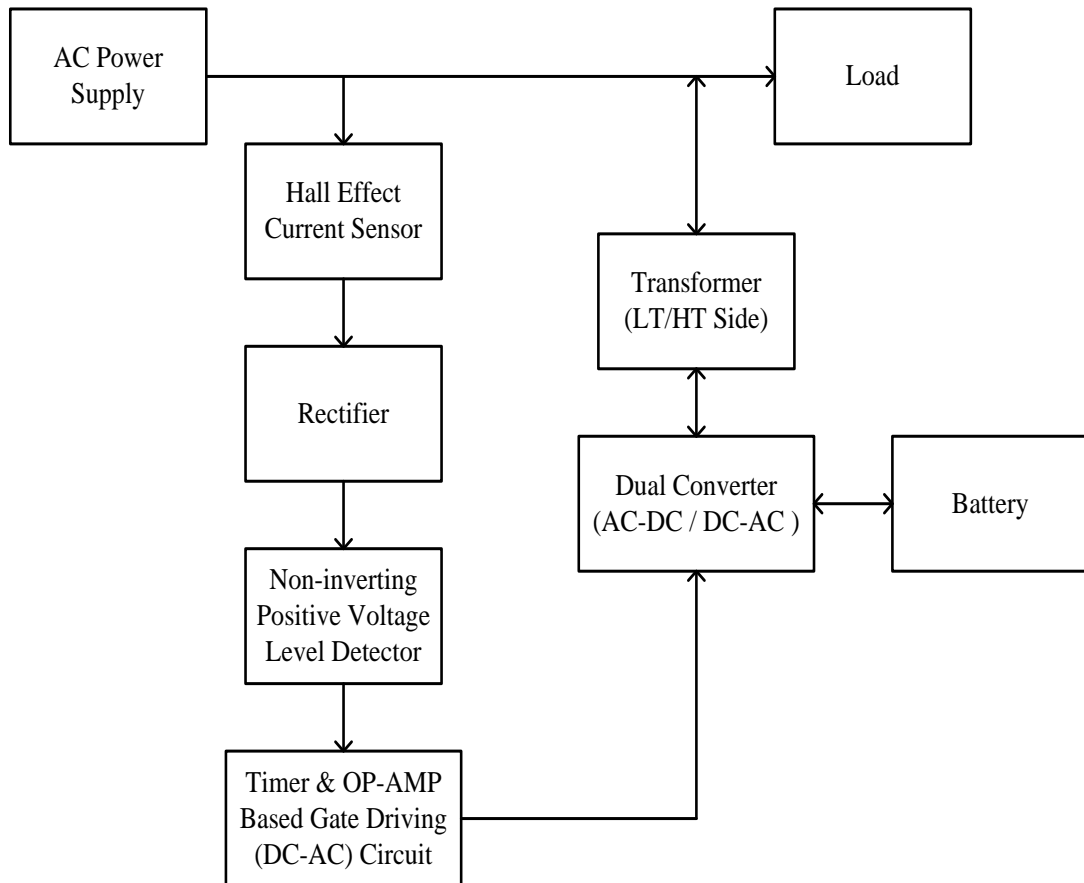
Figure 1: Block diagram of proposed dual converting (AC/DC & DC/AC) system

Figure 1 shows the block diagram of the proposed work. The main AC power supply is connected with load and the proposed dual converter is connected with the load through the 220 V/ 15 V transformers. The information of the line current is sensed by a Hall Effect current sensor. The output of the current sensor is rectified to DC and is compared with a threshold value by the non-inverting positive voltage level detector made by OP-AMP. If the load is getting power from the main AC power supply, the voltage level detector will generate a signal to deactivate the timer IC-based gate driving circuit for the inverter. The rectifier unit in dual converter circuit will convert the AC power into DC power from step down transformer and led to the battery for storage purpose. If the AC power supply is disconnected or offline, the current sensor with the voltage level detector will activate the gate driving circuit and hence activate the inverter. Now the battery will supply power to the load through the inverter and step up transformer marinating uninterruptable power supply across the load.

Simulation Circuit Diagram

Figure 2: Circuit diagram of proposed model

The detailed circuit diagram of the proposed work is shown in Figure 2. The AC power supply is connected with the load through the Hall Effect current sensor which detects whether the load is having power from the main AC supply or not. The output of the current sensor is rectified and compared with a threshold value (1 V) to a non-inverting positive voltage level detector. If there is no supply, then the pulse generation unit will be deactivated. Otherwise, the pulse generation circuit for gate driving will generate pulses and amplified by two non-inverting amplifiers. The dual converter unit is connected across the load through a step-down transformer. If there is power from the main supply, the inverter unit remains deactivated and the battery will charge after rectification. For no

power from AC supply condition, the inverter section gets its driving pulses from pulse generation units and corresponding to battery voltage the diodes in the rectifier becomes reverse biased. The output from the inverter will be supplied to the load through the step-up transformer and making sure of uninterruptable power supply across the load.

Result Analysis

When power supply is online:
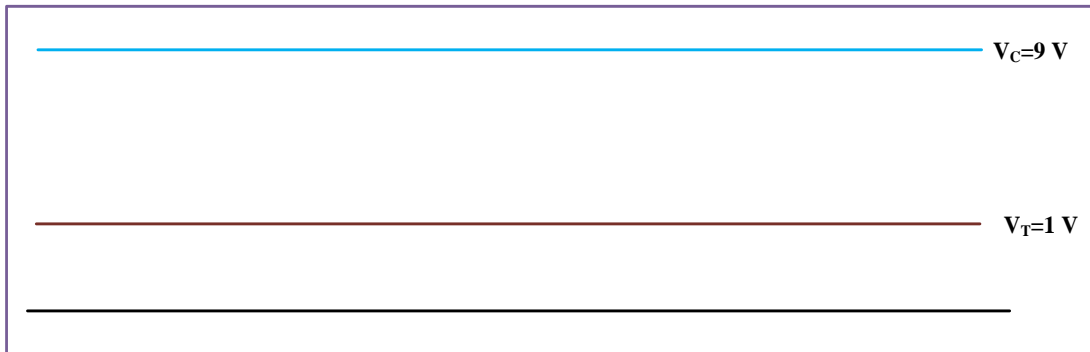
Figure 3: Values of current sensor and threshold value

The corresponding information about the line current (V_C) and the threshold value (V_T) for voltage comparator is shown in Figure 3. It is indicated that the main AC power supply is delivering power across the load. As threshold value is less than the value of the current sensor, the inverter section will be deactivated and the rectifier portion will be activated for battery charging.
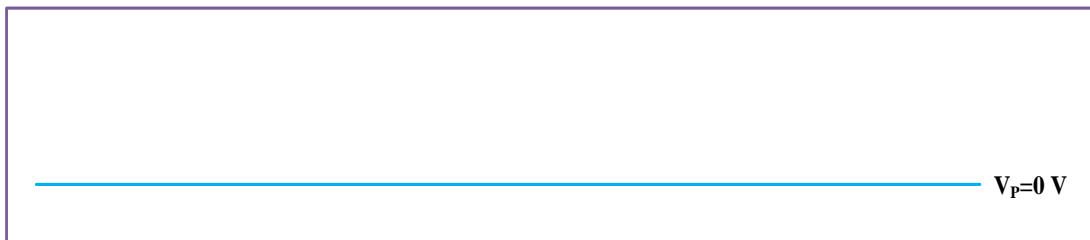
Figure 4: Gate driving pulse 1
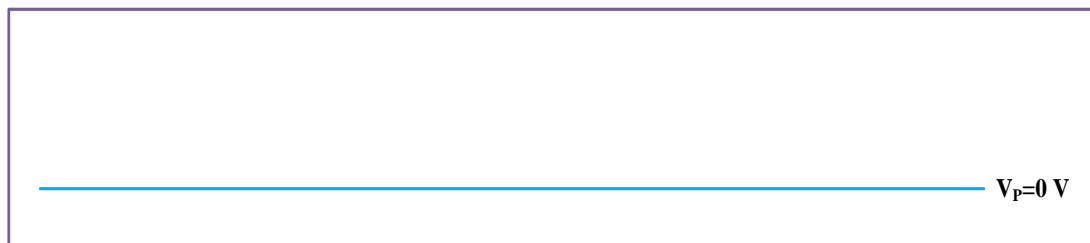
Figure 5: Gate driving pulse 2

Figure 4 & 5 shows the output pulse for the gates of MOSFETs in the inverter section of the dual converter. As AC supply is delivering power to the load (indicated in Figure 3), timer CD4047BM based gate driving is deactivated and there will be no pulse signal (V_P=0 V) for the inverter section.

$V_{avg}=15\ V$

Figure 6: Output of dual converter (AC-DC)

The output of dual converter (AC-DC portion) is shown in Figure 6. This rectified voltage will charge the battery.

$V_P=10\ V$
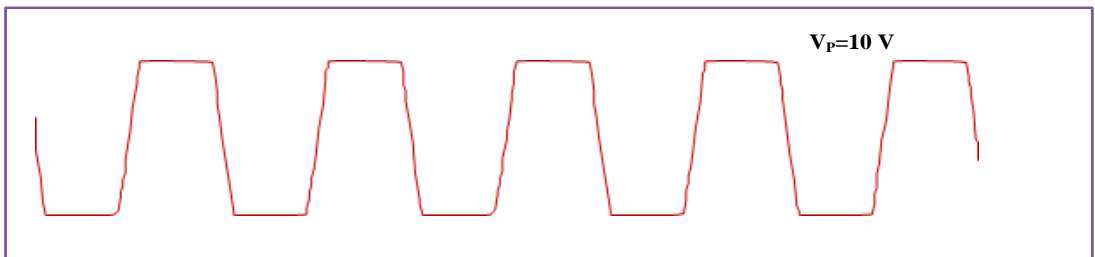
Figure 7: Load Voltage

Figure 7 shows the voltage across the load. For the simulation purpose, the value of source voltage was reduced. In this work, the AC lamp in Proteus software was considered as load. Due to the inductive load, the voltage waveform is not a pure sine wave due to the presence of harmonics.
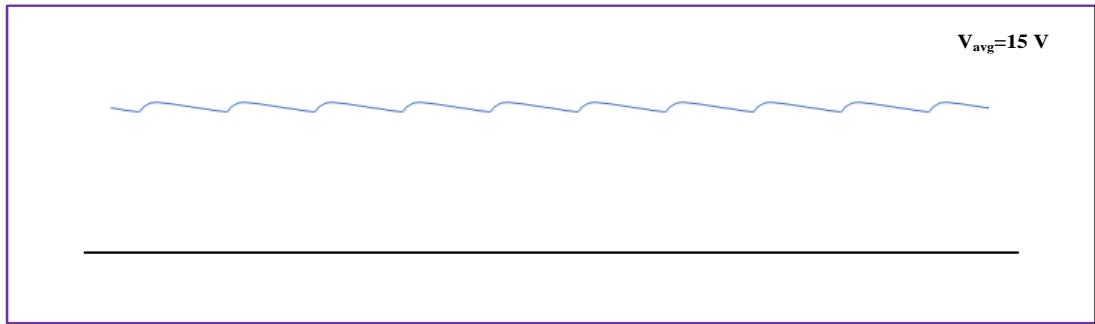
When Power Supply is offline:

$V_T=1\ V$

$V_C=0.5\ V$
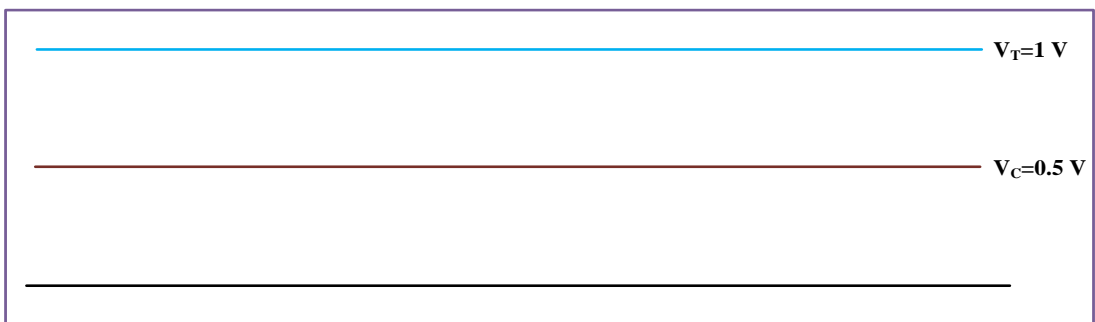
Figure 8: Values of current sensor and threshold value

Figure 8 shows the output of the current sensor after rectification along with threshold value of voltage comparator circuit. As the value of the current sensor is less than the threshold voltage, the pulse generation circuit will be activated and the rectifier section will be deactivated due to reverse bias effect from the battery.

Vavg=0 V

Figure 9: rectifier for battery charging

The output of the rectifier section in the dual converter is shown in Figure 9.

V_P=15 V

Figure 10: Pulse 1

V_P=15 V
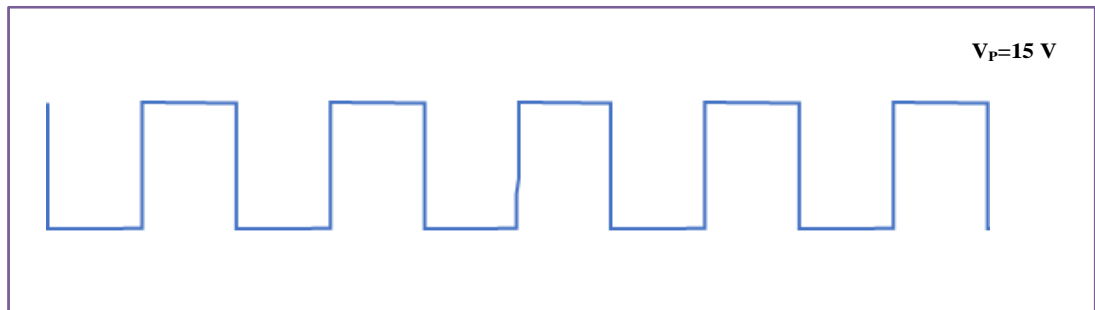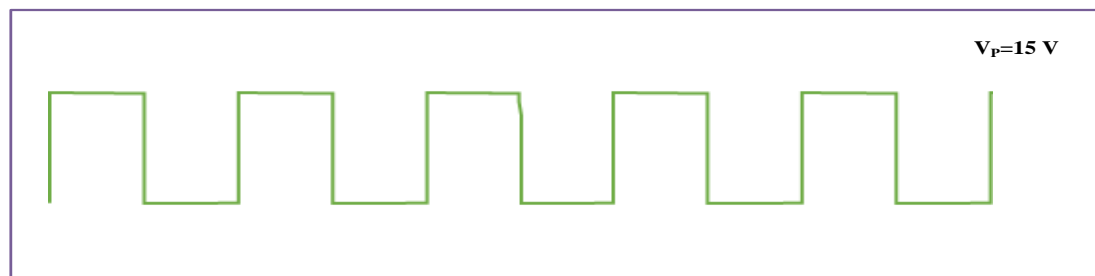
Figure 11: Pulse 2

Figure 10&11 shows the output pulse for the inverter circuit generated from CD4047BCM and amplified to +15 V & -15 V by non-inverting amplifiers just to make sure that the MOSFETs used in the inverter is operating in the saturation region.

V_P=10 V
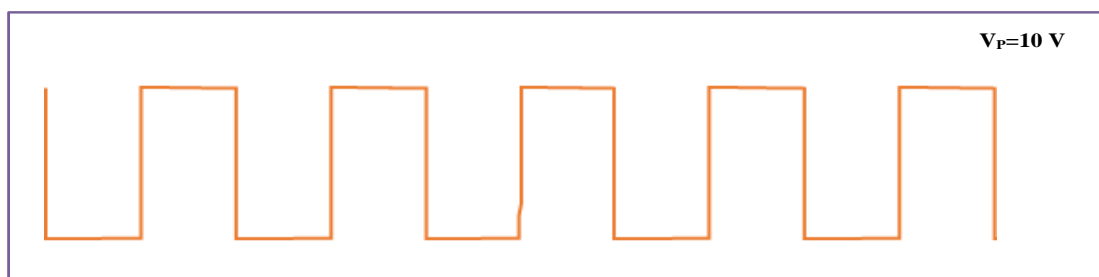
Figure 12: Load Voltage

The output of the inverter section in the dual converter is shown in Figure 12. The output is a modified sine wave which can be filtered to make a pure sine wave. The magnitude achieved from inverter circuit is 10 V (peak).

Conclusion

Dependency on modern technological appliances has brought enormous demands on electrical energy as well as on power supply companies. To store and maintain uninterruptable power supply, the necessity of dual conversion of electrical energy is huge. Often the switching systems used in dual converters increase the cost as well as inject harmonics in the system. The developed methodology in our work for the dual conversion of electrical energy eliminates the disadvantages found in traditional design by reducing the switching systems. The designed converter was simulated under two conditions; when the power supply is online and when the power supply is off. The simulated results verify the desired output of our proposed work. To conclude, it can be said that this designed work can be implemented successfully in commercial applications with some minor adjustments.

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Proposing a New Tariff System with Power Factor Compensation for Small & Medium Sized Industries of Bangladesh by Improving the Existing Energy Meter

Tafsir Ahmed Khan[1], Syed Abdullah Al-Nahid[2], Md. Abdul Based[3]

Abstract: In Bangladesh the electricity bill is generated against an energy meter on its consumed units only. In residential areas it is not a problem since the power factor stays over a sufficient amount due to some sort of power factor correction measures. However for small and medium sized industries it can be an economical problem. Power distribution companies are dealing with losses for such reasons which they are not responsible for. This motivated us to propose a new tariff system along with a completely new metering device which will be connected with existing meters. This tariff system is similar to sliding scale power factor tariff. Here incentives will be provided on top of total bills if the average power factor remains over a limit and vice-versa. In the first part of the report the design methodology and the power factor measurement procedure are described and in the later part hardware design process and simulated results are illustrated. Impact of adaption of the system is significant as normal monthly bill rises up if average power factor is not kept under control and opposite event occurs if it is maintained under a threshold.

Key words: Tariff system, Power factor compensation, Pulse In, Microcontroller, Arduino.

Introduction

The electrical energy generated by a power generating station is delivered to a large number of consumers. The consumers can use electrical energy if it is sold at reasonable rates. The rate (costing) at which electrical energy is supplied to a consumer is called tariff. There are several types of tariff system exists in the world. The electricity bill is generated by calculating the number of units i.e. kilowatt-hour (kWh) had been consumed over a period of time. Many countries take power factor into their consideration while generating bill. In Bangladesh only consumed units are taken into consideration while power factors are left alone. In this paper, a new tariff system is proposed for Bangladesh which is similar to power factor sliding scale tariff especially for small and medium sized industries.

Conventional Tariff System of Bangladesh

Electricity pricing (sometimes referred to as electricity tariff or the price of electricity) varies widely from country to country and may vary significantly from locality to locality within a particular country. Many factors go into determining an electricity tariff, such as the price of power generation, government subsidies, local weather patterns, transmission and distribution infrastructure, and multi-tiered industry regulation.The U.S. Energy Information Administration (EIA) says that "Electricity prices generally reflect the cost to build, finance, maintain, and operate power plants and the electricity grid" [1].

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Some utilities are for-profit companies, and their prices will also include a financial return for shareholders and owners. These utilities can exercise their political power within existing legal and regulatory regimes to guarantee that return and reduce competition from other sources like distributed generation. Electricity tariffs vary by type of customer, typically by residential, commercial, and industrial connections.

Electricity price forecasting is the method by which a generator, utility company, or large industrial consumer can predict the wholesale prices of electricity with reasonable accuracy [2]. Due to the complications of electricity generation, the cost to supply electricity varies minute by minute. Normally the equation for calculating total bill is shown below.

$$\text{Total bill} = \text{Fixed Cost} + \text{Semi Fixed Cost} + \text{Running Cost}$$

$$= a + b\,\text{KW} + C\,\text{KWh}$$

In this tariff system power factor of the consumer's load is not taken into the consideration.

Design Methodology

The first step is to take kWh data from existing meter. There are few ways of doing it. A sensor will be used totake data from the existing meter. Second part will be calculating the instantaneous power factor and record these data. This massive task done through a potential transformer, a current transformer, two zero-crossing detector, an AND gate and an Arduino. The work flow diagram is shown in Figure [1].
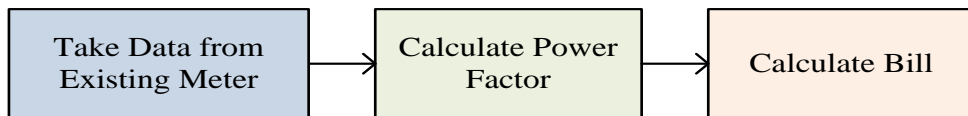
Figure 1: Work flow diagram of the project.

Take Data fromExisting Energy Meter

Taking the kWh data from energy meter is not that simple. There are possibly two ways to do that. One is taking the data directly from the controller which is inside the meter. This method comes with a great hassle since establishing communication in between two different controllers is difficult. Another way is to count the impulse of energy meter. Every energy meter turns on and off an LED few hundred times for each unit (kWh) consumed. A light dependent resistor (LDR) sensor is capable enough to pick this light pulse and carry this information to Arduino. A voltage divider network (works as a transducer) is needed to do so. Figure 2 illustrates such a voltage divider network.
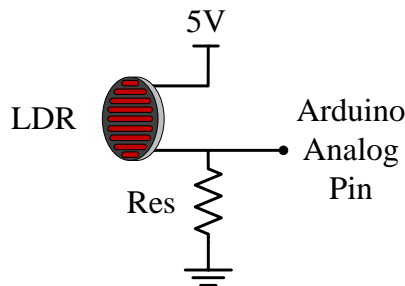
Figure 2: LDR in a voltage divider network.

This network will provide an analog pulse to Arduino. A preview of this analog pulse is shown in Figure[3].
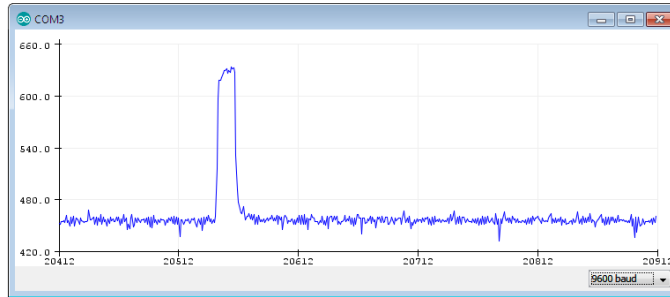
Figure 3: Preview of analog pulse from LDR.

Arduino can easily count the pulse with a simple counter. Most of the energy meter gives 1600 pulses per kWh. So if Arduino counts 1600 pulses then it will increase the number of consumed units by 1.

Calculating Power Factor

Although there are many ways to measure power factor, we adapted a simple one to do so. We stepped down the voltage and the current for measuring easily through electronic devices. We tried to find the correlation between the power factor and their overlapped region. Figure 4, Figure 5 and Figure 6 illustrate an example of such relationship.

Voltage Waveform (from PT)

Current Waveform (from CT)

Output of Zero Crossing Detector 2 (voltage)

Output of Zero Crossing Detector 1 (current)

Output pulse of MOSFET 2 (voltage)

Output pulse of MOSFET 1 (current)

Output of AND gate (voltage AND current)
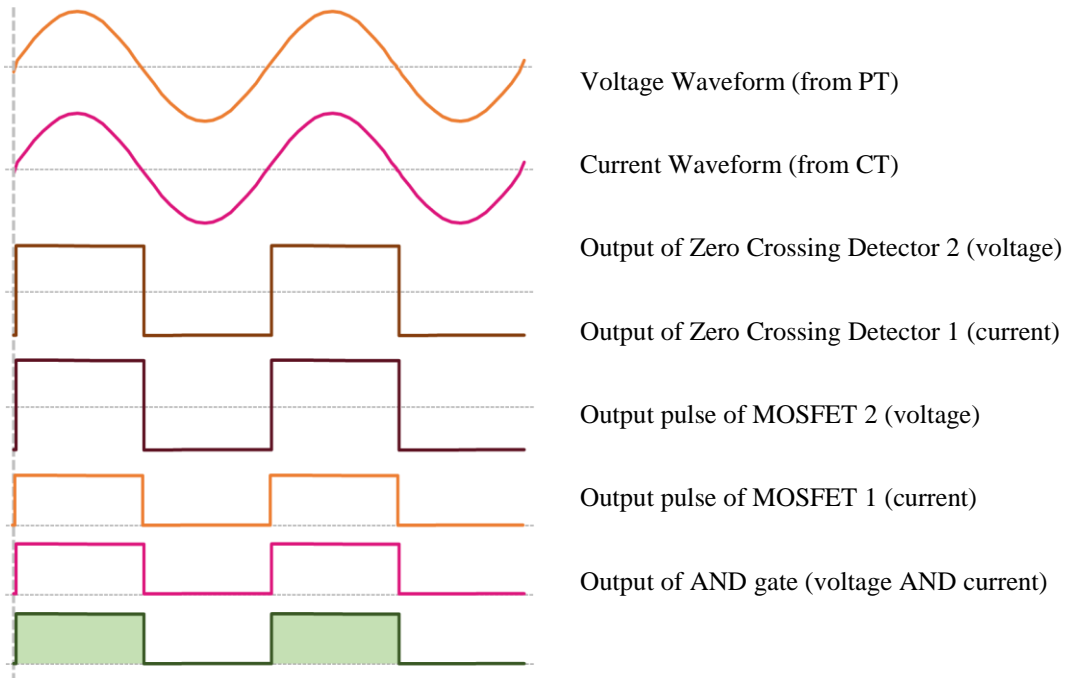
Figure 4: Wave shapes of voltage, current and overlapped region when pf = 1.

Voltage Waveform (from PT)

Current Waveform (from CT)

Output of Zero Crossing Detector 2 (voltage)

Output of Zero Crossing Detector 1 (current)

Output pulse of MOSFET 2 (voltage)

Output pulse of MOSFET 1 (current)

Output of AND gate (voltage AND current)

Figure 5: Wave shapes of voltage, current and overlapped region when pf = 0.707.

Voltage Waveform (from PT)

Current Waveform (from CT)

Output of Zero Crossing Detector 2 (voltage)

Output of Zero Crossing Detector 1 (current)

Output pulse of MOSFET 2 (voltage)

Output pulse of MOSFET 1 (current)

Output of AND gate (voltage AND current)

Figure 6: Wave shapes of voltage, current and overlapped region when pf = 0.

Relationship between Power Factor & Overlapped Region (Pulse Width)

From Figure 7 it can be seen that the output of AND gate varies with the power factor. The overlapped region or width (10 mS) of the output pulse (from AND gate) is half of the period (20 mS) of input signal (50 Hz 220 V AC) for 0˚angle between voltage and current (power factor 1).The pulse width decreases as the angle between voltage and current increases (power factor decreases). For calculating the power factor this width needs to be measured precisely.

10 mS (0˚, pf = 1)

7.5 mS (45˚, pf = 0.707)

5 mS (90˚, pf = 0)

Figure 7: Output of AND gate for different power factors (50 Hz was considered).

By above method we can easily find out the relationship between power factors & overlapped time of wave shapes. Table 1 shows the detailed data of these findings. This table will help us to program our device.
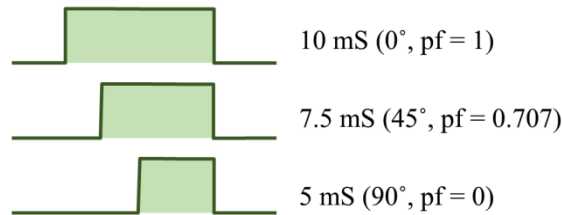
Table 1: Relation between Power Factor &Overlapped Region (Pulse width).

Angle Between V & I	PF	Overlapped Region (Pulse width)
0°	1	10ms
9°	0.988	9.5ms
18°	0.952	9ms
27°	0.891	8.5ms
36°	0.809	8ms
45°	0.707	7.5ms
54°	0.588	7ms
63°	0.454	6.5ms
72°	0.309	6ms
81°	0.156	5.5ms
90°	0	5ms

Block Diagram

The block diagram shows the overall process of our proposed model in circuitry level. The block diagram is shown in Figure 8. The block starts from the place where our energy meter is. The energy meter will provide us the data of consumed unit (kWh information) through LDR network. Then a pair of CT-PT (Current Transformer-Potential Transformer) will step down the current and voltage for processing. Then Zero Crossing Detector 1 & 2 will convert the current and voltage wave shapes to

square wave which will then be passed to And Gate for determining overlapped region of the current and voltage waves. An Arduino will get this overlapped region and determine the width in time (mS). Arduino will keep track of time with a RTC (real time clock) module to generate bill.
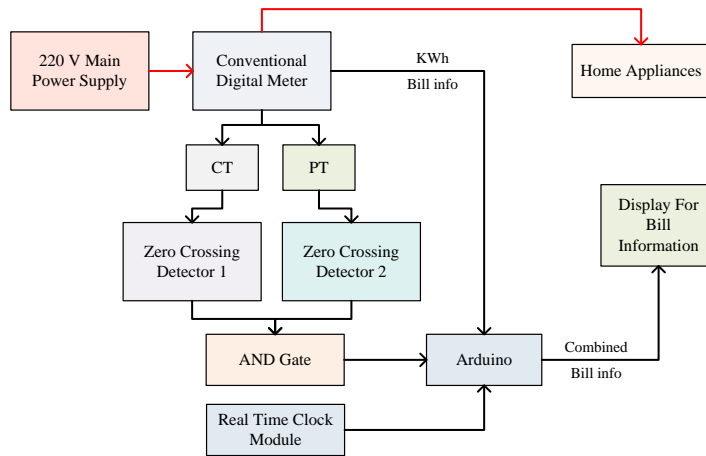
Figure 8: Block diagram of proposed model.

Circuit Diagram for PF Measurement

Before calculating energy consumed (kWh) and other parameters it is necessary to measure power factor inside the microcontroller. The circuit diagram for measuring pf is shown in Figure 9 which is constructed according to the block diagram. Although it cannot determine whether the pf is leading or lagging.
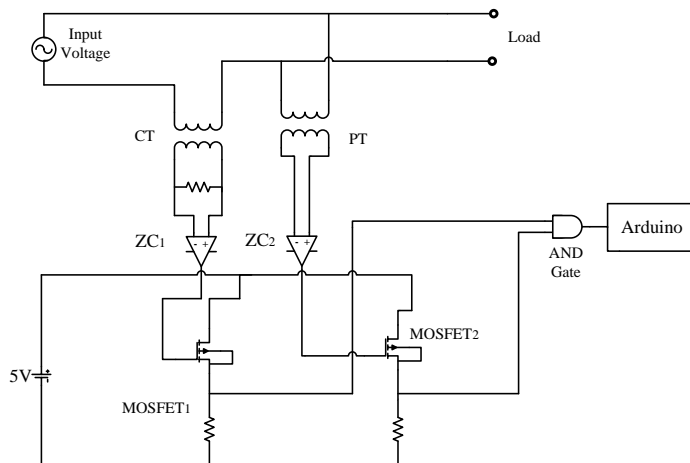
Figure 9: Circuit Diagram for PF Measurement.

Final Circuit Assembly

This circuit (shown in Figure 10) is the extended version of previous circuit. Here the main supply will come through the energy meter. A real time clock (RTC) module is being used with Arduino to keep track of time.
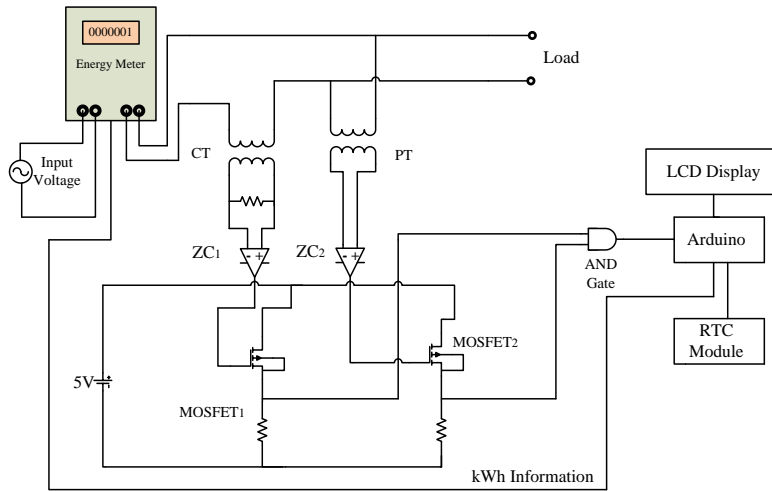
Figure 10: Overall Circuit Diagram.

Power Factor Compensation

Our proposed model includes the provision of giving incentive to consumers if they use their load wisely to keep PF above 0.85. As well as it will add penalty on top of the total bill of consumers if their PF goes below 0.85. It will inform the consumers about their monthly usages and bill instantly. Proposed rate of Incentives and Penalties are given below in Table 2. These rates are arbitrary and are subjected to change according to Govt. instruction.

Table 2: Incentives and penalties in new tariff system.

Incentives		Penalties	
0.85 – 0.89	– 10% of Total Bill	0.80 – 0.84	+ 10% of Total Bill
0.90 – 0.95	– 15% of Total Bill	0.70 – 0.79	+ 20% of Total Bill
Above 0.95	– 20% of Total Bill	0.60 – 0.69	+ 30% of Total Bill

Then the total bill of consumer will be as follows:

Total bill = (Fixed Cost + Semi Fixed Cost + Running Cost) + Percentage of PFC

= (a + b KW + c KWh) + Percentage of PFC

PFC (power factor compensation) can be "+" in case of penalty and "–" in case of incentive. The values of a, b and c will be set by the power distribution companies.

Sample Result (LCD Screenshots)

This is the representation of the output of our proposed model. Figure 11 illustrates the bills of July, 2019 and August, 2019 with nearly same power consumptions but at different power factors.

<div align="center">

Incentive Situation   Penalty Situation

</div>

14:57:23 13/07/19	19:17:53 07/08/19
U_CM:129 U_LM:435	U_CM:95 U_LM:398
PFCM:0.89 PFLM:0.91	PFCM:0.81 PFLM:0.92
B_CM:723 B_LM:3524	B_CM:698 B_LM:2122

11:29:54 18/07/19	21:06:12 15/08/19
U_CM:201 U_LM:435	U_CM:208 U_LM:398
PFCM:0.90 PFLM:0.91	PFCM:0.79 PFLM:0.92
B_CM:1059 B_LM:3524	B_CM:1543 B_LM:2122

08:21:09 23/07/19	21:54:18 23/08/19
U_CM:305 U_LM:435	U_CM:306 U_LM:398
PFCM:0.88 PFLM:0.91	PFCM:0.71 PFLM:0.92
B_CM:1743 B_LM:3524	B_CM:2331 B_LM:2122

23:59:59 31/07/19	23:59:59 30/08/19
U_CM:398 U_LM:435	U_CM:399 U_LM:398
PFCM:0.92 PFLM:0.91	PFCM:0.68 PFLM:0.92
B_CM:2122 B_LM:3524	B_CM:3253 B_LM:2122

In this particular example, bill is generated according to the tariff rate [3] of Dhaka Power Distribution Company Ltd. (DPDC). If the power factor compensation is discounted then the original bill would be around Tk. 2500 whereas with incentives it will become Tk. 2122 (at the end of July) and with penalty it will be Tk. 3253 (at the end of August).

Conclusion

Our tariff System and meter provides an efficient scenario to improve the power factor of a power system by a socio-economical way. Adaptation of this meter will provoke the users to be more cautious about using heavy inductive load. Eventually this tariff system will compel the user to adapt some sort of power factor improvement mechanism. This proposed model is very effective for small and medium industries since in residential areas power factor improvement systems are already in action. This meter can also help to process the monthly bill of its own and it can be seen real time which will help both the authority and user at the same time.

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Design and Performance Analysis of Reverse Rotation Protection Relay using Microcontroller for a Three Phase Motor

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Abstract: A power system is a vast network. From generating stations to final consumer end, all the equipment are considered as a power system. The cost of these equipment in the power system is huge. There is always a probability that the power system may not always operate in healthy conditions. Any kind of unhealthy or faulty situation in the power system may damage the load which eventually brings the necessity of protecting the loads and equipment in a power system during any abnormal situations. From generating point to final load distribution, every equipment connected in the power system must be protected from any kind of uncertainty in the efficient power system. There are lots of power system equipment used today in every power system by spending lots of money to design a protected power system against any kind of disturbances. In the three-phase power system, the correct phase sequence is always a major factor for an integrated grid system. Among the three conditions of parallel operation, one of the major issues is the phase sequence. A sudden improper phase sequence will disconnect the power system from the integrated grid operation. Also, some three-phase loads like induction motor will cause reverse rotation in case of wrong phase sequence which is not desired at all.

In this work, Microcontroller based detection of wrong phase sequence and load tripping mechanism have been designed and analyzed. For any wrong phase sequence, the system will indicate it as abnormal situation and trip the induction motor, which is considered here as a load, to prevent it from reverse rotating. As it is difficult to demonstrate a faulty situation in the existing power system, the whole work is designed and its performance is analyzed in PROTEUS software.

Keywords: Switchgear, Three Phase Motor, Arduino, Phase Sequence, Reverse Rotation, Microcontroller.

Introduction

Protection of induction motors is important because most industrial applications use induction motors from the market due to their high robustness, reliability, low cost and maintenance, and high efficiency [1-2]. They are also critical components in many commercially available equipment and industrial processes. Controlling an induction motor is difficult due to its strong nonlinear behavior stemming from magnetic saturation effects and strong temperature dependence of the electrical motor parameters.

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Especially, the rotor time constant of induction motors can change in a wide range due to rotor temperature[3]. These factors make mathematical modeling of motor control systems difficult. In real applications, only simplified models are used. The commonly used control methods are voltage/frequency, stator current flux, and field-oriented controls. The windings in a 3 phase motor, when activated by a 3 phase supply produce a rotating magnetic field in the rotor area of the motor[3]. Swapping phase.

A. with phase

B. re-orders the fluxes so that the flux rotates in the opposite direction. Swapping B with C does the same thing as does swapping A with C. Think of it like a triangle with corners called A, B, and C.

Swapping any two corners and follow points A, B, and C the motor will run in the opposite direction. Swap two more corners and the motor will back to the original rotation. Each phase has the same voltage in a sine wave, but 120 degrees out of phase. The question then becomes which phase leads the other. This is what determines the direction of the motor. The phases have a phase shift of 120 degrees - called electrical phase angle, meanwhile, the windings on the motor are also shifted by 120 degrees - mechanical angle. In a way, when the current passes through windings the rotating magnetic field is formed, which is the sum of all three vectors. In the conventional protection scheme, the synchronous machine subject to an internal fault is disconnected from the power system by tripping the circuit breaker, thereby reducing its field current to zero[3].

Proposed Model
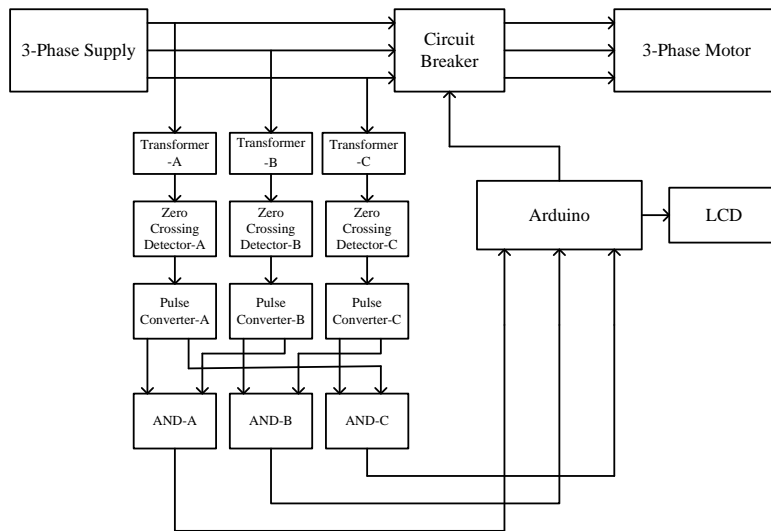
Figure 1: Block diagram of proposed model

Figure 1 shows the block diagram of the reverse rotation protection scheme for the three-phase motor. Three-phase motor is connected with three-phase power supply through a circuit breaker. Three step down transformers are used to step down the voltage and supply it to zero-crossing detectors to convert sine wave to square wave. The outputs of zero-crossing detectors are supplied to pulse converters to convert square wave into pulse signals. Three cascaded AND gates are used to determine the overlapping areas between three phases. The signals from AND gates are supplied to microcntroller

(Arduino) to identify whether the phase sequences are correct or not. If not, then the Arduino will produce a signal to instruct the circuit breaker to trip off and hence disconnecting the motor from the power supply to restrict the motor in reverse rotating.

Simulation Circuit Diagram
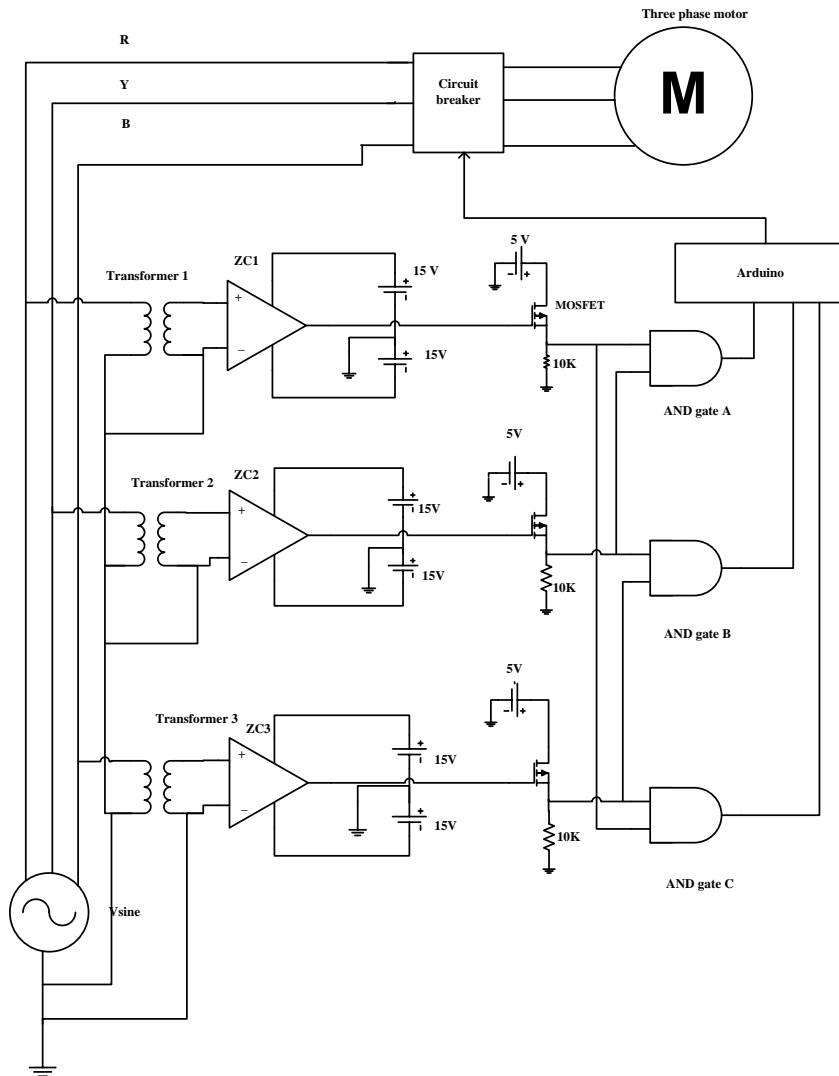
Figure 2: Circuit diagram of proposed model

The complete circuit diagram of the work is shown in Figure 2. Three-phase motor is connected with the three-phase supply through a circuit breaker (Tri pole circuit breaker). Three step down transformers (one for each phase) are used to step down the AC voltage to lower magnitude ranges between 10 V to 15 V (peak to peak). The outputs of transformers are fed to non-inverting zero-crossing detectors to convert sine wave to square wave. The outputs of zero-crossing detectors have a magnitude of -15 V and +15 V for the negative and positive half cycle. These square signals are then

converted to 0 V for the negative half cycle and + 5 V for the positive half cycle by MOSFET based pulse converter units. Three AND gates are used in a cascaded formation with three-phase to identify the overlapping area between two phases. Pulse signal relevant to phase A and phase B are fed to AND gate A. Similarly phase B and phase C are fed to AND gate B and phase C and phase A are fed to AND gate C. The corresponding signals from these AND gates are given input to ARDUINO which will detect the sequence of these overlapped areas of the corresponding three-phase. The correct phase sequence (A-B-C clockwise) will produce AND gate A first, after some delay AND gate B will be high and finally AND gate C will produce a high output. Apart from this sequence, ARDUINO will detect the wrong phase sequence and instruct circuit breaker to trip to isolate the motor from reverse rotating.

Flow Chart for Arduino programming
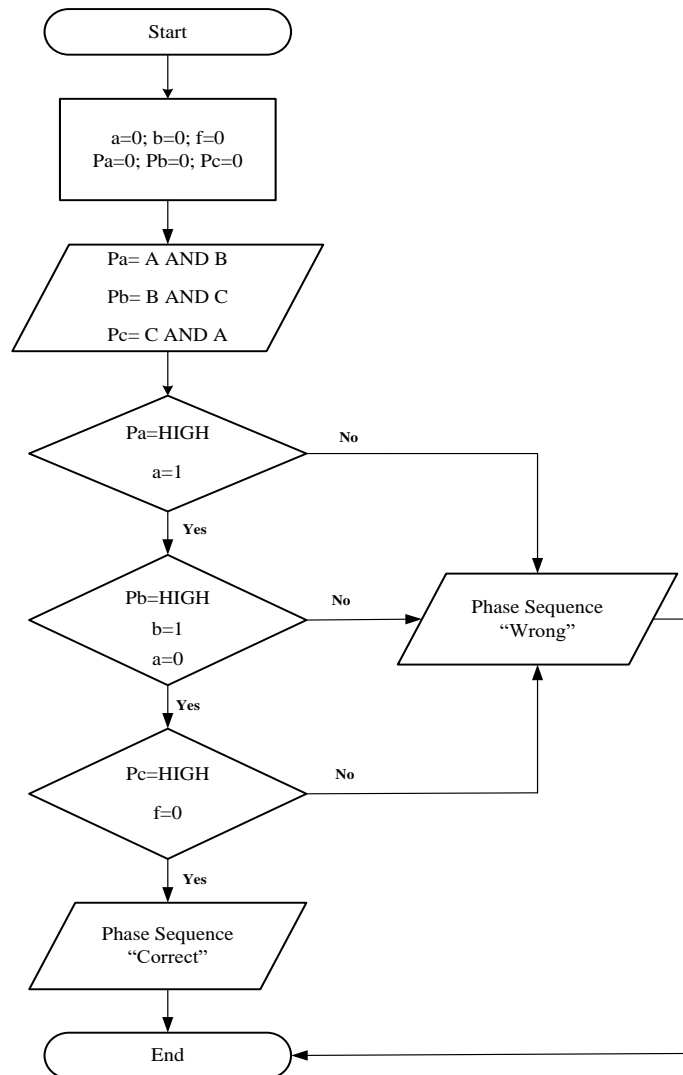
Figure 3: Flow Chart

Result Analysis

Case-1: When supply has correct phase sequence
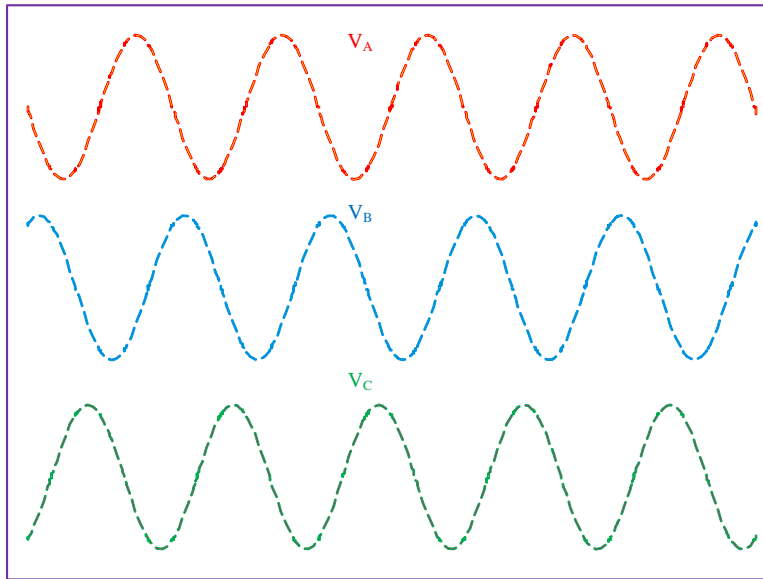
Figure 4: Input from three phase supply

Figure 4 shows the voltage of each phase of a three-phase power supply. These are the inputs to the three-phase motor. It is seen from the figure that voltages of each phase are 120 degree displaced from one another. The phase sequence for this supply voltage is A-B-C (clockwise) which is also considered to be the correct sequence for the motor.
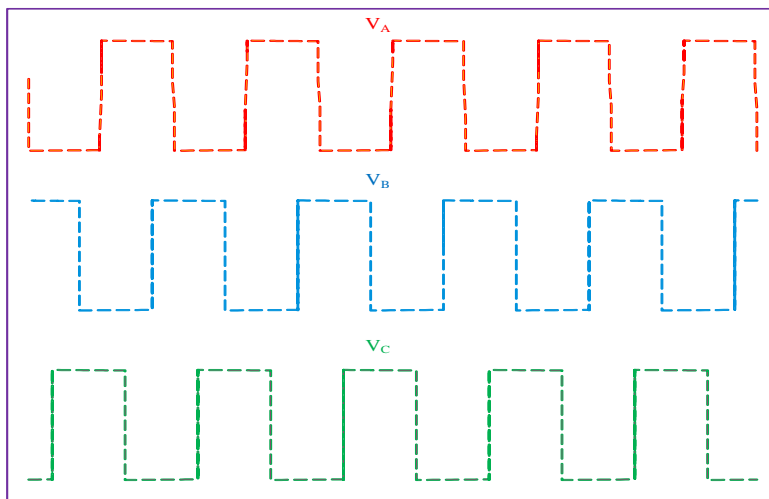
Figure 5: Output of Zero Crossing Detectors

The outputs of zero-crossing detectors are shown in figure 5. The zero-crossing detectors convert sine wave to a square wave with the magnitude of +15 V and -15 V.
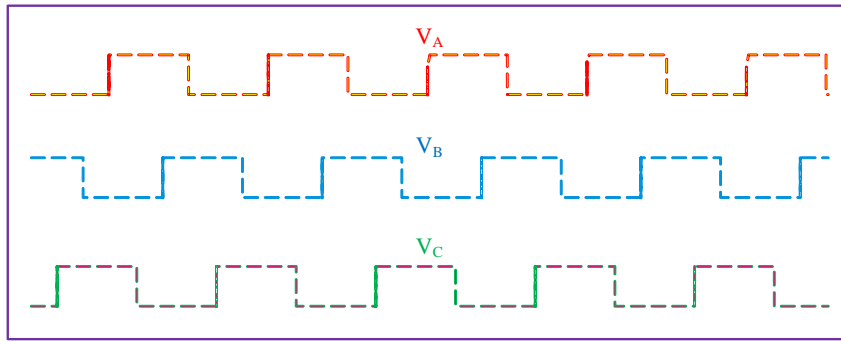
Figure 6: Output of Pulse Converters

Figure 6 shows the output from the pulse converters. The pulse converters convert square wave to pulse signals with a magnitude of 5 V and 0 V.
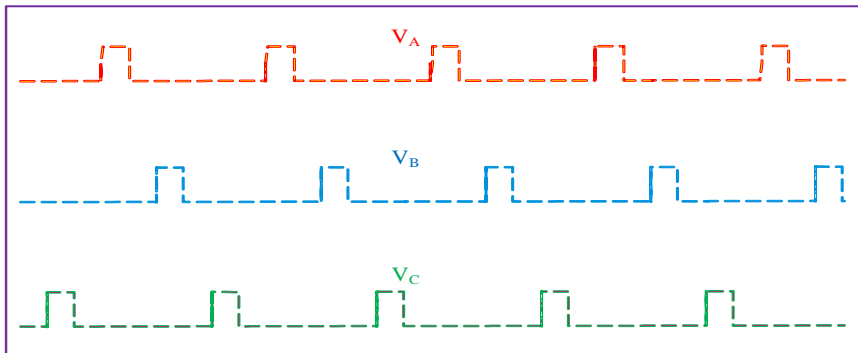
Figure 7: Output of AND gates

Figure 7 shows the output from cascaded AND gates. Pulse signals of phase-A and Phase-B are given input to the AND gate A to determine the overlapping area. Simultaneously signals from Phase-B and Phase-C are supplied to AND gate B and Phase-C and Phase-A are to AND gate C. From the figure it is observed that output of AND-A is first to produce high signal then AND-B after some delay and AND-C produce high signal after AND-B. This indicates that the phase sequences are correct (A-B-C clockwise).

Figure 8: Low Trip Signal for Circuit Breaker

Figure 8 shows the output trip signal for the associated circuit breaker connected with the motor. As the supply (power system) has the correct phase sequence, the ARDUINO will produce a LOW (0 V) trip signal for the circuit breaker.

Figure 9: Output of LCD

The identification of the correct phase sequence of the supply (power system) to the motor is indicated in the LCD which is shown in figure 9.

Case-1: When supply has wrong phase sequence
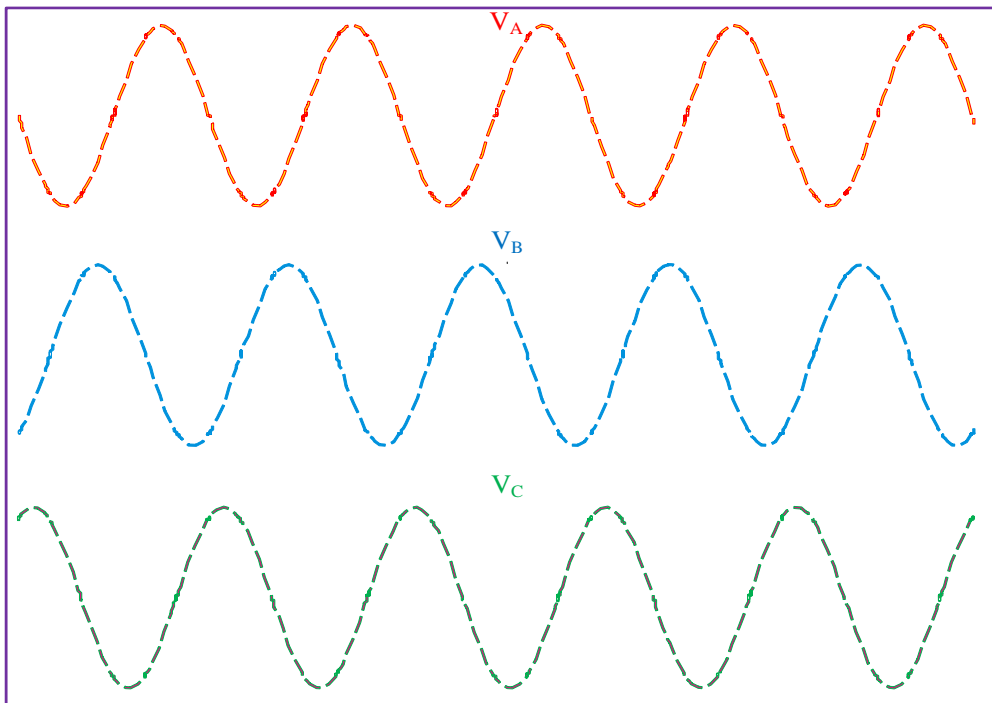
Figure 10: Input from three phase supply

Figure 10 shows the voltage of each phase of a three-phase power supply. The phase sequence for this supply voltage is A-C-B (clockwise) which is also considered to be the wrong sequence for the motor.
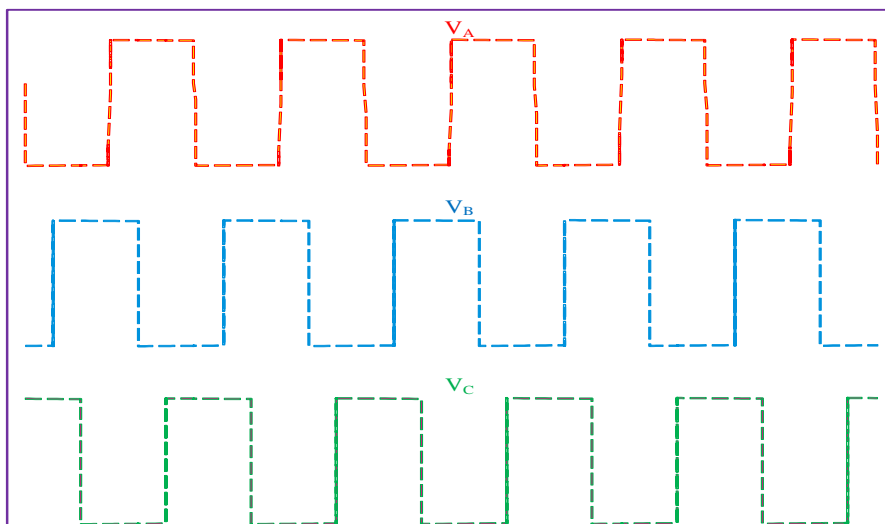
Figure 11: Output of Zero Crossing Detectors

The outputs of zero-crossing detectors from the above three-phase supply are shown in figure 11.
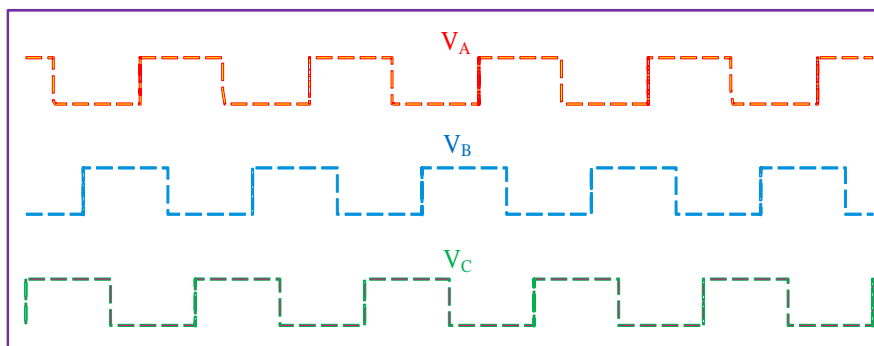
Figure 12: Output of Pulse Converters

Figure 12 shows the output from the pulse converters. The pulse converters convert square wave to pulse signals with a magnitude of 5 V and 0 V.
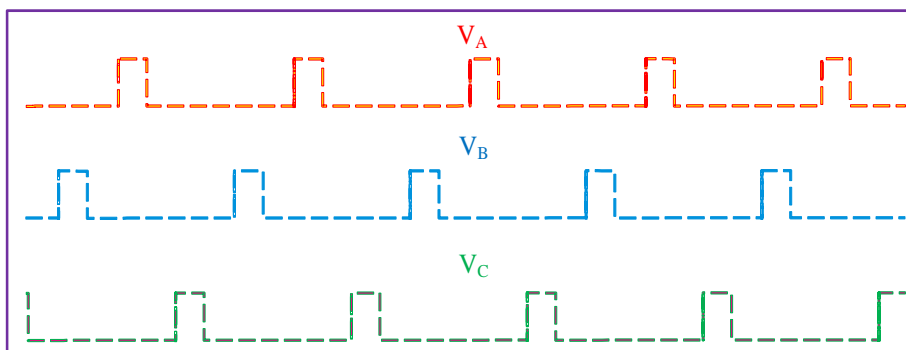
Figure 13: Output of AND gates

Figure 13 shows the output from cascaded AND gates. Pulse signals of phase-A and Phase-B are given input to the AND gate A to determine the overlapping area. Simultaneously signals from Phase-B and Phase-C are supplied to AND gate B and Phase-C and Phase-A are to AND gate C. From the figure it is observed that output of AND-A is first to produce high signal then AND-C after some delay and AND-B produce high signal after AND-C. This indicates that the phase sequences are wrong (A-C-B clockwise).
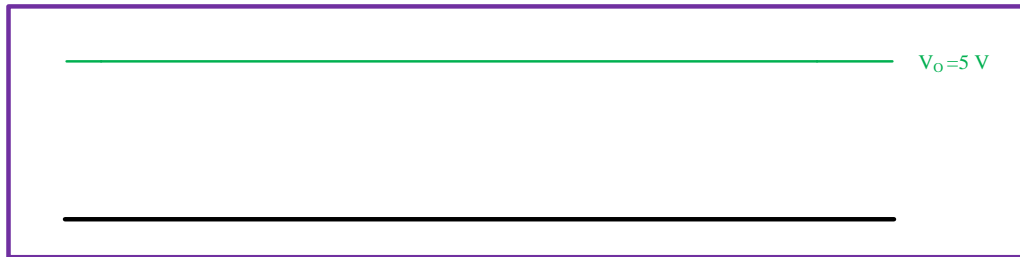
Figure 14: High Trip Signal for Circuit Breaker

Figure 14 shows the output trip signal for the associated circuit breaker connected with the motor. As the supply (power system) has the wrong phase sequence, the ARDUINO will produce a HIGH (5 V) trip signal for the circuit breaker.
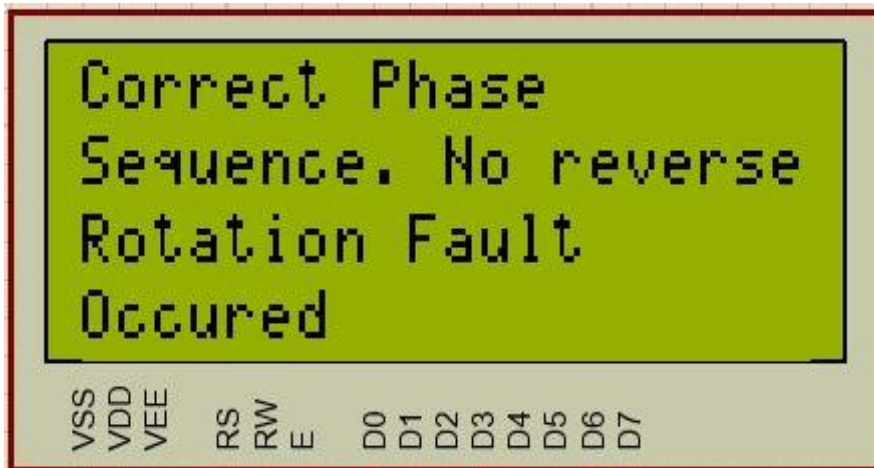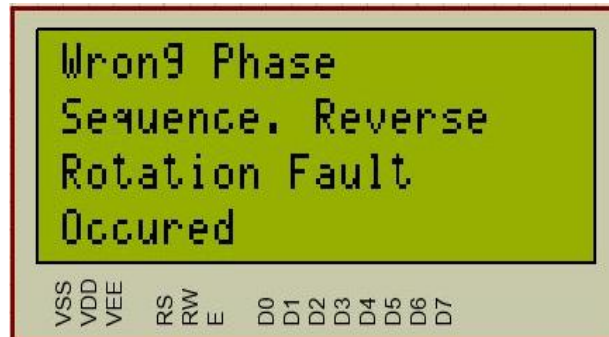

Figure 15: Output of LCD

The identification of the wrong phase sequence of the supply (power system) to the motor is indicated in the LCD which is shown in figure 15.

Conclusion

The main purpose of this work is to protect the three-phase motor against reverse rotation using the Arduino program. Protecting the reverse rotation, this paper focused on designing a system that will detect the wrong phase sequence of the power system and instruct the associated circuit breaker to be tripped. Phase sequence protection is an important safety issue for motors. Reversing the phase sequence causes the motor to reverse its direction of rotation. This can cause serious damage and injury to personnel if, for instance, the motor is coupled with cutting equipment or conveyor belts. Thus it is necessary only to change the phase sequence to change the direction of rotation of the magnetic field. For a three-phase supply, this can be done by interchanging any two of the three lines.

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A Critique on Validity of Academic Reading of International English Language Testing Systems (IELTS)

Md. Abdus Salam⁎

Abstract: This article studies the validity of Academic Reading Module in the International English Language Testing Systems (IELTS) with a view to evaluating the testing procedure, testing questions and the time allocation for the test. It applies qualitative data analysis method to demystify the testing validity of Academic Reading Module of IELTS by pinpointing the problems and challenges that the test takers face during the test. Apart from this, the article recommends solutions on the basis of validity to make the test more valid both for the test takers and test givers. The author finds problems in question format, reading passages mostly taken from science-related topics and time management in Academic Reading Module of IELTS. This article recommends to deduct similar questions, include more reading passages from arts and social sciences and decidetwo reading passages instead of three attemptedin one hour time to make IELTS Academic Module more valid for stakeholders.This article also invites further empirical research to evaluatethe validity of reading skillstest as IELTS is the high stake test.

Key words: Validity, IELTS, Reading, CEFR

Introduction

The validity of a test refers to the construction of a test – how and which way a test is formed to assess stakeholders–such as test giver institutions' expected evaluations and an examinee's way outs to show his or her desired performance. That means if a test is valid, examinees become satisfied by the arrangement of multiline questions set on the question papers and faceable time allocation to complete the answers within the examination schedule.It is worthy to mention that the International English Language Testing System (IELTS) is one of the English language proficiency tests of the world. People from all around the world (where L1-first language is not English) sit for the IELTS test for higher studies and global migration.

IELTS assesses the four skills of English language – listening, reading, writing and speaking. IELTS is designed to judge the understanding and applying capability of a participant in study, work as well as in communication especially in those countries where English is the first language and also in those countries where people use English language as *lingua franca*for communication. So, IELTS is a high stake test for academic and immigration purposes.In 2016, "over three million IELTS tests are taken" (IELTS homepage) all over the world. Since every language has four skills i.e., listening, reading, writing and speaking, on which participants must have the ability to show their competence for acquiring the desired goal of them, IELTS tests the ability of these four skills applying various types of questions. In two types namely Academic IELTS and General Training IELTS, there are sections such as Listening, Academic Reading, General Training Reading, Academic Writing, General Training Writing and Speaking to mitigate the aspiration of different test givers. This article focuses on whether IELTS can evaluate examinees' competence and proficiency or not in terms of validity of testing. IELTS covers four skills of English language but this article only evaluates the assessment criteria of the Academic Reading Module. Firstly, this paper describes the methodology stating the research theme which is followed by the definitions of several terms related to validity to demystify the problems and challenges of a test in terms of validity criteria which are the key principle of a test and of Common European Framework of Reference of English Language (CEFR). This article then

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describes CEFR briefly. Finally, it recommends the probable solution to mitigate the challenges found in this studyby analysing IELTS Academic Reading to judge the effectiveness of the test on the basis of validity of testing.

Methodology

The paper applies qualitative data analysis method to conduct this study. A random selection of an IELTS Academic Reading Test has been taken as the primary data and other research articles and books have been taken as the secondary data to complete the following research objectives:

1. To analyse question pattern and time management of Academic Reading of IETLS
2. To find problems and challenges the examinees of Academic Reading of IELTS faces
3. To recommend solutions for solving the problems and challenges, if any

Construct Validity

Construct validity is the important part of the validity for all kinds of test. In this regard, some test constructors believe thatconstruct validity "is a super ordinate form of validity to which internal and external validity contributes" (Alderson, J. C., Clapham, C., & Wall, D., p.183). It means that question pattern, time management covers the internal validity and test venue, equipment for testing belongs to external validity. Broadly speaking, the word construct of test refers to "any underlying ability that is hypothesized in a theory of language ability to guess the meaning of unknown words from context" (Hughes, p.126). In IELTS academic reading test annexed herewith is to assess the ability by setting a number of questions. For example, in reading passage one the authorfinds 13 questions based on a passage of science topic called 'chronobiology'. It is obvious that that the test takers are not all from science background. So for those of non-science background test takers as well, question setters want to assess whether a test taker can understand and answer the questions or not. Therefore, at the time of selecting the questions, the test constructors should think the category of the test takers. In this connection, Ebel&Frisble (1991) give the following explanation of construct validity:

The term *construct* refers to a psychological construct, a theoretical conceptualization about human behavior that cannot be measured or observed directly i.e., intelligence, achievement motivation, anxiety, achievement, attitude, dominance, and reading comprehension. Construct validation measures the psychological construct the markers intend it to measure.

It means, the test takers should consider the psychology, behaviour, attitude and anxiety of the test takers to make the test more valid. The test constructor is not likely to set questions that might make the test takers anxious. The length of the first reading passage(sources annexed herewith the article) is also very lengthy that might startle the test takers. No explanatory glossary for the technical term is provided to overcome the fear of the examinees and motivate them to perform well through the reading passage.

External Validity

As far as external validity is concerned, the test constructors should think about all arrangements for the test like venue, seat allocation, examination hall temperature and technical devices used for the test to make the test more valid. Hence,Gronlund (1985) describes construct validation as to measure "how well test performance can be interpreted as a meaningful measure of some characteristic or quality"(58). It is found that after finishing the examination, many examinees start talking like that the reading passages are horrible and theyhave not heard the topic before. The test designers, therefore,need to consider the pulse of all categories of examinees. Obviously, this is not to mean that

all questions will be easily answerable; however some questions should be for the average level examinees and some can be for the high level examinees.

IELTS readingsare designed to test whether the examinees can read "quickly and efficiently" (IELTS homepage) or not and whether they can manage their time or not. Examinees will be asked to read three different passages and answer to questions based on those reading passages. However, the content of Academic Reading test and General Reading test are different. Apart from this, IELTS reading test is designed to assess a variety of reading skills of the participants such as, to understand the "general sense"of a passage; to cope with the "main idea"; to read in detail; to apprehend "inferences and implied meaning"; to identify author's 'opinion, attitude and purpose and to "follow the development of an argument"(IELTS homepage). To judge all these ability, 60 minutes time isoffered for academic reading test. No extra time is provided for transferring the answers and no declaration is there "when to start or finish each section" (IELTShomepage). A total of three different kinds of passage accompanied by questions will be set to read and answer questions. This means, a participant is expected to read 2150 to 2750 words to read during the test. Such a lengthy test with so many unknown questions might arouse fear in the mind of a test taker, and therefore, the test might lose the construct validity of IELTS.

AnalysingtheIELTS academic reading test passages it is found that thecontents are usually taken from books, journals, magazines and newspaperson science, arts, social science and commerce. According to IELTS homepage, these passages aredescriptive, factual, discursive and analytical. There may be diagrams, graphs or illustrations to read and understand.The test constructors, however,need to be cautious in selecting the reading passages covering the all established fields of knowledge like arts, science, commerce and literature to maintain construct validity of the test.

There are 40 questions in variationssuch as gap-filling in a passage of written text or in a table, matching headings to written text to diagrams or charts, completing sentences, giving short answers to open questions and answering multiple choice questions. Sometimes examineesneed to give one word answer, sometimes a short phrase, sometimes simply a letter, number or symbol. Each correct answer carries one mark, and scores are converted to the 9-band scale and are reported in whole and half bands (IELTS homepage).

Different categories of questions are set to judge the ability of different levels of readers or participants. There are questions for all levels of test givers. Some questions are for the average readers and these types of questions can be answered easily. For example, one word answer based questions. Some questions are for the expert readers just like MCQ and True/False/Not Given questions.This paperargues not for the variations of questions but for the lengthy passages and time constraints that might jeopardise the construct validity of the test.

As regards content validity the relevance of a test is considered to the real world. In the present context it can be said how relevant is the content to the assessment domain like readingthat is the English language reading ability. In this regard, if a student wants to go for higher education, she/he has to study and understand many reading materials written in English. Thus, IELTS academic reading tests are designed to assess a learner's quick reading and understanding ability by setting a number of passages from a variety of source including analytical and descriptive. In the reading passages attached herewith as an appendix, we see both descriptive (first section) and analytical passage (third section). Hence, Hughes (1989) says, "In order to judge whether or not a test has content validity, we need a specification of the skills or structures, etc.it will always not be the case that all specifications will be present in all test, however, the test constructor with the basis for making a principled selection of element for inclusion in the test" (129). That is to say the test constructor will make a specified structure of the test considering the assessment to the participants. Just for an example, in IELTS Academic Reading test attached herewith, the author sees structure i.e., time 60 minutes; questions 40

in numbers; three sections; scores in 9-band scale. Every item of this test is calculative on the reading skill of the learners that is necessary for a non-native English speaker while studying in an English speaking country. So, the most important salient feature of content validity, "the greater a test's content validity, the more likely it is to be an accurate measure of what it is supposed to measure, i.e. to have construct validity"(Hughes26) in other way. Alderson, Clapham and Wall observe that the test specification in content validity "may be a formal teaching syllabus or curriculum, or it may be a domain specification" (173). However, Henning (1987) says, "criterion- or domain-referenced tests have certain profound advantages over more traditional norm-referenced tests" (87). Bachman et al. (1988) have mentioned two rating scales for content validity:

The Communicative Language Ability (CLA) covering the areas of grammatical, textual, illocutionary, sociolinguistic and strategic competence; Test Method Characteristics (TMC) concerning the testing environment, test rubric, item type and nature of test input in which complexity of language, rhetorical organization, degree of contextualization, test topic, cultural bias and pragmatic characteristics(cited in Alderson et al,p.174).

In IELTS academic reading passages which are set as an appendix of this study, content validity is nicely maintained for the better assessment of the examinees. Here, the assessment domain is English language. If an examinee fails to secure a good band, it is obviously accepted by all overseas educational institutions that the examinee is not able to achieve education in an English speaking country. It means, a learner has to read and understand many reading materials even more complex than an academic reading test in a short period of time.Observing the necessity of examinees, IELTS Academic Reading test is designed toassess the students,and thisis accepted by educational institutions of the English speaking world.

Face Validity

Face validity means the perception of the examinees about the test. Whenever an examinee sits for the IELTS academic test, she/he must have an idea of the language skills required to study in an English speaking country. Over the years,participants from all over the world are attending IELTS academic test to go for higher education. To Hughes (1989),"A test which does not have face validity may not be accepted by candidates, teachers, education authorities or employers" (45).

As IELTS score is accepted by the educational institutions of the English speaking countries like the UK, the USA, Canada, Australia, New Zealand and others. It is also accepted even in the countries where English language is used as second language. Such countries include India, Malaysia and others. Ingram (1977) has explained, "face validity refers to the test's surface credibility or public acceptability" (18). Thus, face validity is related to the "holistic, referring to the test as a whole" (Alderson et al172). Sometimes, examinee may claim about the "particular poor items, unclear instructions or unrealistic time limits, as a way of justifying a global judgement about the test" (172). However, due to the advent of communicative language testing (CLT), Morrow (1979;1986) and Carroll (1980;1985) argue about the "authenticity" and mention that "a communicative language test should look like something one might do in the real world with language" (Alderson et al172). In this regard, the test constructor must be conscious about the face validity of a test and they have to think whether or not a test is "acceptable to users" (173). Thus:

[t]hat face validity is important in testing; tests that do not appear to be valid to users may not taken seriously for their given purpose; if examinees consider a test to be face valid, they are more likely to perform to the best of their ability(Alderson et al173).

Criterion Validity

Criterion validity refers to the day to day measuring the same thing and to get the same result of the test. IELTS academic reading test is conducted by the British Council and IDP throughout the globe over the years. If a participant is asked to sit for a test in a day and the same participant is asked again to sit for the test in the next day, the result of the participant will be more or less same; if it is the situation, the test has criterion validity. There are two kinds of criterion validity; "concurrent validity and predictive validity" (Hughes 89). For example, if a student attends a test of 60 minutes reading test in a set structured items and get a result; if that student attends that kind of test on the same set items but less in question numbers in 30 minutes; if in both cases the result or performance of the participant remain same, then the test has concurrent validity. In case of IELTS academic reading test, the result or score of the participant will remain same because the items are selected in such a way that the examinee will able to answer the questions on which she/he has the required skill. Just for an example, an average reader cannot answer correctly to the questions like MCQ and True/False/Not Given questions even if she/he gets ample time for answering.

The other kind of criterion validity is predictive validity which means a test taker's "future performance" (Hughes 29). IELTS academic reading test is designed for the learners who intend to study abroad and to migrate to the countries where English is the language for instruction. Predictive validity will ask whether the goal of getting education and understanding the reading material written in English will be equivalent to the score level of the examinee or not. If the answer is 'yes', it might prove that the test has predictive validity. In this regard, it is mentionable that the candidate who does good in IELTS academic reading test, obviously she/he will do good in her/his future performance abroad at the time of receiving education in English speaking country.

Benchmark of IELTS levels against the CEFR

The Common European Framework of Reference for Language is the standard form of evaluation of an examinee's competence and performance based on four skill's ability in any language. To set these criteria, the Council of Europe has made a division of participant's abilities into six stages which are A1, A2, B1, B2, C1 and C2 with ALTE (Association of Language Testers in Europe). Now, let's see the CEFR stages comparing to IELTS scores.

1. A1 is the lowest CEFR level, it is attainable by only the very beginners of English learning. They can understand very short, simple texts, a single phrase at a time, picking up familiar names, words and basic phrases and reading as required. There is not equivalent level on IELTS band scale.

2. Level A2 is the elementary stage, where readers can understand short, simple texts containing the highest frequency vocabulary, including a proportion of shared international vocabulary items. A very slight difference is there between A1 and A2. This corresponds roughly to 4 on the IELTS. They are called limited users because they have frequent problems with understanding a reading passage andanswering question accordingly.

3. Next level is the intermediate B1. Candidates can understand short simple texts on familiar matters of a concrete type which consists of high frequency everyday or job-related language. The band score is equal to 4.5 and 5.0 on the IELTS. They have difficulties with more intricate language but can usually understand overall meaning.

4. The upper intermediate stage is called level B2. At this stage, the reader can read with a large degree of independence, adapting style and speed of reading to different texts and purposes, and using appropriate reference sources selectively. Has a broad active reading vocabulary, but may

experience some difficulty with law-frequency idioms. The band is the similar as 5.5-6.5 on the IELTS.

5. The advanced level is named C1. Examinees can understand a wide variety of texts including literary writings, newspaper or magazine articles, and specialized academic or professional publications, provided that there are opportunities for re-reading and she/he has access to reference tools. Band score is comparable to 7-8 on the IELTS.

6. Level C2 might be named the 'Mastery' stage. The learner can understand in detail lengthy, complex texts, whether or not they relate to his/her own area of specialty, provided she/he can reread difficult sections; can understand a wide range of long and complex texts, appreciating subtle distinctions of style and implicit as well as explicit meaning; can understand virtually all forms of the written language including abstract, structurally complex, or highly colloquial literary and non-literary writings. This is approximately the same as 8-9 on the IELTS. This level is the standard of an expert, which means they have a full understanding of the English used in any given situation.

Discussion and Recommendations

1. In case of face validity, the examinee faces time constraint. In this regard, this article recommends that there might be two reading passages and time 60 minutes will be fine for all kinds of readers. Sometimes, the author finds repetition of items and structure with a view to maintaining the standard of the examination. For example, questions 1-7 are on True/False/Not given and again questions 32-37 are on Yes/No/Not given. It reads, there is no basic difference between these two items mentioned earlier. So, the author recommends that the test constructor will accept recommendations successively for the improvement of face validity of a highly circulated language ability testing examination like IELTS.

2. In many countries of the world, science is not very developed and science education is also on the wane. In this regard, this article recommends selecting reading passages from a variety of sources, not all from one field like science. For making the idea clear, the titles of the reading passagesannexed herewith are 'Making time for science'; 'The Triune' Brain'; 'Helium's future up in the air'. So, two passages are from science and one from astronomy. The participants might get startled to see such kind of texts. Thus, therefore, this author recommends inclusion story of different kinds like story from folktales and arts and humanities as items of the reading passages in IELTS Academic Reading module.

3. This article also invites further empirical research to make IELTS Academic Reading Module more valid in term of assessment criteria.

Conclusion

The IELTS is a worldly-accepted and marketed, English-language test covering all four major skills and is acknowledged by tens of hundreds institutions from all over the globe for the purposes of higher education and immigration. This article has demystified some basic tenets of validity such as construct, content, face and criterion validity of IELTS Academic Reading sub-section from the different sources like books and research articles. This paper has recommended some changes in face validity that might be considered by the successive test constructors. In case of IELTS, this paper will see time as a friend and also as an enemy for doing better like a time-limited test. Since many participants from all over the world take part in IELTS for fulfilling their dream of studying and living abroad, there is tremendous scope of research for improving the construct validity of IELTS.

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Maneuvering the impact of COVID-19 pandemic with the existing scenario of Bangladesh: Deficiency in legal policy including legal & social challenges that come within 'The Communicable Diseases Act 2018'

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Abstract: Nobody knew that the outbreak of COVID-19 would bring the world to its knees with the unprecedented level of transmission of the novel coronavirus, which has caused severe consequences globally, affecting more than 67 million and resulting deaths of almost 4million till 31st May 2020. In a vulnerable country like Bangladesh with limited resources, the aftermath of Corona has cost us heavily due to being one of the highest densely populated nations in the world along with the fact that no cure has been invented globally. However, the Bangladesh government is facing difficulties to tackle the situation mostly because people are unfamiliar with these new terms relating to COVID-19 and even if knowing about such, people have the tendency to defy regulations of lockdown, quarantine and social distance, which is an another major issue. For the purpose of controlling, preventing and eradicating, the government of Bangladesh has incorporated the life-threatening novel coronavirus (COVID-19) in 'The Communicable Diseases (Prevention, Control and Eradication) Act, 2018', regardless of the objectives to enforce the Act, a dilemma may arise on the applicability and suitability of the overall influence on the ordinary people. Thereby, this research study aims to identify, examine and analyze the applicability and enforceability of the Communicable Diseases Act along with the overall gravity it may have contributed towards the mitigation, if properly enforced, on the current scenario of pandemic crisis in Bangladesh.

Key Words: Novel Corona virus (COVID-19), Pandemic, Lock down, Quarantine, Social Distance, Communicable Disease, Legal Frameworks, Social Challenges.

Introduction

The outbreak of Coronavirus (COVID-19), a new infectious disease causing severe acute respiratory syndrome has affected more than 67 million people around the globe which is referred as a pandemic crisis till 31st May 2020. In a vulnerable country like Bangladesh with limited resources, the aftermath of Corona can cost us heavily due to being one of the highest densely populated nations in the world along with the fact that no cure has been invented globally. To minimize the impact of this newly disease, a nation must take immediate measurements as like Taiwan, to lockdown the perimeter of infected areas as well as isolate those who have been transmitted with this disease; otherwise the outburst may result in a greater distress. However, the Bangladesh government is facing difficulties to tackle the situation mostly because people are unfamiliar with these terms such as quarantine, isolation, social-distancing, lockdown and what precautions to take or what not, as something new this has never happened before, even if knowing about such, people have the tendency to defy regulations which is an another major issue. For the purpose of controlling, preventing and eradicating, the government of Bangladesh has incorporated the life-threatening novel coronavirus (COVID-19) in 'The Communicable Diseases (Prevention, Control and Eradication) Act, 2018', after repealing and merging with some of the dated laws and ordinances relating to infectious disease control. Regardless the

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objectives for enforcing this legislation, a dilemma may arise on the applicability and suitability of the overall influence of the law on the ordinary people. Therefore, this research study aimed to identify, examine and analyze the applicability and enforceability of the Communicable Diseases Act along with the overall gravity it may have contributed towards the mitigation, if properly enforced, on the current scenario of pandemic crisis in Bangladesh.

Objectives

The main purpose behind the research paper is to exhibit the gravity of legal and social impact under the regulation of the newly Communicable Diseases Act might have created on the minimization of current scenario of COVID-19 in Bangladesh, only if this Act was properly implemented earlier. In addition to, the research study, the authors have highlighted on the following purposes:

1. Whether there is any existing challenge while enforcing the newly said Act, if so, what are the strengths and weaknesses of this Act?
2. What measures were adopted or are taken in this context by the Administrative sectors of Bangladesh comparing with Taiwan example?
3. Whether the newly Act is feasible in nature, based upon the strategic management carried out by the concerned authorities of Bangladesh?
4. To determine and analyze contributing reasons which persuaded the ordinary people of Bangladesh to defy the newly enacted Act.
5. To assist future researchers to understand the following subject and assist them for further research.

Methodology

To improvise and analyze the research study, the information has been obtained from both primary and secondary sources. In case of primary data, the information was collected through the online survey using Google form among 102 respondents enrolled in different category of professions, consisting of 16 questions, containing both open ended as well as close ended structures in the form of multiple choice questions, written in both Bangla and English, and also their opinions were considered regarding the newly enacted Act and ways to improvise the Act more effectively. Moreover, data collected from questionnaires are qualitative interviews because all questions were designed to get the opinions and experiences of informants to fulfill the research purposes. For in-depth critical evaluation of the newly Communicable Act, expert opinions of lawyers, journalists and social activities were also taken into considerations with the help of Zoom platform video conference, organized by the Center for Law and Policy Affairs (CLPA), non-governmental organization. On the other hand, secondary data was collected from numerous secondary sources such as books, journals, Case Laws, newspapers, and websites.

Pre and Post Situation of Bangladesh in Comparison with Taiwan while Tackling the Impact of COVID-19

"The success or failure of any government in the final analysis must be measured by the well-being of its citizens. Nothing can be more important to a state than its public health; the state's paramount concern should be the health of its people"

Franklin Delano Roosevelt

Global research studies have analyzed that immediate and strict interventions from the government are major ways to reduce the spread of COVID-19. However, considering the rate of level of awareness, literacy and importantly, being the world's third largest densely populated country, the burden for Bangladesh government has doubled the challenges while dealing with the prevention of infectious disease. But instances from other countries like Taiwan, Singapore, Iceland, and New Zealand have set examples that a country possessing good healthcare system, science, technology and good governance can beat any emerging disease, no matter what size, population or literacy rate of a country possesses.

Perhaps narrowing to the initiatives taken at the initial stages by the government when corona was emerging globally would clear our views on this matter. According to the suggestions of global scientists, COVID-19 the new coronavirus, spread quickly around the world after it emerged in China sometime within October 6, 2019 to December 11, 2019, resulting more than 3.71 million infected people and 258,186 have died globally[1]. Taking it as a warning sign, different countries have taken different precautionary measures to control the spread of Covid-19, where the success rate of Taiwan at controlling the spread of infectious coronavirus has won it global recognition.

The National Health Command Center of Taiwan had taken early measures on 3rd week of December, last year, by first learning then-unidentified severe respiratory disease of COVID-19 with the possibility of human-to-human transmission and then sent two experts to Wuhan to enhance their understanding of the virus. During the month of January, current year, they took steps on disinfecting local transports, monitored all individuals who had travelled to Wuhan within 14 days or had a fever or upper respiratory tract infections and imposed strict border controls as early as January 25, closing access to visitors from mainland China, Hong Kong and Macau, as a mechanism to fast response and detect infected persons. Despite being half a million Taiwanese working on the mainland and a million people from the mainland visiting the island per year, triggered the fact that Taiwan would be the hardest hit locality amid the pandemic situation. However, they introduced the system of 'Quick Response' by code scanning and online reporting of travel records and health symptoms to reduce the risk of infecting others, based on the origin of their flights and 14-days travel histories, and failure to maintain 14-days quarantine regulations would suffice to a fine up of NT$1 million (US $ 33,000). With the help of technology and governmental recruited companies and organizations including the military and prison authorities, each Taiwanese citizen is allowed to buy three masks per week at a cost of just NT$15 (US $ 0.50), using a national health insurance ID card[2]. Following the remarkable precautionary mechanisms have allowed such country to comprehend the spread of infectious disease within the end of March, 2020, causing death of just 7 persons and infecting 449 persons till today[3]. Similar precautionary approaches have been adopted in various countries depending upon their circumstances, but unfortunately, only few countries were successful against the battle of novel coronavirus.

Viewing from the context of Bangladesh, lack of medical facilities, lack of governmental management, lack of maintaining lock down; isolation; social-distancing, considering populated country and lack of awareness have made us vulnerable towards the pandemic outbreak. The term 'pandemic' was not mentioned in any legislation of Bangladesh which caused ambiguity in the legal arena until recently on 18th March, 2020, the High Court Division declared and directed the government to issue national gazette that novel coronavirus COVID-19 should also be included along with 23 already enlisted diseases in 'The Communicable Diseases (Prevention, Control and Eradication) Act, 2018', giving it a retrospective effectiveness from March 8 this year, when the first case of coronavirus was detected in Bangladesh[3]. In this regard, the government published gazette notification on 23rd March, 2020, after 5 days to tackle the nationwide health emergency in eradicating the infectious disease. Although the provisions in spreading dangerous epidemic disease were included in the precious Epidemic Diseases Act (1897), but it was abolished for legal ambiguity and later the newly Act was adopted without the

inclusion of the word 'pandemic', containing loopholes within the legal provisions and exhibiting the high possibility of impractical outcome.

Just like any other country the initial step taken to fight back against COVID-19 is by imposing strict country wide border lockdown through shutting down airports, seaports, rail stations, bus stations and all other public transports so that no foreign infected person could enter into the country and infect others until the entire situation reverts back to normal. Another major initiative is to carry out as much as tests, if possible, in order to isolate those infected persons from others and provide them speedy medical treatments. With the first instances of confirmed corona cases in Bangladesh on 8th March 2020[5], the government failed to prepare initial adequate measurements to contain the spread. Before that, the U.S. embassy in Dhaka included Bangladesh in a list of 25 countries at high risk of Covid-19 on 4th March, 2020[6]. Knowing all these warning signs, the government declared 'general holiday' instead of strict country wide lockdown from 26th March, 2020, and from here on then the number of days of holiday began so does the rate of death and infected persons, whereas different countries have adopted drastic measures such as Taiwan itself. Till today, the total numbers of infected cases are 162,417 total death 2,052, carrying out total 849,062 tests and recovered 72,625 persons, where Dhaka city along has the highest infected rate with 18,671 cases[7].

Legal Anatomy of 'The Communicable Diseases (Prevention, Control and Eradication) Act, 2018 in respect to Governmental Initiatives

Nobody knew that the outbreak of an infectious disease would bring the world to its knees with the unprecedented level of transmission of the novel coronavirus has caused severe consequences globally. As the world struggles to barely survive in this pandemic, Bangladesh has seemed to be napping in spite of getting a head-start of three months since the spread of COVID-19 from China. Although the State has the primary responsibility to ensure the improvement of public health through enacting and adopting various preventive measures and initiatives as set forth under Part II of the Constitution of Bangladesh, for the best interest of the State[8]. However, international and national experts blame the ineffectiveness of the application of legal provisions even in the presence of numerous national laws among which are, the *Penal Code, 1860* and the *Communicable Diseases (Prevention, Control and Eradication) Act, 2018*, inadequate precautionary measurements where example can be taken from Taiwan, as well as poor decision making and management from the government side. But at the same time, huge number of people about 80% (Figure 6) from the survey agrees that insufficient knowledge of people regarding COVID-19, have caused them to defy the regulations of lockdown, quarantine and social distance, particularly including poor people who attempted mostly in search of food and medical supplies (Figure 7). Perhaps, early planning and productive steps relating to the distribution of food, medicine and essential materials could have controlled the existing scenario before exceeding beyond our control. As the State further vests fundamental responsibility to provide and assure basic necessities of life, including food, clothing, shelter, education and medical care to every citizen[9].

Through evaluation of the newly Communicable Act, it will exhibit the extent of gap existing between legal provisions and practical scenarios in the societal context of Bangladesh. The following Act has been enacted and adopted in consonance with the World Health Organization (WHO) and International Health Regulation enumerated under **Section 9**, where the duties and functions of this Act will be performed *by the Health Ministry during the epidemic emergency* of the country, subjected to general or special powers of the government. The Directorate of Health shall be entrusted to formulate strategic policies to prevent, control and eradicate communicable diseases and safeguard humankind from its national or international escalation acquiring collaboration from public, private, domestic or international organizations, if necessary under **Section 2**[10]. Ensuring the interest of public health just not only come within the purview of the fundamentally responsibility of the State under Part II of **the**

Constitution but also reflects the significance of the fundamental rights as the Right to Public Health comes within the ambit of *Right to Life[11] as well as Right to Protection of Law[12]*, being enumerated under Part III of **the Constitution**. However, COVID-19; global pandemic, was *neither within the ambit of the new legislation nor any legal definition* was provided until recently the High Court Division of Bangladesh declared and directed the government to enlist COVID-19 with other 23 diseases under **Section 4** on 18th March of the current year. However, within the enlistment of COVID-19, *no legal definition has been clarified whether it is a contagious, infectious, deadly disease or virus, or whether it is 'epidemic' or 'pandemic', or whether it is sufficient to state COVID-19 as just any other communicable disease* and there is *no such separate provision on how to tackle and deal with such infectious disease as it is highly contagious*, hence this leaves room for legal ambiguity because *'pandemic' and 'communicable' have two different meanings, referring to different types of diseases.* Probably limited time frame might have caused such anarchy but COVID-19 was finally included on 23rd March, 2020 in the National Gazette, whereas WHO has published the first Disease Outbreak news on the new virus on 5th January, 2020, with active investigation for the entire month of January and finally declared the novel coronavirus (COVID-19) outbreak **a global pandemic on March 11, 2020[13]**.

A special significance has been prescribed under **Section 3** that no matter what other national laws say, in times of epidemic emergency crisis, the *special law of Communicable Act shall prevail above all*, where the ordinary people including top governmental officials are bound to comply with the rules and regulations provided, *monitored and regulated by the Director General of the Department of Health[14]*. In pursuance of **Section 5**, the Directorate of Health is empowered to taking necessary initiatives to address public health emergencies and reduce health risks, increase awareness, prevent and control infectious diseases through by any means, to separate the infected area from the infection-free area, providing necessary instructions to prevent the spread of the disease to the infected area and to prevent recurrence in the affected area, to examine the person infected with the infectious disease and, if necessary, antibiotic, preventive vaccine or drug application and instructing such person to deliver information to the Directorate regarding such disease, to contain the spread of the disease, the Directorate can impose quarantine or isolation measures on any person suspected to be affected, at any hospital, temporary hospital, establishment or their homes, to restrict movements within the country along with as the arrival of flights, sea-vessels, buses, trains or other vehicles from one place to another, both nationally and internationally, to inspect and to take necessary actions in any place or establishment, house, or in any clinic, hospital and diagnostic lab that provides healthcare for contagious diseases, accordingly if it is provided to the person suffering from infectious disease, considering to be the source of transmission of such disease and to perform any other duties if assigned by the government from time to time.

Previous experiences had shown that the outbreaks of epidemic like *Chikungunya back in 2017 and Dengue in 2019*, are a common phenomenon to the people of Bangladesh, who are victimized of the vicious cycle of ineffective public policy, negligence by government officials and an inadequate and unprepared health system[15], even in the presence of numerous national health laws entrusting upon the Directorate of Health. Similar patterns are also emerging in dealing with the new pandemic situation because government agencies have chosen once again to ignore early signs, not to understand and acknowledge the gravity of the situation. As already stated under **Section 5**, Health Directorate shall be empowered with special jurisdiction to take any necessary measurements to reduce the risk of public health to provide the best outcome for the state, but contrarily reality is showing otherwise. In pursuance of **sub-sec.1 (o)** of the following **Section 5**, specially emphasizes that the Health Directorate can declare any markets, masses, stations, airports, boats and ports temporarily closed to prevent the outbreak but instead the Civil Aviation Authority of Bangladesh (CAAB) has announced temporary partial shutdown on one of the International Airport from 20th March, 2020, keeping other International and National Airports open[16], whereas the first corona cases was confirmed on 8th March, 2020. On the

other hand, public transports like plane, train, ferry and bus services, CNG-run auto rickshaws and improvised motorized vehicles were temporarily shut down after the death of four corona patients, however, exempting trucks, covered vans and vehicles carrying medicine, fuel and perishable items, through issuing a notice by the Ministry of Road Transport and Bridges from 26th March, 2020[17]. On the same date, Bangladesh Inland Water Transport Authority (BIWTA) has suspended operations of water vessels across the country[18]. Corresponding decision was also taken for national supermarkets except for kitchen markets, food shops, pharmacies, hospitals and all emergency services on a limited duration, announced by the Cabinet Secretary[19]. Thereby, all these instances are indicating towards the mismanagement strategies applied by different ministries and divisions of government without the consultation of Health Directorate in case of decision makings relating to national public health emergence, which has also been agreed by the respondents of the survey **about 61%** (*mentioned in Figure 15*), and most importantly practical approaches directly contradict with the provisions of **Section 5(1) (o)**. Further, the Directorate of Health is empowered to declare any area as infected and prohibit entry; if the disease in any particular area cannot be contained or removed and if there are reasons to believe that the disease may be transmitted from an infected individual, the Director or any empowered official may direct for that person to be isolated or transferred to a different location[20]. Instead of imposing countrywide *'Lockdown, a situation in which people are not allowed to enter or leave a building or area freely because of an emergency[21]'* the Ministry of Public Administration rather announced the *'General Public Holiday, a day when most people do not go to work or school, especially because of a religious or national celebration[22]'* from 26th March, 2020 till 30th May, 2020[23] after the outcome of four deaths and at least 39 infections[24], where 'Lockdown' and 'Public Holiday' express two different interpretations, which would have carried out by the Health Directorate, imposing the entire country under lockdown, if complying under **Section 11** and hence, indication another contradictory proviso under the following Act.

In addition to, the Act imposes responsibility upon the concerned health practitioners and respective owners and managers of hotels, boarding(s) or residential places to notify the Civil Surgeon, then he shall promptly notify the Director General of such matter, regarding any instances of contamination[25]. If any authorized officer has reason to believe that the substance used by a contagious person remains infected then he may in the manner prescribed by the rules, purify or destroy those[26], can direct the owner for purification in the manner prescribed herein if finds infected vehicle[27], the authorized officer has also the authority to transfer to other place or isolate any such infected person temporarily, in the manner prescribed by rules, if he has reason to believe that through that patient others might be affected then he can isolate the infected person from infected free persons and transfer to any isolated place[28], but referring to which place, what sort of place he would be going to send or whether we have any such kind of place exists, such contentions are vague. Lots of panic and speculations are surrounded regarding the burial process of those who have died because of corona infections or could have died having similar corona symptoms, with the fear that people might get infected if they touch the dead body during the burial process which is why many family members have abandoned the funeral processions of the deceased persons[29], however, the entire burial process is illustrated under **Section 20** which will be buried or disposed off as per the directions of the empowered officials in this regard.

In case of imposing punishment, this Act offers two penal sections one is under **Section 25** where if any person obstructs any Director General, Civil Surgeon or any other empowered official from performing their lawful duties or defies to follow any direction instructed by them then such act shall be punishable with up three months imprisonment and/or fine up to Tk. 50,000 (US $590) and another is under **Section 26**, where if any person provides false or misinformation despite knowing the correct information, shall be sentenced to maximum two months of imprisonment and/or a fine of BDT 25,000 (Us $294). In addition to, the **Penal Code, 1860** also imposes criminal liability where a person

commits any act which they know or have reason to believe is 'likely to spread' the infection of a disease dangerous to life, then he shall be punishable under imprisoned for a term up to six months or be liable to fine or both[30]. As there is no doubt that the fatality rate of the COVID-19 can have deadly consequences and the terms 'likely to spread' and 'have the reason to believe is' can extend to the wide application towards the prevention of the virus. Even if a person disobeys any rule of putting vessels into quarantine or regulating the intercourse between places where an infectious disease prevails and other places then he shall be punishable of imprisonment up to six months and/or fine or both under **Section 270 of the Penal Code, 1860**. Comparing these both laws for imposing punishment the Penal Code, comprises provisions relating to the negligent and malignant spread of infectious diseases, penalizing those who disobey the regulations of quarantine whereas the newly Communicable Act is based upon present context.

Yet people, who breached lockdown, quarantine and social distance, were penalized under various national laws with different ranges of fine, without the complete implementation of the Communicable Act, solely conducted through the jurisdiction of the Mobile Court, carried out by the Executive Magistrate [31]. This clearly contradicts against the intention of the ***Communicable Diseases (Prevention, Control and Eradication) Act, 2018***, highlighting in pursuance of **Section 3**, where one side illustrates the significance of prevailing this newly Act about all, during any epidemic crisis or national health emergence and other side reflects the failure of the state to acknowledge the purpose of law with inadequate strategic policy, unprepared health system, ineffective enforcement of legal provisions and assurance of the public safety, particularly to those, who are continuously working in the field for our safe and security.
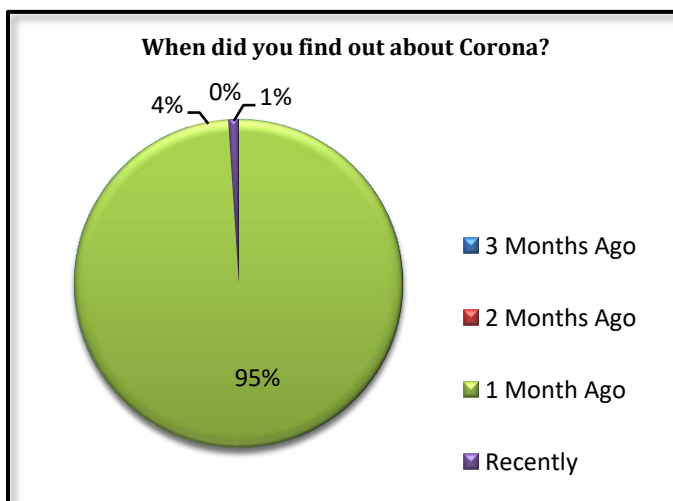
Findings, Discussion and Analysis

To further emphasize and reflect the social perspectives in order to fulfill the objectives of the research paper, a google survey was conducted among 102 respondents, between 70% men and 30% women around 24 to 60 ages, having enrolled in different genres of profession where among 34.3% are students, 9.8% are advocates, 9.8% are private job holders, 8.8% are involved in teaching, 7.8% are businesspersons, 3.9% are bankers, 3.9% are engaged in researching fields, 2.9% are journalists and the rest 18.8% are from other sectors of professions. The following figure shows the views of general people in dealing with the control of infectious disease Covid-19 in Bangladesh from both government and general people's sides, highlighted underneath:-
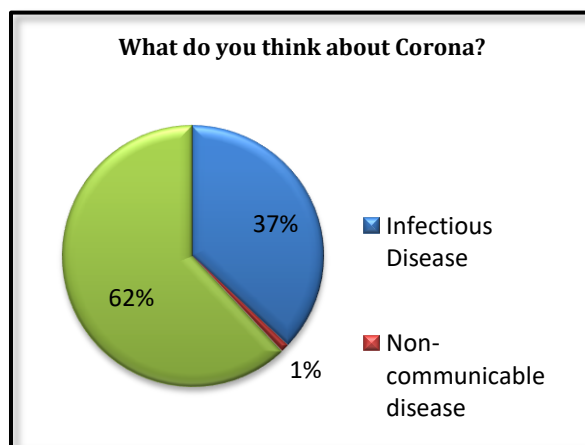
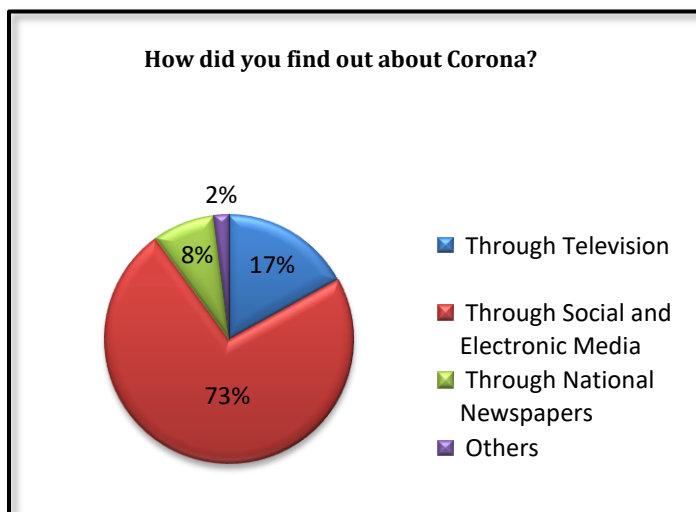**Figure 1: Knowledge about COVID-19**

When asked about the concept of COVID-19, 62% of people stated as epidemic or pandemic where 37% as infectious and the rest 1% thought as non-communicable disease. It clearly shows ambiguity among general people on the theory of COVID-19 and even no legal or general definition has been provided anywhere, neither in legal provisions nor in any public health document.

When did you find out about Corona?

4%   0%   1%

95%

- ■ 3 Months Ago
- ■ 2 Months Ago
- ■ 1 Month Ago
- ■ Recently

Figure 2: Duration of Knowing COVID-19

In case of duration when these respondents came to know about the effects of coronavirus 95% agreed, they knew from last year December, whereas 4% came to know from 2 months ago of the current year but 1% just came to know recently. Though most of the general people have the knowledge about Covid-19 from the moment of outbreak but overall population of Bangladesh lacks awareness in this concern.

How did you find out about Corona?

2%

8%   17%

73%

- ■ Through Television
- ■ Through Social and Electronic Media
- ■ Through National Newspapers
- ■ Others

Figure 3: Medium of Knowledge about COVID-19

Social and electronic media have a big influence over the minds of the people when it comes to obtain information about this unidentified disease where 73% agree with the fact, 17% know from television and the rest 8%, 2% know from national newspapers and other following sources. At the same time, lots of hoax information has been spread throughout social media relating to corona and thereby, it is important to receive information from authentic sources and properly educate ourselves.
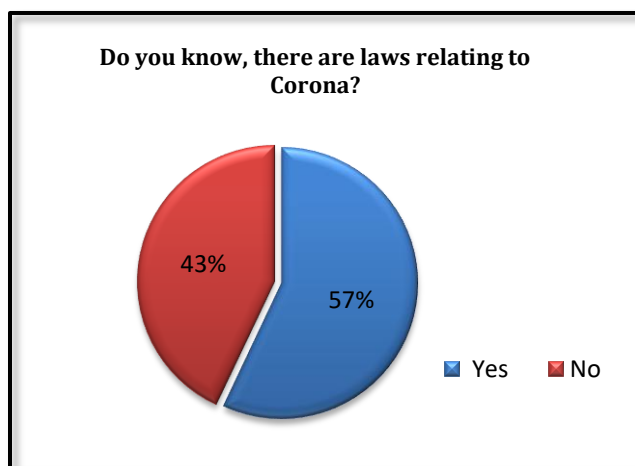

Figure 4: Laws related to COVID-19

Among the 102 respondents, 57% do know about the existing laws concerning diseases and virus, however, mostly about 43% are not sure whether it relates to corona as just recently this contagious disease was enlisted in the Communicable Diseases (Prevention, Control and Eradication) Act, 2018. Even in the presence of the above Act, legal ambiguity still remains an issue in dealing with the outcome in a vulnerable country like Bangladesh.
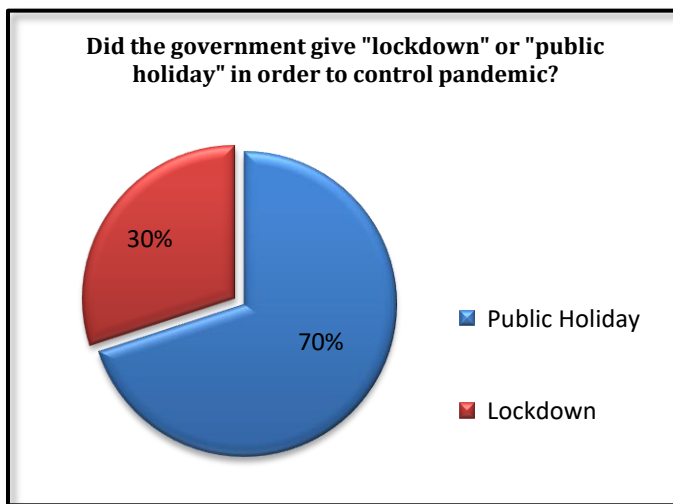

Figure 5: Initial Step of Government

The Bangladesh government has declared 'public holiday' instead of 'Lockdown' in the emergence of COVID-19, agreeing by 70% people of the survey but 30% thinks it is a lockdown. Due to this negligent decision, has caused people to believe that they can utilize their free time as like any other general public holiday which has immensely contributed on the raise of the number of infected persons in the country.
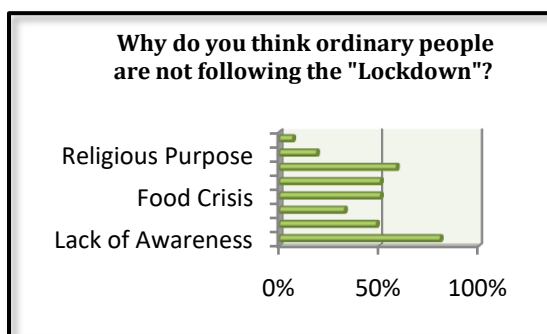

Figure 6: Reasons for Defying the Lockdown

In the survey, the highest rate about 80% of people agree with the fact that due to lack of awareness, 59% and 49% respondents think that lack of understanding and negligent people did not maintain and follow the provisions of lockdown, social distancing, personal protective methods and quarantine procedures which further allowed to the number of infected persons and death of many people, crossing over 1000 marks. Moreover, many people even knowing the consequences have the tendency to disobey legal rules and regulations where 33% of respondents define the same. Considering the country of being over populated and poor, maximum people earn their livings through daily basis methods where the influence of COVID-19 has created huge food shortage, sky-rocket prices of daily, medical or necessary items and no intervention from the government's side to regulate and maintain these irregularities for which the survey exhibited 51% by the respondents agreeing the same situation.
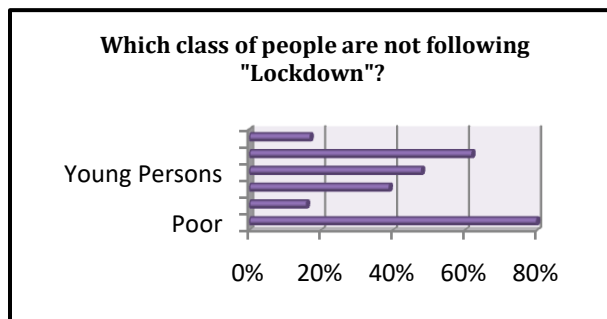
Figure 7: Classifications of People Defying Lockdown

As mentioned earlier, the maximum people make a source of living based on their daily basis professions where they are more afraid of not earning rather than the impact of corona and as a result, the above image reflects about 80% of people think that poor are mostly defying the regulations of lockdown which also includes daily labourer in this category about 62%. But other classes of people

such as young person's 48%, middle class family's 39%, rich family's 16% and others 17% are not concerned about the current situation which is another reason to contribute in the raise of rate of infections. The overall situation could have been managed if the governmental organizations with collaborations from private organizations, made flexible way to convey daily necessary, food and medical essentials to the convenient and secure places for individuals' places, along with proper availabilities of tests, medicines, having affordability. Besides, anyone who defies lockdown, defies quarantine, provides misinformation, assists in spreading the infection or commits any other act which goes against the legal regulations must be brought under strict punishment, either by imposing fine, imprisoning or suspending national documents, within the legal provisions of the newly said Act, if necessary also including other relevant laws. At the same time, people who are directly engaged working from outside such as governmental officers, doctors, nurses, law enforcement officers, pharmacists, parcel delivery persons, cleaners must be provided with adequate protective equipments and measurements from the local government depending upon their areas and locality.
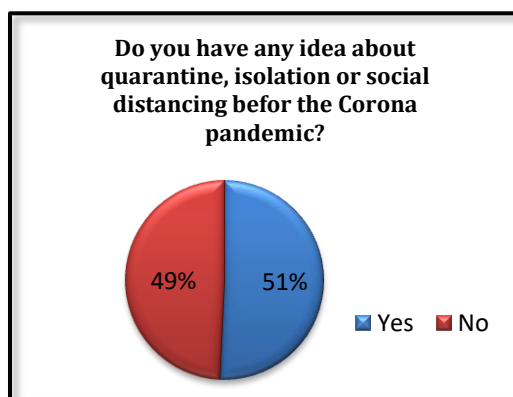
**Figure 8: Understanding of Quarantine, Isolation or Social Distancing**

The survey further illustrates that about 51% do have the idea about the following terms of, 'quarantine', 'isolation' and 'social distance' which they gain knowledge with the help of internet and national mass media before the outbreak of pandemic whereas 49% have not heard about these above terms before.
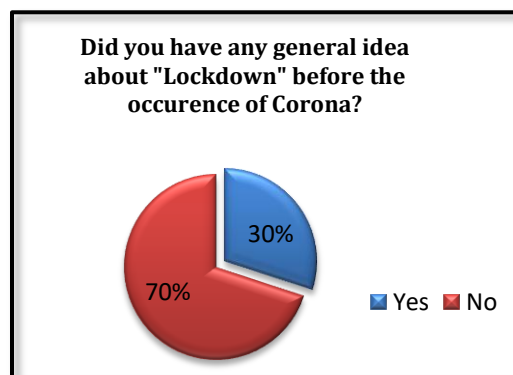

Figure 9: General Idea about Lockdown

When asked about do they possess any idea about the term 'lockdown' before the spread of corona and shockingly only 30% people know about this term but having inexplicit meanings within it. Some say restriction on physical movement where people will stay where they were before, or imposition of curfew, if such person requires going outside then must maintain social distance, wear masks, gloves and after returning home must wash their hands for 20 seconds, at that time, every organization and institution will be shut down except for hospitals, grocery stores, police stations etc., others say making themselves locked out at home with following protective measures which can be of two types either preventive or emergency where the country has taken preventive measure lockdown, or maintaining social distancing meaning lockdown, but no uniform definition of such term about what actually 'lockdown' means. On the other hand, a huge number of percentages about 70% have no knowledge what is 'lockdown' and what measures we have to adopt during lockdown period.
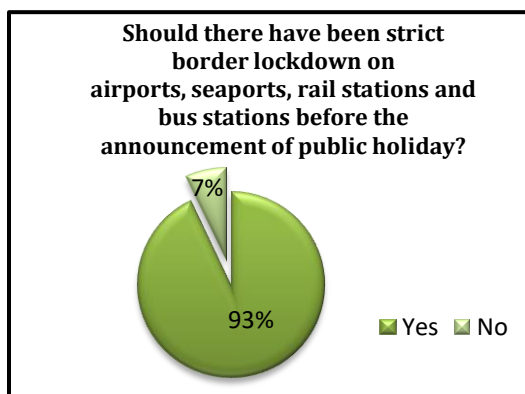
Figure 10: About Strict Border Lockdown

In order to slowdown the spread of infectious disease strict border lockdown on airports, seaports, rail stations, bus stations or any other public transportation should the first concern of any country both regionally and nationally. But a different turn took place in Bangladesh where there was no strict border lockdown rather a partial lockdown is a suitable way to say this until recently at the beginning of April at the current year, the government enunciated severe measurements. Here the survey demonstrates that 93% of people think that strict lockdown should have been implemented before the outbreak of corona in Bangladesh by the government but the rest 7% differs with the fact.
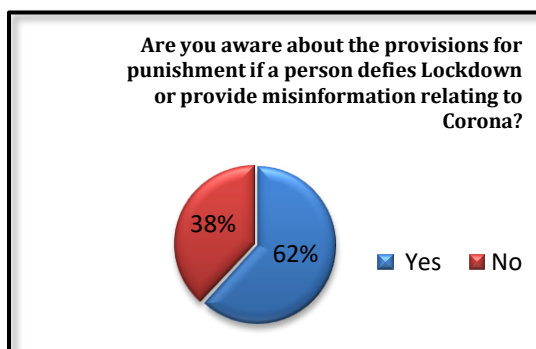
Figure 11: Punishment for Defying Lockdown or Providing Misinformation

Though the national laws illustrates the consequences of breaching any legal provision, similar for also if anyone defies the regulations of lockdown, social distancing, quarantine, provide false or hides information, commits or assists the spread of infectious disease as regulated and illustrated under the 'The Communicable Diseases (Prevention, Control and Eradication) Act, 2018. However, no such action or imposition of punishment has been carried out which comes within the outline of this newly Act. Even though 62% people know about the presence of all these provisions but ineffective implementation has driven people to defy lockdown and also not carrying out proper personal protective measurements. Unfortunately, 38% people have hardly known about the existence of such provisions.
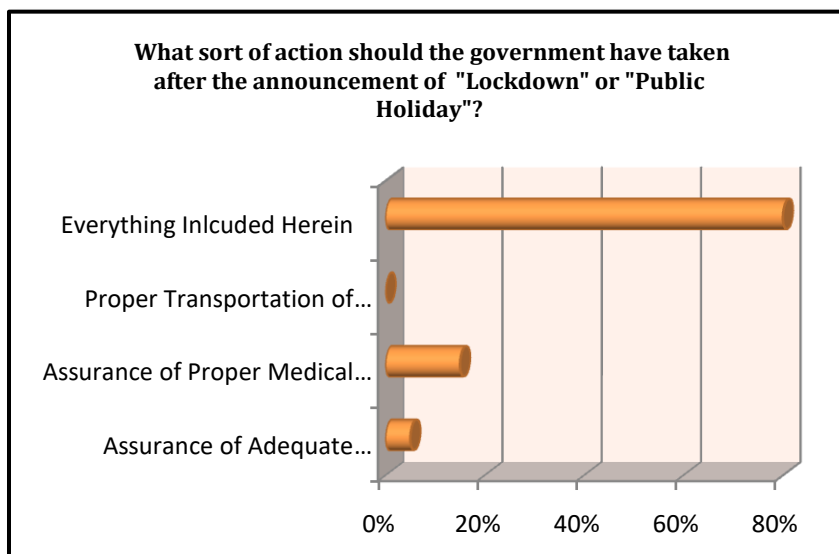

Figure 12: Actions could have been implemented by the Government

Being an over populated country with high rate literacy and poverty can be extremely burdensome for the government of Bangladesh but maybe, based upon assumptions early drastic preventive mechanisms could have controlled the rate which is now prevalent. As a result, the survey illustrates that 80% of people prefer proper management and assurance of quality adequate food, medical supplies and necessary daily items in the market with pricing affordability, monitored and regulated by the governmental authorities, so that ordinary people could easily access these products to their convenient local places without the need to go outside, maybe if possible involvement of private organizations could help further, allowing such would reduce the risk of possibility of infections as well as decrease in the spread of COVID-19. But at the same time, people who are unable to work from home or suffer from financial meltdown, in such cases government may introduce schemes for public welfare funds to aid them in this pandemic crisis for the time being and later expenditure of relief can be collected from the general public as a surplus of tax for few years, if requires.
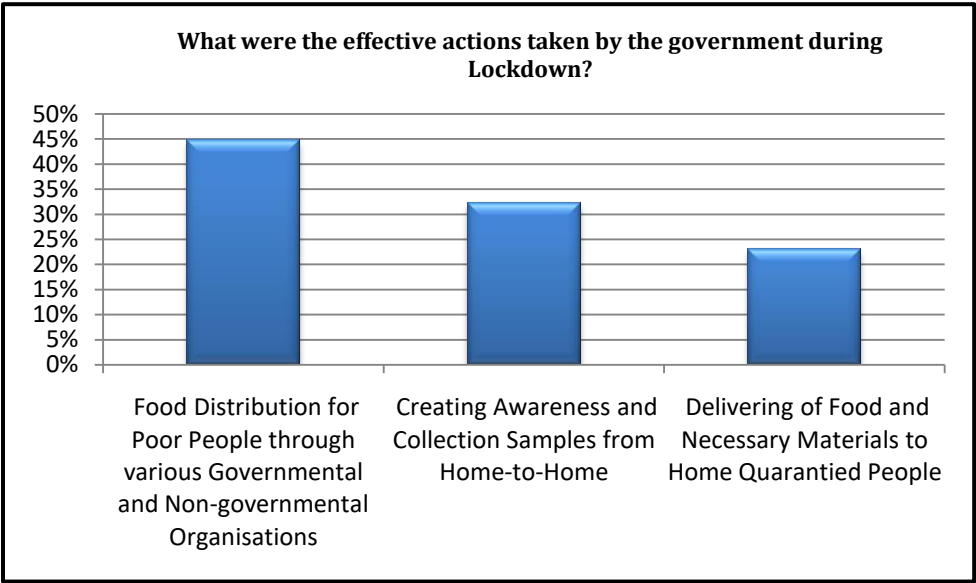
Figure 13: Initiatives taken by the Government

Even having flaws in the governmental system, the government of Bangladesh has done some appreciable initiatives in the sectors of food, necessary materials and money distributions for the poor, quarantined people and unemployed citizens on the priority basis, especially for beggars, vagrants, day laborers, rickshaw pullers, transport workers and tea vendors even with the assistance of non-governmental or private organizations as the survey reveals the same with 45% agreeing. Till the month of April 2020, the Bangladesh Ministry of Disaster Management and Relief have allocated about 40,000 metric tons of rice and Tk 11.5 crore so far. In addition to, the Finance Ministry has recently announced a fund of Tk 1,256 crore for a one-time payment of Tk 2,500 to 5 million poor families. From every Government Ministerial Departments, Members of Parliament, Bangladesh Army, Border Guard Bangladesh, Bangladesh Cricketers, Non-governmental Organizations to each individuals have been contributing funds from their respective positions to battle against the impact of novel coronavirus in Bangladesh.
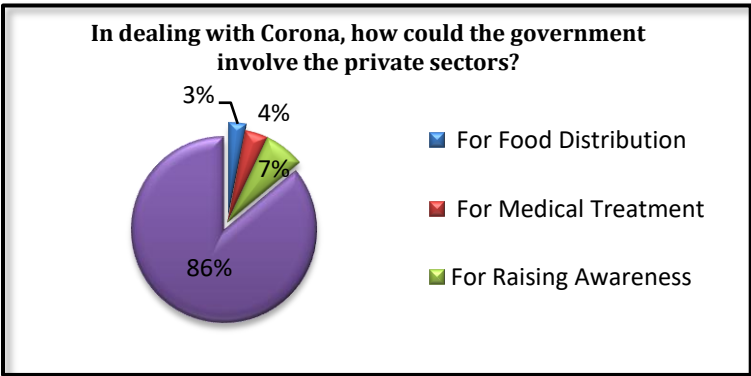
Figure 14: Involvement of Private Sectors

There is no doubt of denying how private and non-governmental organizations have contributed immensely amidst the pandemic situation in Bangladesh. Similar views have been expressed by the survey's respondents by 80% confirm that they want private organizations to be involved with the governmental departments in the segments of distributing and delivering food, medical supplies and daily materials to the convenient places of individuals to minimize the outbreak, even in providing medical treatment for speedy recovery to the infected patients in private hospitals or initial medicinal measures who are in risk of infecting, and maybe also in case of raising social consciousness or disinfecting public places so that the burden over the Bangladesh government can be eased off, keeping in mind with the limited resources the country possesses.

Do you think other Ministerial Departments of Governement have acted in consultation with the advice of the Health Ministry in making decisions during Corona?

- 34%
- 5%
- 61%

■ Yes
■ No
■ Not Sure
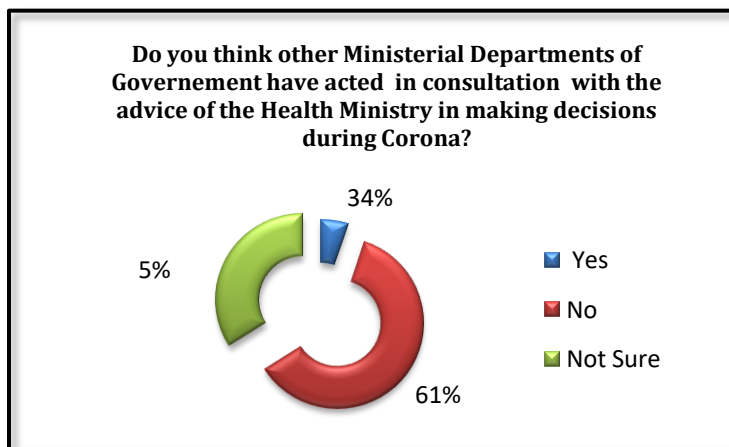
Figure 15: Cooperation between other Ministerial Departments and Health Ministry in decision makings during COVID-19

Unfortunately, when it comes to making decisions on the public affairs the governmental ministerial departments have mostly felt short without the need to maintain coherent relationship and cooperation with each ministry. As a consequence, 61% of people affirm that there was no coordination between Ministry of Health and Family Welfare and other Ministries while taking decisions relating to COVID-19 or any other health related advice or preventive measures which certainly goes against the spirit of the newly The Communicable Diseases (Prevention, Control and Eradication) Act, 2018 Act, on the contrary, 34% disagree with the statement and the rest 5% are not sure.

Recommendations

1. While enforcing the above said Act, the following social, economic, political, religious, geographical and administrative sectors should be considered with consistency.
2. Establishment of National Health Command Sector for speedy disposal of COVID cases.
3. Constituting schemes of insurance and medical facilities for health providers.
4. The newly Act lacks the legal definition of 'Pandemic' whereas it was present in the previous repealed the Epidemic Diseases Act, 1897, thereby, reformation should be made to include legal definition of 'Pandemic' in the newly Act.

5. Legal punishment must be ensured to those infected persons who defy the regulations of social-distance, isolation and maintenance of quarantine.

6. Legal punishment must be ensured to those persons, who are not infected, however, defy to comply with the provisions of this newly Act, thereby, strict provisions should also be included for better implementation.

7. Legal punishment must be ensured to those persons who conceal, provide false or misinformation regarding the prevention, control and eradication of infectious disease, through inclusion of stricter provisions.

8. People coming from abroad, must go through medical screening and maintain certain medical measures such as self-isolation or under quarantine for a temporary basis before returning to normal routine.

9. Legal punishment must be ensured to those persons, coming from abroad, for not maintaining medical measures by means of suspension of passport, National Identity Card (NID) or compensation, depending upon the gravity of offence.

10. The government can collaborate with private organizations and non-governmental organizations to prevent, control and eradicate the infectious disease, to achieve productive enforcement of the above said Act.

11. The maximum number of people in our country has the earning source of livelihood on daily basis, so before taking any precautions, the government should formulate public funds for their food or any necessary supplies.

12. For the purpose of effective enforcement, a panel of experts' opinion in different sectors of profession can be taken into consideration to acquire depth analysis of the overall impact.

13. The government must mandate not only to the doctors of public hospitals to provide treatment to infected patients but also to the doctors of private hospitals while dealing with the pandemic situation.

14. There must be proper communication and collaboration between the Ministry of Health and Family Welfare with other inter-ministerial departments in regulating the prevention and eradication of infectious/contagious disease.

15. Sections 269 & 270 of the Penal Code, 1860, can be applied in this sense for preliminary initiatives to impose punishment.

16. People who are affiliated with the prevention, control and eradication of infectious disease, such as nurse, street cleaner, garbage cleaner, etc. should be aware about the provisions of this newly Act along with the precautions come with it.

17. Certain imposition of punishment must be ensured by the government as a paradigm, reflecting the consequences of not abiding the law.

18. During the pandemic distress, the government should include a list of 'what should be done or what should not be' in this newly Act, at the time of general holiday.

19. The Ministry of Health and Family Welfare should constitute a 'Legal cell' to tackle the situation.

20. At the time of distributing food, Trading Corporation of Bangladesh (TCB) should maintain certain procedures and well-management.

21. The government should also focus on the decentralization to avert the situation quickly.
22. Medical service should be given at every district level to tackle the situation quickly.
23. There should be introduction of legal process to file complaint against any particular who defy the rules and regulations of this newly Act.
24. For further implementation and successful outcomes, 'The Communicable Diseases (Prevention, Control and Eradication) Rules' should be formed immediately.
25. Safety measurements should be ascertained to those volunteers who are assisting in delivering and distributing the necessary supplies to the helpless and needy people.
26. With the help of mass and social media, social consciousness can be made by familiarizing the following terms of isolation, self-quarantine, lock down etc.

Concluding Remark

Desperate times require desperate measures as the world is going through crucial time and Bangladesh is not a stranger to it. But to prevent the outbreak of COVID-19, the government must come with speedy solutions to save public health before it becomes a disastrous situation. Partially, the government has exhibited some positive initiatives like providing distribution relief, making scheme budgets for unemployed and poor people, circulation of corona awareness in mass media, legalizing the use of masks in public places; however, drawbacks from the governmental side cannot be overlooked especially in the absence of public health schemes for health providers, existence of policy gaps in the 'The Communicable Diseases (Prevention, Control and Eradication) Act, 2018'. Thought should be given whether blaming the government justifies a suitable decision, whereas developed nations like USA, UK, Italy etc., having high quality of healthcare could not withstand the force of COVID-19. As a result, this emphasizes the need for establishing the National Health Command Centre which will deal not only in urban centric areas but also rural centric places. It is expected from the private organizations to come forward in this aid to reduce the burden of the government. Further, proper implementation of this Communicable Diseases Act should not only be done but also seen to be done, even by means of imposing stricter punishments on those who the regulations of lockdown, social distancing, and quarantine or who provide false information or circulate misinformation. Perhaps, applying prompt measures and individuals working mutually may contribute to overcome the existing pandemic crisis in Bangladesh so that this incident never repeats in the history of mankind.

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