

# Online Poverty Alleviation System in Bangladesh Context

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**Abstract** - The main purpose of this work was to develop an online poverty alleviation system in Bangladesh. The system will find out the root cause of poverty based on some social indicators. Government organization will take steps based on the system prediction and analysis results. Presently there is no existing online system to measure the situation of poor or extremely poor people using data analysis in Bangladesh. So this flexible and user-friendly system is proposed in the context of Bangladesh. Four Data Flow Diagrams (DFDs) and one Entity Relationship diagram have been developed to represent the proposed system. Different features of the poverty alleviation systems have been discussed in this paper. The features include institute, surveyor, admin and super admin activities. Admin will validate the institute and surveyor accounts and monitor their works. Super admin will give access the admin and monitor the admin and whole system. The surveyor inserts the people data and system analysis inserted data and groups them based on some criteria. Finally, the proposed system recommends the target people to the associated institute who would help the destitute to come out of poverty.

**Key Words:** Poverty, Alleviation, Online, System, Data Analytics

## 1. INTRODUCTION

With the proliferation of the Internet technology, online poverty alleviation system has become an effective component to traditional system in many developed countries. It is web based, efficient, flexible and adaptable, which can provide a new and open mode of reducing poverty the needs of various government and non-government organizations.

In Bangladesh application of communication technology increased enormously in the recent years. It is perceived that the government and non-government organizations are working in numerous sectors such as education, governance, banking and commerce, rural development and health using ICTs to reach citizens more competently and to bring relevant services to closer to the abilities of the citizens. The number of Internet users has increased greatly in the past few years in the country, and most of the institute has good Internet facilities.

These activities aligned with the ICT policy of Bangladesh-2002 on poverty alleviation using [1]. Online poverty alleviation system is a new technology, which can be implemented in the context of Bangladesh to reduce poverty and ensure transparency of the institutes. The main

intention of this paper is to develop an online poverty alleviation system with suitable features and lack of ambiguities [2]. In this system surveyor inserts the people data and system analysis the inserted data then identifies the root cause of poverty. Based on the system analysis or prediction results any institute or government organization can take steps to overcome the situation. So any Institute or government organization can take the opportunity of this system. The system generates a graphically pie charts and a table which shows the present condition of the poor people so that organization can take immediate steps actually what they need.

Major objectives of this paper are –

- Design a model to check out the present status of the poor people.
- Design a database for analysis the poor people.
- Find out the root cause of poverty, for the specific region, which is solvable.
- Recommend them to the institute for guideline or a training to overcome the poverty level.

## 2. DESIGN OF THE POVERTY ALLEVIATION SYSTEM

The system has been made for analysis of the people data graphically. Basically, system analysis of the people data is internally based on their monthly income and other social indicators. Four Data Flow Diagrams (DFDs) and one E-R diagram have been developed to represent the whole system.

### 2.1 System Design

System design focuses on the technical and implementation concerns of the system. Few steps can simplify the task of designing coding of a system dramatically.

Following steps were completed for designing the system.

**Step 1:** Identify precisely the core functionality & the system design using data model such as ER data model (Figure-2).

**Step 2:** Normalization of the system precisely and drawing DFD of the system.

**Step 3:** Explain precisely the core functionality & the system design using DFDs.

Additionally, database design was one of the main components of the poverty alleviation system. The collection of data usually referred to as the database. One or more large

structured sets of persistent data usually associated with software to update and query the data.

A database system is designed to manage enormous information of poverty alleviation. The database system provides safety of the information store, despite system crashes or attempts at unauthorized access. It helps sharing data among different users, and avoiding possible anomalous result.

Designing web page of the poverty alleviation system was another important component where contents are placed in a logical sequence and images with appropriate resolution so that the users/ visitors may get clear understanding of the purpose of the poverty alleviation system. The web page of the system is a resource of relevant information for the users that is suitable for the World Wide Web which can be accessed through a web browser.

An Entity Relationship diagram and four data flow diagrams (super admin, admin, institute and surveyor) have been developed to express the logical structure of the system and represent the information flow within the system respectively. In fact the E-R diagram (Figure-2) is the blue print of the database and reflects the data required for each of the four components (super admin, admin, institute, surveyor) of the system [2].

Of the four DFDs the data flow diagram of super admin is given in (Figure-1). The diagram indicates that the system attracts lot of responsibilities for super admin, admin, institute and surveyor. The surveyor will insert all the people data to the system. Then the system will generate a prediction result based on the inserted data. Based on the prediction result the system recommends the people to the corresponding institute and encourage the institute to add those people for training. Admin will monitor the surveyor and institute and Super admin will monitor the Admin. This information is kept in JSON format to the database and the web page is stored on a remote web server.

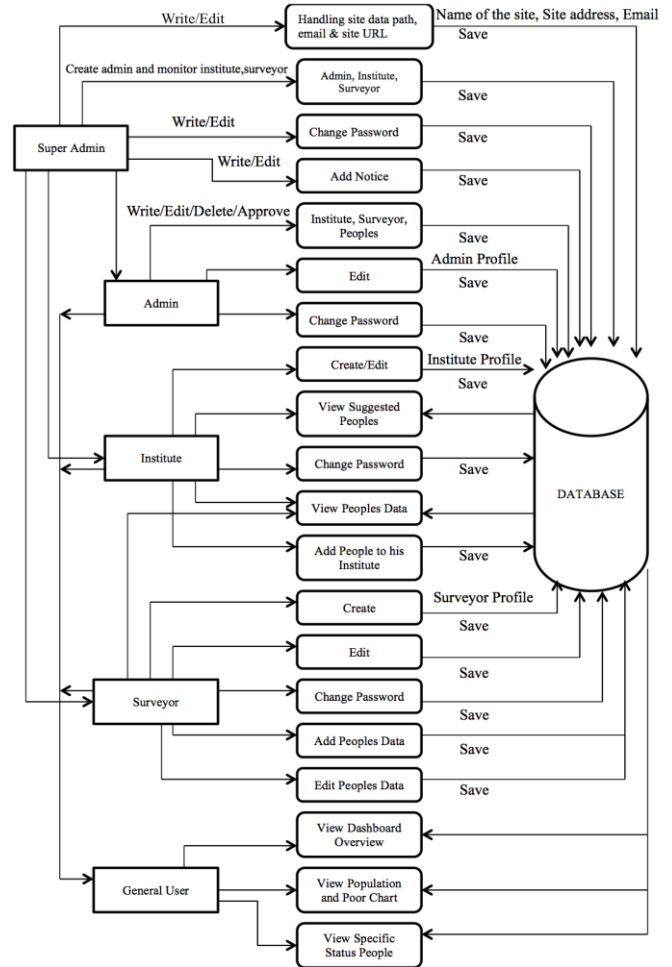


Figure 1: Data Flow Diagram of Poverty Alleviation System.

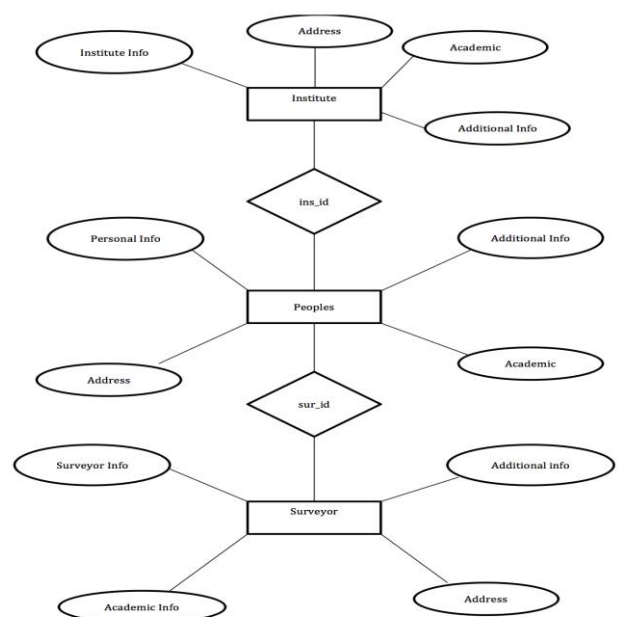


Figure 2: Entity Relationship Diagram

The above diagram is the Entity Relationship Diagram of the system. There have three tables People, Institute and Surveyor. In the people table have 35+ fields such as Name, Father Name, Email, Phone, Gender, Religion, Marital Status, Child Number, National ID Card Number, Date Of Birth, Residence, Blood Group, Address, Occupation, Monthly Income, Saving, Technical and Agricultural Training, Working Scope, Any Cultivation Land, Drug Addiction etc. The system needs the people information for generating the prediction result. Institute and Surveyor table is needed for operating the system.

Actually, the whole system has been designed based on the following steps.

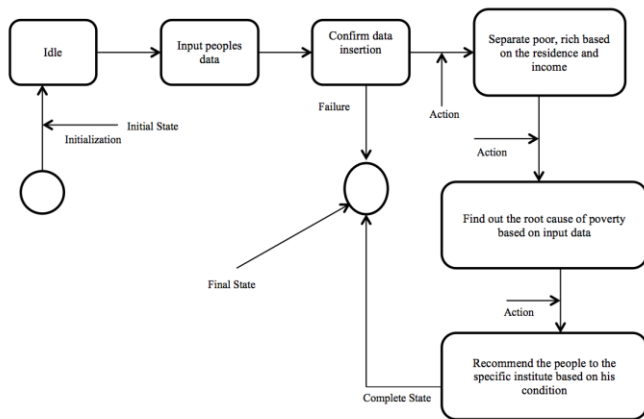


Figure 3: State chart diagram of poverty alleviation system

The surveyor will input the people data. The system will confirm the validation of the data then save to the database and categorizes the people based on the monthly income and residence. Then the system will find out the root cause of poverty based on the input data. Finally, the system will recommend the people to the associated institute.

The following tools and language were used for designing the whole system and Analytics the data.

**Frontend (in the browser of the user):**

- 1) HTML5 for the structure of web page
- 2) CSS3 for the design of web page,
- 3) Bootstrap v3.3.7 for the responsive web design,
- 4) Native JavaScript
- 5) JavaScript libraries like jQuery.
- 6) AJAX that allow interaction with the user and the backend system while staying on the same page.

**Backend (on the server of the host of the web page):**

- 1) Operating system (e.g. Linux)
- 2) Web Application Server (e.g. NodeJS) [3]
- 3) Database (MongoDB) [4]
- Frameworks: ExpressJS [5], Mongooses [6]
- Editor: Sublime Text [7]

**2.2 Logical Design**

The logical design of a system pertains to an abstract representation of the data flows, inputs and outputs of the system [8]. During inserting data to the database, the system categorizes the people based on the income and residence. According to the Bangladesh government who lives below the line of \$2 per day is being assumed as a poor man [9]. Also, some more categories based on that minimum threshold. Such as rich, middle class, lower middle class, poor, extremely poor. Here is the column chart of income and social status for the rural people.

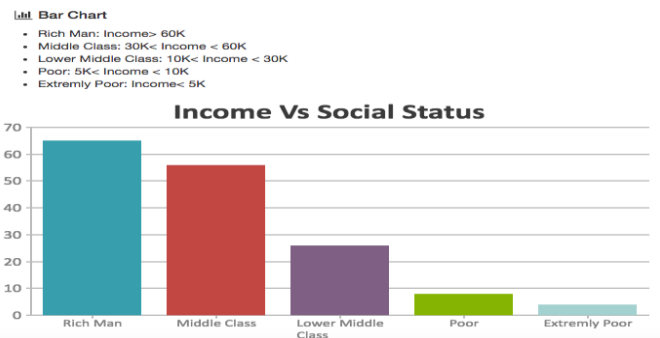


Figure 4: Income VS Social Status

For the urban people the threshold value is not same. These are

- Rich Man: Income > 90K
- Middle Class: 50K < Income < 90K
- Lower Middle Class: 20K < Income < 50K
- Poor: 10K < Income < 20K
- Extremely poor: Income < 10K

Following is the flowchart to separate the people based on their income for the rural people.

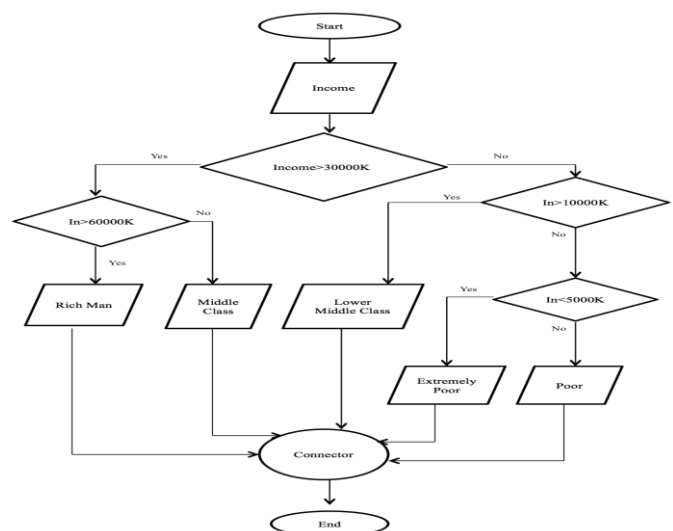


Figure 5: Flowchart of people status based on the income.

For the urban people, the flow chart is same just the income is bit high.

### 3. FEATURE OF POVERTY ALLEVIATION SYSTEM

The feature of the poverty alleviation system was analyzed to understand the design and components, and relevant features of the systems. In fact, this proposed system has been added the relevant feature, which is essential for analysis the people data and presents it properly. Apart from this system shows the reason of poor using charts and a table for the specific reason or a person. The online system presented in this paper may be used for both government and non-government purpose. Some features of the system are given below.

#### 3.1 Dashboard

The home page of the system is designed with the cupule of information and registration form for Institute and Surveyor. Dashboard page shows the total inserted people. Also shows how many rich men, middle class, lower class, poor and extremely poor separately. It's an overview of total inserted people. Every user can get that information and see some charts from the left sidebar. Also, have a blog based on this and a notice page, every user can see that and read for gathering knowledge. At the top right menu bar there have two-dropdown menu icon

1. List of Surveyor, List of Institute
  2. Registration for Training Center, Registration for Surveyor
- Next one is login button and that is reserved for the authorized user only.

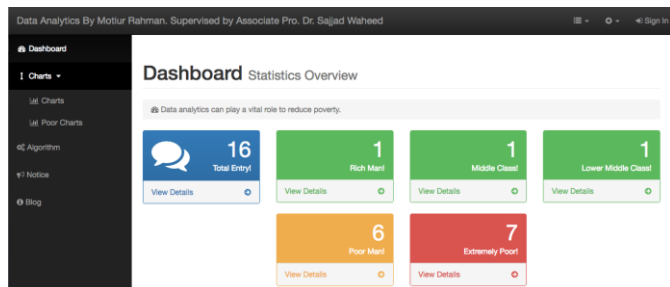


Figure 6: Dashboard Overview

#### 3.2 Registration

The top right menu bar of the home page has an option for registration for surveyor and institute. The surveyor will insert the people data to the system. When the surveyor or institute will fill up their registration form with their login credential and submit, a request will be generated to the Admin panel for approving their account. After approving their account they will be able to login to the system and perform their works.

#### 3.3 Dashboard feature of Surveyor

After login to the system, surveyor will get a dashboard with some addition feature such as edit profile, update profile, change password, see people table and search people for the specific reason. The most important feature is adding people data to the system and updates their information if needed.

#### 3.4 Dashboard feature of Institute

After login to the system, institute admin will get a dashboard with some addition feature such as edit profile, update profile, change password, see people table and search people for the specific reason. The most important feature is adding people to his institute for training under specific department (Figure-7). Another option is recommendation, system recommends poor people to the institute based on the institution type and region.

##### 3.4.1 Add To My Institute

Institute admin can add any person to the institute under specific department and contact them. Also, can remove them from the institute after completing their training. At first, institute admin needs to go to the people table and search the people based on the specific area. Also, can search the people from the system recommendation table. Now admin will choose the desired people then just copy the id number and paste into the first field of the "AddToMyInstitute" page and add a department for the chosen person. Finally, click the "Add To My Institute" button (Figure-7).

##### Added the following peoples to my Institute

Add people to my institute				
Enter peoples ID	Enter Department name	Add To My Institute	Remove From My Institute	Total Added:4
id	Name	Father_Name/Guardian	Address	Department
0:5883a0006bd6a6842af2756c	tomal Status:Extremely Poor	backer	Div:Rajshahi Dist:Chapai, P.S:Shibgorji, Post Code:1216, villi:Kansat Bhalabari Phone: 1723308619 Email: tomal@gmail.com	carpenter
1:5883b7577ddfadaac7546cd4c	Renu Status:Middle Class	Faku	Div:Rajshahi Dist:Chapai, P.S:Shibgorji, Post Code:6341, villi:Kansat Bhalabari Phone: Email:	electronics
2:5889c293b54f3b03a79cab70	delu Status:Poor	mostu	Div:Rajshahi Dist:Chapai, P.S:Shibgorji, Post Code:6341, villi:Kansat Bhalabari Phone: Email: mostu@gmail.com	painter

Figure 7: Adding People to The Institute

#### 3.5 Dashboard feature of Admin

After login to the system, admin will get a dashboard. Admin can edit profile, update profile, change password and some additional feature such as edit/delete people data,



edit/delete institute and surveyor data. Also, admin have to approve the surveyor and institute requested account. Admin will monitor the institute and surveyor works and their activities.

### 3.6 Dashboard feature of Super Admin

The whole system will be handled by the super admin. Super admin can login as a surveyor, institute and admin. All the admin, surveyor and institute will be monitored by the super admin. The admin credential will be generated by the super admin and distribute to the admin person.

## 4. IDENTIFY THE CAUSE OF POVERTY

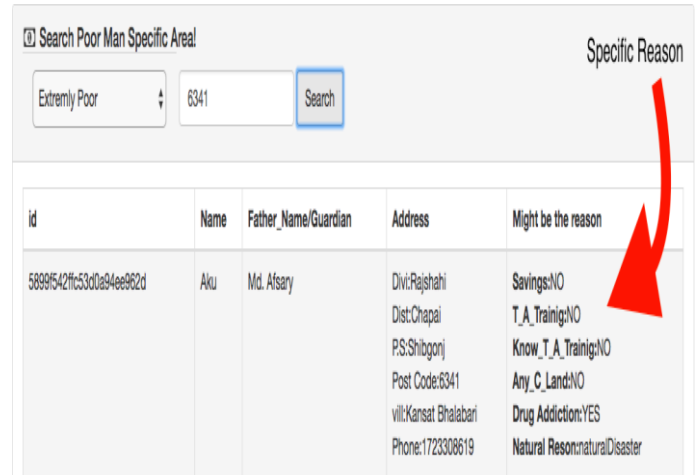
Surveyor will ask the people some question that answer would be helpful to figure out the cause of poverty. At first, need to know the occupation and monthly income of the people. Basically, that answer would be helpful to categorize the people to the social status. Secondly asking a bunch of question

1. Savings? Can save any money or not for every month?
2. Take any technical or agricultural training or not? To get success and do the job perfectly it's no need to say that at least need a minimum training on that specific sector.
3. Any working scope what you know? Some people fall into a problem because of his geographic region. In fact what he knows if that work is not available in the neighborhood then that working experience would not help.
4. Do you know about technical or agricultural training? In fact most of the rural people don't have proper information about the technical or agricultural training and institute. Actually, this is the lack of proper information and education.
5. Any personal land for cultivation? If does not have any personal land for cultivation then have to think other option to recover it.
6. Drug Additions? We know drug addiction is on of the main reason for poverty. Drug use and addiction have no single cause but the risk factors for drug use include poverty. A person in an impoverished situation may abuse drugs or alcohol as a way to cope with the dangerous environment she lives in, a way to deal with her financial stresses or a way to cope with physical or emotional abuse. Many times, drugs and alcohol are easily accessible in impoverished neighborhoods where some people actually sell drugs in hopes of overcoming poverty [10].
7. Some other reason is Flood, River Erosion, Cyclone and Natural Disaster. This is solvable reason if government takes immediate steps. Also, sustainable development can help a lot such kind of problem.

### 4.1 Cause of Poverty for the Specific Person

System generates a table view based on the previous answer of the question for the every people. Look at the attribute of the "Might be the reason" column first one is "Savings: NO" means specific person don't know about savings but any kinds of business or investment need some extra money or

any crucial moment need money. So this is one of the causes of poor status. "Technical Agricultural Training: NO" means did not take any kinds of training. But for the professional work or getting success need at least training, without training don't think the better output. One the other hand if any person takes any Technical or Agricultural Training, is not to be a poor. "Know Technical Agricultural Training: NO" means don't know anything about it. So the lack of proper information specific person is depriving the opportunity where everybody should aware about it to become a skilled manpower.



Search Poor Man Specific Area

Extremely Poor | 6341 | Search

id	Name	Father_Name/Guardian	Address	Might be the reason
5899f542ffc53d0a94ee982d	Aku	Md. Afsary	Divi:Rajshahi Dist:Chapai PS:Shibgonj Post Code:6341 vill:Kansat Bhalabari Phone:1723308619	Savings:NO T_A_Trainig:NO Know_T_A_Trainig:NO Any_C_Land:NO Drug Addiction:YES Natural Reason:naturalDisaster

Figure 8: Cause of Poverty for the Specific Person

"Any Cultivation land:NO" means don't have any cultivation land. This is one of the reasons of poverty, generally no land no money then you are a poor. But this is not the major cause. Some people have land but poor because they don't have the proper knowledge about the cultivation. On the other hand, those who have the land but don't have enough time to cultivate it, in this case, landless people can take the opportunity. "Drug Addiction: YES" means taking drug. Drug is very much expensive and harmful for the body. And gradually it destroys the family bonding and all assets. Finally, it turns into a useless people for the society and the family. "Natural Reason" Some natural reason like natural disaster, flood, river erosion are one of the causes of poverty. So the system takes that data to figure out the causes. Also, increasing the awareness of the people and sustainable development program of the government might minimize it.

### 4.2 Identify Reason Using a Charts

Also, system generates a pie charts based on the pervious answer of that question,  
*T\_A = Technical Agricultural*

Figure 9: Pie Chart Total Population: 14

- Lack of Education: 11
- Lack of Savings: 11
- Lack of Technical or Agricultural Trainings: 12
- Don't know about Technical or Agricultural Training: 11
- No Working Scope: 4
- No Cultivation Land: 11
- Drug Addicted: 7
- Natural Reason: 0

Percentage reason of poor for specific Area

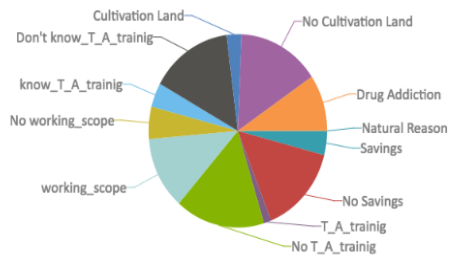


Figure 9: Poor Chart for the Specific Region

The main purpose of this chart is to identify which things take more effect on their life for the specific region or the whole community. In this charts shows how many people drug addicted, no cultivation land, don't know about technical or agricultural training etc. Actually, shows the percentages of the causes. This poor chart is dynamic and the system can generate it any specific region by entering the postcode.

## 5. RESULT AND DISCUSSION

Our goal is to find out the main reason of poor for the people then recommend them to the specific institute so that institute can take necessary steps accordingly.

After collecting information via the surveyor, system analysis them and generate a table view and a pie chart then groups them based on some social indicators (Figure -10).

Primarily system follows this mechanism to recommend the people to the specific institute. For example, if the system finds a poor or extremely poor people who do not have any technical or agricultural training or do not have any working scope or do not have any personal land for cultivation then recommend them to the nearest "Technical Institute". At the following figure shows the reason of recommendation for the specific institute based on some criteria.

### Grouping

### Responsible Entities

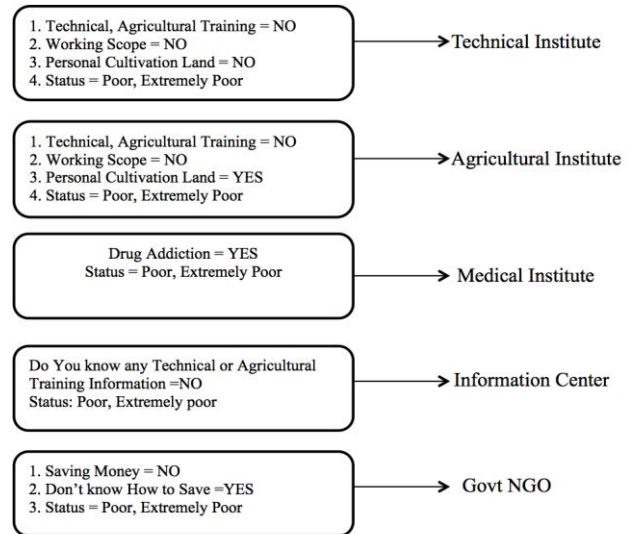


Figure 10: Recommendation Chart

A person can be recommended multiple institutes based on the present condition. Suppose a person do not have any technical or agricultural training also drug addicted. In this scenario, the system recommends that people to the technical or agricultural institute and medical institute as well. Actually, every institute can see whether that people includes any institutes.

Here is the recommendation table (Figure-11). At the left sidebar, there has a button named "Recommended", after clicking on that button the following table will be shown. The system encourages to the government org or institute for giving them more priority.

### Recommended people to your Area

You can pay more attention to them!  
 Total Population: 9

id	Name	Father_Name/Guardian	Address
0:5884df009aa07a086771bbf7	kamal Status:Extremely Poor	w	Div:Dhaka Dist:Mirpur, P.S:Mirpur, Post Code:6341, vill:kazipara Phone: 1723308613

Figure 11: Recommendation Table

The Institute has to contact those people and understand them about their offer to make them skilled manpower.

## 6. CONCLUSIONS

The online poverty alleviation system is an innovation in the context of Bangladesh. Government organizations may take the advantages of this system. It will help to find out the root cause of poverty to the specific person and region. Monitoring everything easily by the super admin and admin. Apart from these facilities, a large number of people may get help at a small step.

To find out the root causes of poverty system take some useful information by the help of Surveyor then analyze it. Finally, shows it graphically in a table view and the pie charts. To see the pie chart and the table view government organization or institute can extract the knowledge of root cause of poverty very easily for the specific people or a region.

After analyzing the people data, the system recommends them to the institute for giving them more priority. Basically, the people around the institute get the more priority, if the people considered with some criteria. However, ensuring the security of the online system still remains a challenge for the admin and super admin of the system.

## 7. ACKNOWLEDGEMENT

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