

Online Agriculture Support System for Bridging Farmer-Consumer Expectations

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Abstract:- Advances in computer technologies have profoundly influenced the use of Information and Communication Technology (ICT) support in agricultural activities. Half of the working population in Bangladesh depends on the agriculture sector. Historically over the last 10-15 years, ICT has changed the way of world works but on the other hand there has not been a desirable change of agriculture sector in Bangladesh. This study describes the design and development of an online agricultural support system that can bridge the gap between farmers and consumers demands. This online system will act as a unique and secure way to perform agro based marketing with equipment renting. Also this web tools provides a computerized farming system which has been implemented as part of precision agriculture before starting the cultivation process according to the area of the cultivation land and the season. Here, Multiple Linear Regression of machine learning algorithm is used. This technique is used for forecasting rainfall, average temperature of certain location, soil P^H level and prediction based yield rate. Besides, farmers can optimize on their agricultural activities such as information about nearest preservation centers, consulting with experts, comparison of current market rate, awareness about latest technologies. It can ensure the flexibility which can maneuver the consumer-farmer relationship in an effective manner.

Keywords:- ICT; Online; Support System; Farmer; Consumer.

I. INTRODUCTION

The use of ICT in agriculture is very important for sustainable development and its impact on national economy. Visible Impact can be seen after change the way of use ICT in agriculture. Bangladesh agriculture is a very important contributor in the country's GDP with the figures from the Ministry of Agriculture showing its total contribution in 2015 was approximately 16.33%. Contribution of agriculture in GDP of Bangladesh is in the declining form and it is due to improper focus on agriculture and role of technology is somehow neglected. There is a

need of inclusive growth in agriculture sector, proper knowledge about different farming techniques, buying and selling agricultural products in a legal price, hiring agricultural equipments whenever it is needed, knowledge about preserving and nearest preservation centers and most importantly, information about current facilities and projects those are conducting by government for the farmers. So there is a positive and essential role of technology in Bangladesh as it is one of the fastest growing exporter of agricultural products (Tamzid Rahman, 2016). According to the World Bank, the total arable land in Bangladesh is 6.12 percent of the total land area (Nations Encyclopedia, 2020). Nearly half of all workers and two-thirds of rural areas are directly employed by agriculture, and about 87% of rural households rely on agriculture (Wikipedia, 2020).

As part of existing innovations, MOA (Ministry of Agriculture) develops agricultural policies, plans, regulations, acts and provide support in developing new agricultural technologies to boost up agricultural production and coordinate with local and international trade agencies for marketing (MOA, 2019). In this line, EKRISHOK is an initiative of BIID (Bangladesh Institute of ICT in Development) for the use of Information Technology in the field of agricultural extension and market management. E-krishok is an information based service that provides information and advice on agricultural across the country. This information is conveyed to the peasantry through local information centers using various information technologies such as mobile, internet, computer etc. Farmers can also take this service directly (E-krishok, 2019).

Similarly, Pesonen (2013) mentioned that farmers face increasing demands in their everyday farm operations; from stakeholders along the food chain, governments and the society. They investigated how Internet-based service infrastructure enables networked production systems which support farmers to operate efficiently and fulfill farming demands using present and future technologies. The work was based on system engineering approach. Results from other projects were utilized to create a modeled system representation of the whole farm production infrastructure.

At the same time, Chauhan (2013) introduced a new web-based decision support system called AQUAMAN that was developed to assist Australian peanut growers schedule irrigations. Application of the tool for scheduling irrigations of commercial peanut farms since its release in 2004–2005 has shown good acceptance by local peanuts growers and potential for significantly improving yield.

In this connection, Gertsis (1998) also developed an artificial intelligence expert system coupled with COMAX which assists in decision making for farm management. The model is used mainly for irrigation and nitrogen fertilization management and for plant growth regulators (PGR) application, based on daily weather data, soil physical and chemical characteristics of each site and some cultural characteristics. It has a proven potential for increasing profitability and is used in USA, where it was established and validated, in commercial farm management. Its uses as a tool for the cotton farm manager will be demonstrated in their research.

Most of the tools provide only information about agricultural activities & research. There are some e-commerce websites which allow to trade with agricultural products. But a user friendly platform specially for farming related trade & works does not exist. Farmers don't get any help from network based information technology.

Observing the present system and all these websites, a decision has been taken to that the existing systems have some drawbacks. Some of the major drawbacks are listed below:

- Most of the system provide only information.
- Farmers do not get any facility over internet.
- Middle man gets the lion share while selling.

- Limited usage of modern agricultural equipment.
- Ignorance about market price.
- Ignorance about latest government projects.

To overcome these drawbacks it is needed to develop a supportive system that will not only help farmers to attain a good profit that they deserve but also will help them farming smartly. Our developed system will resembles such a system.

II. RESEARCH METHODS

The agricultural system is designed for 3 types of users: farmers, admins and buyers. Firstly, the users have to browse the website and for the first time to access all of the features, users need to be registered by filling up the registration form. The registration form contains username, contact number, location, email (optional) and password. The users have to use this username and password as login credentials for further using the web tools. Users can access all of the features such as buying products, hiring agricultural equipment, information about nearest preservation center, acknowledging about current market rate, asking questions to the experts and promotions of new inventions.

A. Information Flow Diagram of Developed System

Here is the information flow diagram of the online agriculture support system (Figure-1). In the flow diagram, input means the entire user information's, posted advertises, posted questions etc. Application is the manipulation of those data, preservation of data and using with this system. Database is the storehouse of data. Three types of user access: registered users through registration form, unregistered or guest users and admin panels.

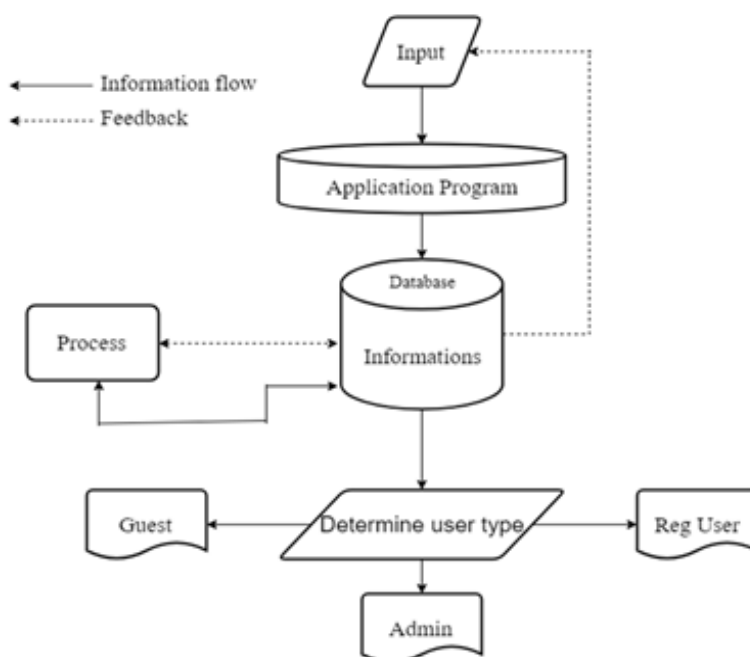


Fig 1:- Information Flow Diagram of Developed System

B. Database Implementation

Database is needed for accurately recording data, updating and tracking them on an efficient and regular basis referred to Figure-2. In this system, there are a database called 'data' consist of 5 tables of data.

- Users: storing and manipulating data from registered users.

- Products: storing and manipulating data from buy/sell section.
- Equipments: storing and manipulating data from equipment rental section.
- Preservation centers: storing and manipulating data from preservation center section.
- Qa: storing and manipulating data from query section.

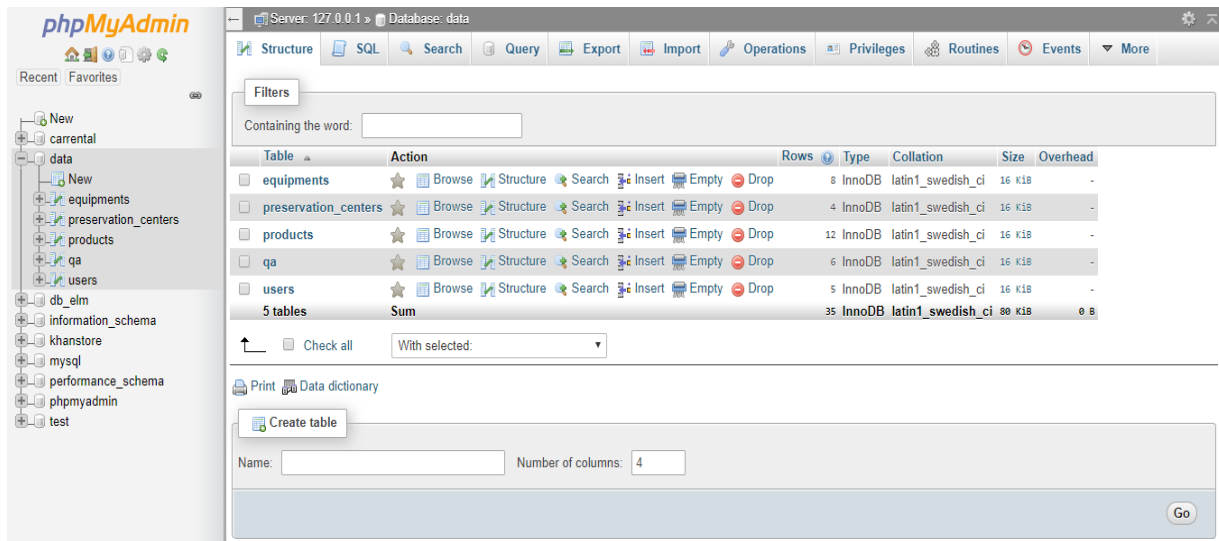


Fig 2:- Sample Database of the Developed System

C. Homepage

Upper part of the homepage of proposed system includes navigation bar that contains all of the features of the developed system referred to Fig 3.

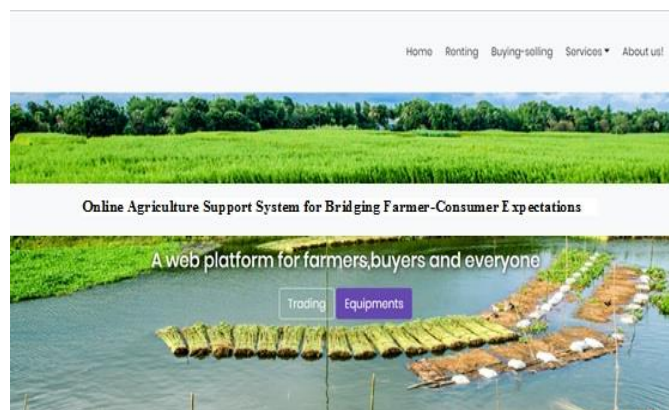


Fig 3:- Homepage of Developed Support System

Here presenting sign in modal which is in the homepage. The system integrates technology of Python, JAVASCRIPTS, PHP and MYSQL database development environment.

III. RESULTS AND DISCUSSIONS

The aim of this system is to simplify the task of the farmers and attain a legal profit that they deserve. It will surely make the farmers more relaxed, because they don't need to think about marketing of their products and also not about hiring agricultural equipment. This helps to save time and to optimize the work of farmers as well as of consumers. The system is designed to achieve maximum

user satisfaction. As the system evaluated, each step of the development process met the system's objectives and primary user requirements.

The objective of this study is to build such a corresponding support system that will be the comfort zone for our farmers for selling their goods and taking equipment in rent. Although we design the system not only for the farmers, it will act like an aid for the customers also, as they can directly approach to the farmers and can have the fresh goods. We hope this system will bridges the gap between farmers and consumers and will assist the farmers improving their knowledge and skills.

IV. CONCLUSION AND SUGGESTIONS

Online agricultural support system has been designed and developed aiming to introduce the online platform for agricultural services in Bangladesh. The developed system is the initial base for further more technological enhancements in the principal field of Bangladeshi economy which is certainly agriculture. One of the prime reasons for building this system is to provide an easier and trustable platform for farmers for their farming business through imparting necessary facilities. Certain enhancements could be suggested for the system in future such as to integrate actual online payment or transaction, useful prediction for flood, natural calamities using weather updates, dynamic fertilizer prediction and so on. This system can be upgraded and further extended with the following features:

It can be improved the design, implementation and documentation in such a way that anyone can use this web tool for better performance. The crop recommendation system can be improved further if more number of predictors can be incorporated. The web page can be made lighter so that with low internet speed that page can be browsed.

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