Smart Agro: An Application for Efficient Crop Planning & Selling using Machine Learning

Samiksha Dharmadhikari[1] Rutuja Deshmane[2] Sneha Biradar[3] Rahul Patki[4]
Dr. Rajeswari Kannan[5]
[1,2,3,4,5]Department of Computer Engineering
[1,2,3,4,5]Pimpri Chinchwad College of Engineering, Pune University, India

Abstract— Agriculture plays a pivotal role in Indian economy. The agricultural sector not only provides employment to half the country's population but also accounts for 18% of India's GDP (gross domestic product). However the farmers don't get their due pay for the hard work they put in due to involvement of lots of middlemen while selling the yield to customers. As farmers are less connected to the internet and news, there is less awareness in general among farmers about various beneficiary scheme available for them. A major problem for the farmer is the unpredictability of future demand and price for crops, which leads to crop failure and ultimately loss for farmers. Crop failure due to unsuitable weather and less market value, leads to farmers committing suicides. After surveying existing systems, this paper proposes a broker free platform for buying and selling agricultural products along with recommendations regarding cross-selling of agricultural products, beneficial crops as well as a guide to set optimal crop price to the farmer.

Key words: Agriculture, Crop-Failure, E-Commerce, Broker Free Platform, Cross-Selling, Beneficial Crops, Optimal Crop Price, Farmers, Android Application

I. INTRODUCTION

E-commerce applications [3] in agricultural domain help the farmers get best price for their agricultural produce as well as other agricultural utilities by providing a broker-free platform to sell or to buy agricultural entities such as: crop seeds, fertilizers, insecticides, agricultural equipment, machinery like tractors which are needed on a day-to-day basis, thus providing a direct marketing facility to the farmers [4][13]. This paper presents a study encompassing a number of techniques taken into consideration while developing an e-commerce application for farmers with the help of various existing applications available for farmers along with the approaches used in them [5][12].

II. EXISTING SYSTEMS

In paper [1] AgriCom application is used in Agriculture System to suggest farmers to select a crop for cultivation mapping using different ground parameters crop production, methods, fertilizer, technology, tools. It is an android based application which provides information to farmers regarding different crops and farming practices and other agricultural products. The author also says that, the system is helpful to increase productivity of crops and indirectly to increase GDP of India thereby reducing poverty. As farmers adopt new techniques and differences in productivity arise, the more productive farmers benefit from it.

In paper [2] KrishiVille is a mobile based android application which provides all facilities to traders and farmers related to agricultural field. Krishi Ville takes care of the updates of the different agricultural commodities, weather forecast updates, agricultural news updates. The application has been designed taking Indian farming in consideration. The application helps farmers in all manners, that is, in education, weather forecasting, information sharing, expert advice, crop analysis and understanding it more clearly. It provides the future information on the fingertips at anytime and anywhere to the farmer.

In paper [8] a user friendly auctioning site is developed where any kind of product can be auctioned and provide value added service to the bidders and sellers. In the first module is the validation for the administrator. In the second module the registration for the seller and buyers. If already registered then the user can directly login to the auction website and the administrator can keep the overall data of the users. Final phase of the project requires shipment process, where the winner of the bidder will get his products delivered through proper online transactions.

The paper [9] speaks about the project in which the idea that will make every farmer reach the homes in there nearby locality or cities by the medium of this web portal and application. Here used are some simple database and used a reference algorithm for displaying the images on the left side termed as related product in the purchase product. The chat option, guest login, multiple language are implemented as additional features to the system making system more user friendly. By the help of this portal people will be able to get fresh food to eat and will be able to explore parts of their nearby villages for picking up their purchases and exploring the place establishing relation with farmers and gaining profit by saving their money, adding profit directly to the farmer helping farmers too. This application uses take the farmers location coordinates (GPS) latitudinal and longitudinal coordinates[15].

III. PROPOSED SYSTEM

One time registration is required for buyers and sellers which includes all their details. In the seller application, Sellers can add products and commodities to sell along with their description and maximum retail price. Seller/Farmer can see the orders placed for their products along with consumer/buyer information. Sellers get an overview of customer buying pattern through Market Basket Analysis. The information about various agricultural government schemes and links to their official site are provided in available in the system. The Admin can upload results of Market Basket Analysis and Prediction of crop rates as a helpful measure for crop planning.
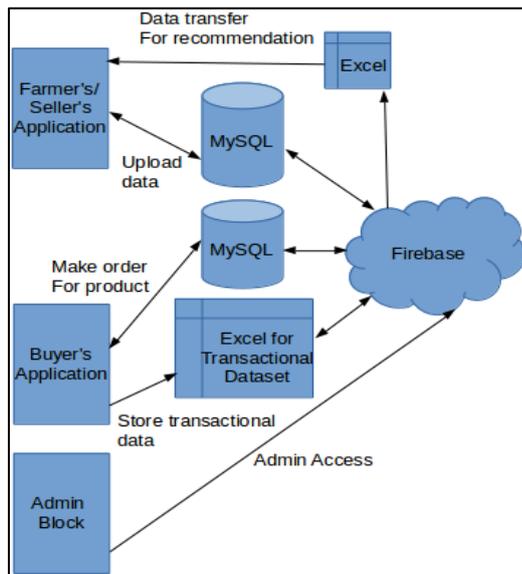
Fig. 1: Architecture Diagram of Proposed System

In figure 1, there are two applications, one for buyer and one for seller/farmer. The data from both the applications is stored in MYSQL database and some of the data related to the buyer and seller is transferred to Firebase, for example Seller ID, buyer ID and registration information. The excel sheet stores the transactional data which is gained from the buyer's transactions and it is synchronized with Firebase in order to perform market basket analysis.

IV. Applications

The most important use of agricultural e-commerce application is that it helps the farmers get best price by providing a broker-free platform to sell or buy their agricultural produce as well as other agricultural utilities like crop seeds, fertilizers, insecticides or other agricultural equipments [4][11].

The e-commerce platform is also useful in predicting the beneficial crops based on demand and market basket analysis which lead to better crop planning[6][15].

Another application is that the customers willing to buy fresh vegetables or any other agricultural produce will get it directly from the farmers at cheaper prices as no middlemen are involved[7][10].

V. Conclusion & future scope

The study of existing systems reveals that there are many existing applications and websites which provide information about various farming practices. Existing systems are of following types: A simple e-commerce application/website for the farmers to sell their products, a system to get information regarding crops, a system for providing information regarding various government schemes related to farming. The proposed system combines features of all of the above existing systems and provides some other useful features such as optimal crop price prediction, recommendations regarding beneficial crops, cross-selling of crops which will help reduce the number of farmer suicides due to crop failures, decreased crop revenue, lack of information about government schemes, crop practices and lack of motivation [6][7]. The proposed system will not only bridge the gap between farmers, customers and the government but also reduce the hoarding of stock, which ultimately may reduce inflation of market price of agricultural commodities [8].

The future scope of this system lies in adding extra features like effects of weather on farming and dynamic updation of marketplace's current prices which may be implemented by consulting experts and farmers after they have used this application. The proposed system can overcome language barrier by using native language (Marathi) as well as Standard English language and the scope can be further expanded by adding speech recognition and voice output in native language for farmers. Further image recognition can be added to directly identify the object to buy/sell thereby increasing the productivity and reducing requirement of farmer interaction to manually input data.

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