Krishi Setu - Bridging the Value Gap

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***Abstract*— Krishi Setu is an attempt to eliminate middlemen so that farmers get maximum profit from the trade chain. Our portal is a simple website where a farmer can upload the quantity of harvested crops and wholesalers can purchase as per requirements and availability. Some peculiar features of the website include news related to farming, current prices of crops, multilingual support that will be visible on the dashboard. Website also consists of features which will determine crop disease by uploading a picture of the crop. The consumer will get recommendations on their purchases as per season and locality. The buyer can visit the place or have courier services integrated. We would choose the most optimized path if the good is supposed to be delivered to another location and there are drop points that come in between. This also reduces delivery cost-efficiently.**

***Keywords*— Agriculture, small-scale farmers, eliminating middlemen, crop disease prediction, buying and selling.**

I. Introduction

Agriculture, "The backbone of Indian economy" as quoted by MK Gandhi is defined as an integrated system of techniques to control the growth and harvesting of animal and vegetables. It is an uncomplicated endeavor comprising of technical and practical processes that helps in the maintenance of the ecological balance and protects human resources; most importantly it is a viable food production system (Agro Products 2015). In 2012-13 agriculture contributed to 13.9% of the total GDP (Economic Survey & CSO 2014, p. 23), and employed 47% of the total workforce population (World Bank 2014). The combined efforts of Central Government, State Governments and the farming community have succeeded in achieving a record production of 264 MT of food grains during 2013-14 (Economic Survey & CSO 2014, p. 19). This record production has been achieved through effective transfer of latest crop production technologies to farmers under various crop development schemes being implemented by the Department of Agriculture & Cooperation backed by remunerative prices for various crops through enhanced minimum support prices**.**

As Indian economy has diversified and grown, agriculture's contribution to GDP has steadily declined from 1951 to 2014, yet it is still the largest employment source and a significant piece of the overall socio-economic development of India. Crop yield per unit area of all crops have grown since 1950, due to the special emphasis placed on agriculture in the five-year plans and steady improvements in irrigation, technology, application of modern agricultural practices and provision of

agricultural credit and subsidies since the Green Revolution in India. However, international comparisons reveal the average yield in India is generally 30% to 50% of the highest average yield in the world.

Even after knowing all this information , farmers in India are the most exploited and underprivileged. They never get the deserved profits, owing to their efforts. The reasons include faulty farm practices like overuse of chemical fertilizers, uneven rainfall, and soil infertility. But one of the major causes is the transportation of the harvested produce to regulated markets. Farmers are paid only one-quarter of money that consumer is going to pay while the middlemen get 75percent of the entire chain. With food inflation at an all-time high, these middlemen are only boosting the soaring food prices further. Gaining from these profits, the middlemen deprive farmers and consumers of a fair price.

To benefit the farming from the new global market access opportunities, the internal agricultural marketing system in the country also needs to be integrated and strengthened. In particular, the market system has to be revitalized to:

a) Provide incentives to farmer to produce more;

b) Convey the changing needs of the buyers to the producers to enable production planning;

c) Foster true competition among the market players and

d) To enhance the share of farmers in the ultimate price of his agricultural produce.

Today the farmers cultivate crops based on the experience gained from the previous generation .Since the traditional method of farming is practiced there exists an excess or scarcity of crops without meeting the actual requirement. The farmers are not aware about the demand that takes place in the current agricultural economy. This results in the loss to the farmers. The expressed reasons in order of importance behind farmer suicides were – environment, low produce prices, stress and family responsibilities, poor irrigation, and increase in the cost of cultivation. The main reason is the low prices of the products and the increased cost of cultivation. The cost of crops are determined by economic demand and the limits of the production.

In recent years, different application domains have been introduced with new constraints and methods for the technology. Information technology has become a part of our day to day life, and is increasing in the field of agriculture. Farmer Portal in the field of agriculture is a milestone in the field of development. Farmer portal basically includes the buying and selling of products. The objective of our farmer portal is to eliminate the middleman in that buying and selling of agricultural produce, so as to ensure that the farmer gets the correct price for his produce and ultimately to earn deserved profit.

II. Lacuna In The Existing System

A) Interface issues:

Existing systems provide the complicated interface[1].This is a user friendly interface with the required language support.

B) Language support

Existing systems had a mono-language interface. This system provides multilingual support.

C) Additional Features

System provides good help to farmer by predicting the crop disease and giving the required prevention and treatment, the system also provides offline ordering of the produce using the SMS services.

D) Authentication issues

Existing systems provide direct account creation. This system does proper authentication using the Aadhar number or Agricultural license number.

III. Proposed System Architecture

Fig. 1 shows the detailed architecture of our system. The entire system consists of two main divisions:

- Farmer
- Buyer

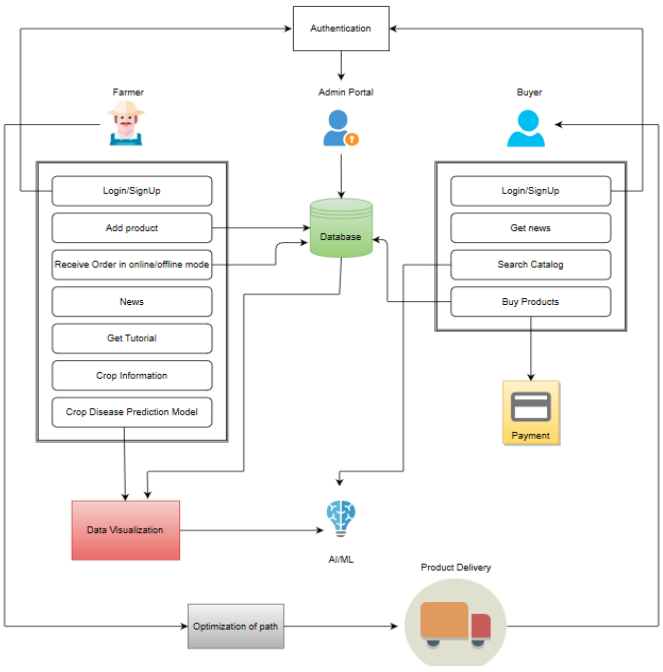

Fig 1. System Architecture

Farmer:

This division of our system consists of various features that we provide to the farmer. Features include:

- Authentication(Login/Sign up)
- Farmer can upload their crop products to our portal
- Farmers can receive order in offline mode through SMS API or online mode through mail API
- News API for getting latest farm related news[8]
- Tutorials related to farming
- Various crop information and current market price of crop products using AgMarknet API[2]
- Crop Disease Prediction

Buyer:

This division of our system consists of various features that we provide to the buyer. Features include:

- Authentication(Login/Sign up)
- News API for getting latest farm related news[8]
- Searching various available crops from different farmers
- Buying available crops in bulk
- Rating crops
- Payment gateway integration[7]
- Recommendation of crops based on location

IV. System Design And Working

Farmers have been given access to the entire portal and can avail various features without even registering to the portal. To add a product for sale, the farmer needs to register into the portal by validating his credentials. Aadhar Card Number is an essential prerequisite for registering. After registration, farmers can upload details regarding his products like price,quantity, category and other details. After a purchase has been made, the farmer is notified about it via two modes: SMS and email services. News related to the agricultural field is also provided to the users. Various farm related tutorials and information about crops is also available on the portal.

The portal also has a feature which displays current market price of farm products so that farmers

remain informed and can decide the prices of their products. For this, the farmer enters the name of the commodity and a particular state and the details like district, market, variety, arrival date, minimum price, maximum price and modal price will be displayed.

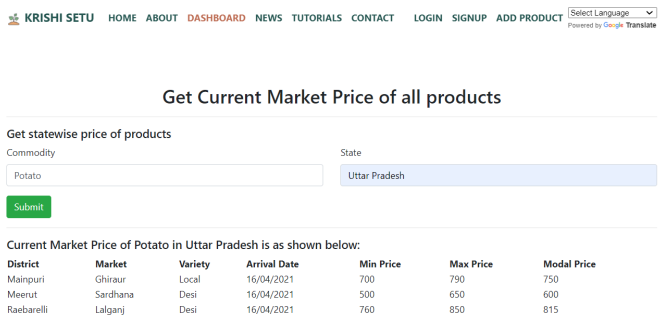

Fig 1(a). Current Market Price

Krishi-Setu provides multilingual support for the users to overcome linguistic barriers. The website provides a facility of crop disease prediction to the farmers. The farmer has to enter the name of the crop along with its image to get the prediction. The information regarding the disease like cause , prevention and cure will also be provided along with the prediction.

The wholesalers(customers) on the other end need to register to the website in order to purchase the products. While registering, the The Food Safety and Standards Authority of India(FSSAI) is required. The customer can only purchase the products above a minimal quantity specified. The customer then has to proceed with the payment. The website provides a feature to the customers for tracking their orders. The customer can view their previous purchases and provide feedback on them.

The users can contact the owners of the website in case they encounter any queries while accessing the feature of the website.

V. Methodology

A) Crop Disease Prediction:

Many-a-times because of the diseased crop, farmers suffer from a huge amount of loss. It's important to detect the disease before the loss.

So the crop disease prediction module predicts whether a crop is infected or not. For this module, we have used the dataset from Kaggle[3], and on that data, further processing is done, processing basically means filtering and cleaning the data from irregularities. Then, we feed the processed data to the CNN algorithm for further training and testing purposes. We train the model using the feature comparison and matching and accordingly the predicted output is generated. The basic structure of the module is shown in Fig. 2

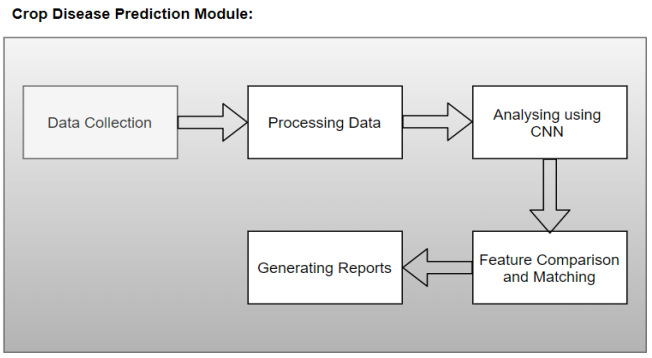

Fig. 2 Crop Disease Prediction Module

B) Recommendation System

In the recommendation module ,the buyer will get the recommendation of the products on the basis of his location. The location log module tries to find the location of the user and collect it for further analysis and after applying the recommendation algorithm ,the user gets a

recommendation based on his location.The basic structure of the module is shown in Fig. 3

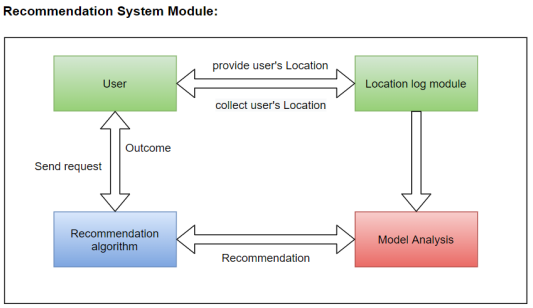

Fig.3 Recommendation System

C) Ordering:

The user creates an account/ login to the portal and selects the products and after adding it to cart he will try to make the payment using the payment module which we implemented using stripe and it will generate the invoice/bill and also sends an email to the user. The basic structure of the module is shown in Fig. 4

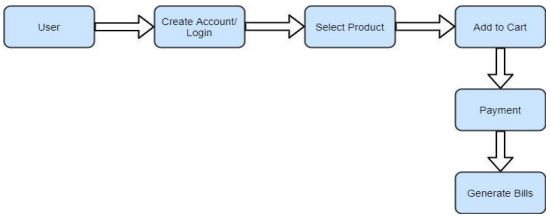

Fig.4 Ordering

D) Payment module:

The customer/ buyer submit the order on the krishi setu website and contact the payment gateway ,the payment gateway[7] confirms the payment request from the merchant's bank and after the successful payment ,sends an email notification to the merchant[7]. Here the merchant is our buyer.The basic structure of the module is shown in Fig. 5

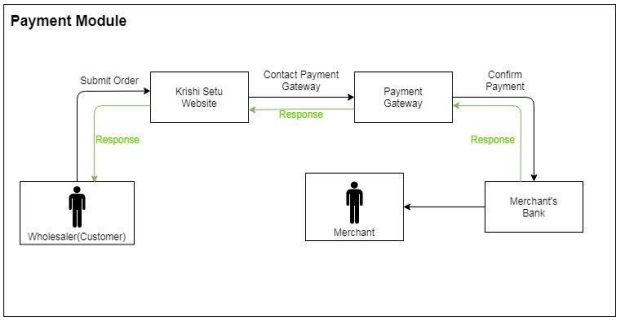

Fig.5 Payment Module

VI. Results of Implementation

A) Crop Disease Prediction:

For the crop disease prediction module, we will give the crop name and the image for the same as input to the model and we get the Crop disease name as the output. The implementation is shown in Fig. 6

Fig.6 Prediction Output

B) Ordering:

Buyer adds to cart the required products and at the time of checkout he is asked to login to the system and the final order list will be displayed as shown in the Fig. 7

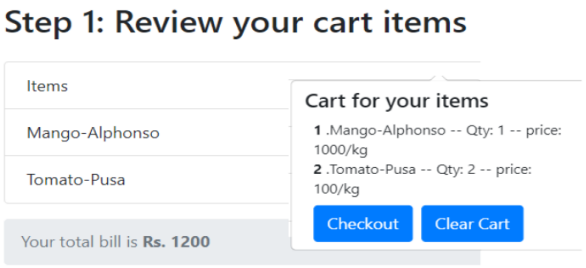

Fig.7 Ordering from Website

C) Payment Module:

The customer makes the payment and accordingly it will get updated in the database[7] and the customer will receive confirmation mail regarding the order as shown in Fig. 8

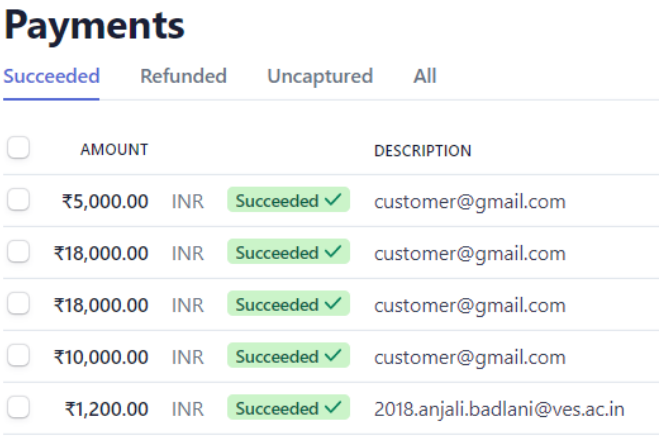

Fig.8 Recent Payments

VII. Future Scope

A. A friendly chatbot for helping farmers.
B. We will make a delivery system that will choose a route which will have a minimum path.
C. The organisation could work with some marketing undergraduates.They could make the farmer aware of the website and help them use the features of the website.

VIII. Conclusion

The project is developed with the aim to overcome the issues stated in the existing system. It aims to develop with advantages as user friendly and easier to access.Our proposed site will be more efficient and to improve the measure of increased performance. Usually farmers could not have any basic knowledge based on websites and applications. They don't have any idea about web applications, online auction, online crop disease prediction etc. , but the proposed system can be brought with easier access by them without any middleman. Farmers/Customers can sell/buy farm produce at optimal price without any middleman involved between farmer and consumer and earn profits.It will be more helpful for farmers to know about the information about current farming and so they can feel that this is a more secure and beneficial website.

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[8] News API: <https://newsapi.org/>