An App-Based Solution for Farmers using Opinion Based Technique in Agricultural Development

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Abstract - *Farmers are the backbone of our country that is facing many problems and among many problems, the important one is getting relevant information about the crop and weather details at the right time. This is an agriculture-related application with the main aim of providing better ideas to improve their practice in farming. Agriculture app which we developed provides the facilities like recent market prices, weather forecast, agricultural ideas, smart farming practices and crop knowledge. But the major problem faced by farmers today is in selling their goods, where middle persons make a profit, so seller platform is introduced and apart from these features, it also gives news related to agriculture field in various places and scheme introduced by the government. Here we have also applied a technique used to generate opinion, based on crop knowledge, weather/climatic condition and best resources the farmers hold at hand.*

Key Words: **Right Time, App, Need, Seller Platform, Govt. Scheme, Crop Knowledge**

1. INTRODUCTION

The agriculture is the crucial reason for the production of food and raw materials, which eventually is the reason for the survival of the population. In India, most of the population is dependent on agriculture. However, there is also need to assess and rejuvenate the mechanism for updating the technology or aids to help reach the goal. In the approaching decades, agricultural field will drastically change. The 'green revolution' which had a basis of highly developed pesticides and fertilizers, in the near future agriculture will be revolutionized with the help of smart farming technique. Every developing economy has agriculture sector as the irreplaceable pillar and so does India. In India, the agriculture sector contributes close to 20% of GDP. Either directly or indirectly, 60% of total population of India depends on agriculture. The vast majority of Indian farmers, which includes small-scale producers, are often unable to access the information and technological resources that could increase the yield and lead to better prices for their crops and products. The extensive use of mobile phones throughout the country could be the game changer in this problem. It will put agriculture field to its pinnacle.

The available improved agriculture technology has the potential of raising the yields of agriculture products in the country at least twice or thrice to present numbers. This can only be done, under the existing set of conditions, if the technology is communicated to the farmers in the manner they can understand it and they are also convinced of its economical adoption in their local conditions. This is the job of well planned, organized and effective extension department. At present, it is the weakest link in the chain (Research-Extension-Farming Community) of agriculture department and it needs immediate strengthening.
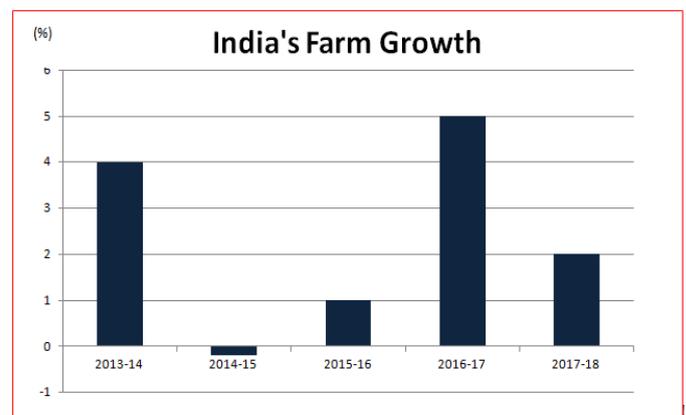
Chart -1: Bar Chart for India's Farm Growth from 2013-2018

The objectives of developing the application are as follows:

- To elevate the typical living of the farmers by serving them in right use of their resources.

- To help in scheduling and implementing village/field plans for rising production in the agricultural field.

- To offer amenities for enhanced quality of farming life combined with optimized work on the field.

- To guide farmers before the occurrence of uneven events and provide solutions to prevent it.

- To give farmers a platform to sell to customers / buy from suppliers directly.

2. LITERATURE SURVEY

This section of the paper provides areas of research which has already been done.

Raval et al discuss a Process which uncovers useful data and the basics of various Data Mining Techniques like Classification, Sequential Patterns, Association rules,

Prediction and Clustering and also states its importance in business roam[1].

Agrawal et al discuss various Data Mining tools such as Dashboards, Text-Mining tools and provide an overview of these tools and the various scenarios in which they can be deployed [2].

Grajales et al have proposed a web application that utilizes open dataset like historical production, land cover, local climate conditions and integrates them to provide easy access to the farmers. The proposed architecture mainly focuses on open source tools for the development of the application. The user can select a location from the map for which the details are available at one click [3].

Bendre et al collects data from GIS (Global Information System), GPS (Global Positioning System), VRT (Variable Rate Fertilizer) and RS (Remote sensing) and is manipulated using Map Reduce algorithm and linear regression algorithm to forecast the weather data that can be used in precision agriculture. The purpose of this study was to investigate the effective model to improve the accuracy of rainfall forecasting [4].

Hemageetha mainly focuses on using the soil parameters like pH, Nitrogen, moisture etc for crop yield prediction. Naive Bayes algorithm is used to classify the soil and a77% accuracy is achieved. An Appropri algorithm is used to associate the soil with the crops that could provide a maximum yield in them. A comparison of accuracy achieved during classification using Naïve Bayes, J48 and JRIP are also presented [5].

Rub et al present a comparative study of the regression models that could be used for predicting yield. The algorithms discussed are Multilayer perception Model (MLP), Regtree (Regression tree), RBF (Radial Basis Function Network and SVM (Support Vector Machine). They have concluded that SVM serves as a better model as far as yield prediction is concerned [6].

Sujatha et al describe the purpose of various classification techniques that could be used for crop yield prediction. A few of the data mining methods, such as the Naïve Bayes, J48, random forests, support vector machines, artificial neural networks were presented. A system using climate data and crop parameters used to predict crop growth has been proposed [7].

Kushwaha et al predict the suitability of a crop for a particular climatic condition and the possibilities of improving the quality of the crop by using weather and disease-related data sets. They have proposed an analysis, classification and prediction algorithm that helps in building a decision support system for precision farming. It is based on the Hadoop file system [8].

Fathima et al use data mining techniques on real-time data that help in knowledge discovery. They use k means clustering algorithm to cluster the farmers based on the crop type and irrigation parameters. An Appropri algorithm is used to determine which two crops are selected as a frequent item set. They generally focus on the policies that government could frame by the cropping practices of farmers [9].

Veenadhari et al described the purpose of data mining methods in the area of agriculture. A few of the data mining methods, such as the k-means, ID3 algorithms, the k nearest neighbour, support vector machines, artificial neural networks were presented [10].

Sellam et al explain the various environmental parameters like the Area under Cultivation (AUC), Annual Rainfall (AR) and Food Price Index (FPI) that influences the yield of crop and the relationship among these parameters is established. Using Regression Analysis (RA), Linear Regression (LR) the various environmental factors and their infliction on crop yield is analyzed [11].

3. METHODOLOGY

In this section of the paper, we discuss a technique to reach our objective through a mobile application. The application's back-end is a combination of machine learning algorithms and opinion mining giving way to the following features:

• Weather Forecast Report: Weather forecasting is to deals with science and technology to forecast the state of the atmosphere for a current time and for a current location to real-time forecast. Ancestors have tried to predict the weather using their experiences and knowledge. Weather forecasts are made by collecting grouped data about the current state of the atmosphere at a current place and using data mining of atmospheric processes to demonstrate how the atmosphere will change, after 24hr or a week. A weather report will be created to help the farmers to take necessary decision for their crops.

• Information about Crops: Agriculture is all about the cultivation of Crops, Animals etc. The agricultural study says that growth of production will be dependent on climate, soil, medicines and fertilizers, and appropriate information help to mature production of the food .We are providing all detailed information about crop, fertilizers, etc.

• News and Govt. Schemes: Government of India will launch different Programs which benefit Farmers but the drawback of poor performance of this program is that they are not able to reach every person and not able to give proper information so here we provide detailed information and Process of different programs. This way farmer will never be afraid to implement and this leads to the growth of the country as produces increase and get exported.

• Farming Tools and Technology: Farming tools and technology will see a rapid growth. Different tools which help the farmers for growing there production has not been implemented due to the lack of awareness between the new technology available and the farmers; this way

they will not get proper guideline hence the solution is to provide detailed information and alerts about new upcoming technologies.

• Suggestion generator: Based on Crop knowledge, weather/climatic conditions, market prices and resources in hand is carefully analysed by a mathematical formula. This is explained in the paper below.
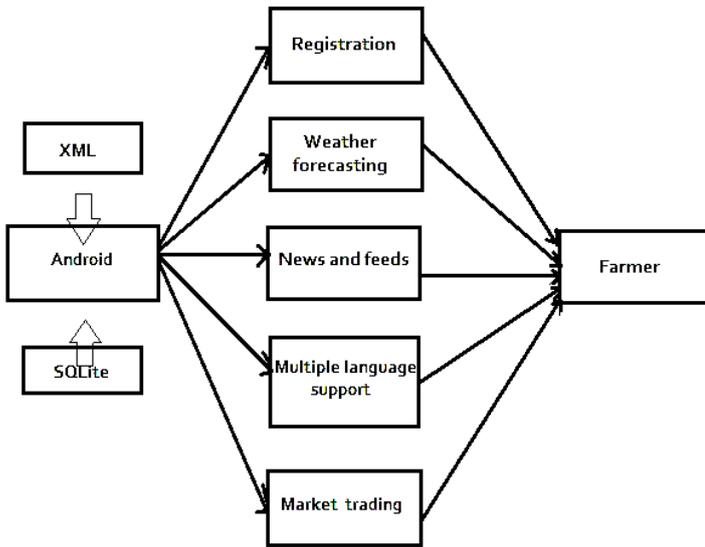

Fig -1: System Architecture of the proposed model

3.1 Data Mining Techniques

This section will discuss the important algorithm for predicting farmer suggestions.

1) Binary Logistic Regression: A type of regression analysis where the dependent variable is either 0 or 1. The logistic regression model is simply a non-linear transformation of the linear regression. The logistic distribution is a Shaped distribution function where the estimated probabilities lie between 0 and 1. The estimated probability suggests the probability that the agricultural practice belongs to a particular class. If the probability is below 0.5 than it is class 0 and if it is above or equal to 0.5 it is class 1.

2) Naïve Bayes: A probabilistic model which implements Bayes theorem with strong independence assumptions. The probability of each agricultural practice belonging to different classes is computed. The agricultural practice belongs to the class with the highest probability is chosen.

3) Support vector machine: Another method used for prediction and classification is the Support Vector Machine method. The advantage of SVM method is that it has a good ability of generalization. A study

conducted by Gray Et Al in 2014 showed that the SVM method had the highest accuracy prediction concerned with risks identified.
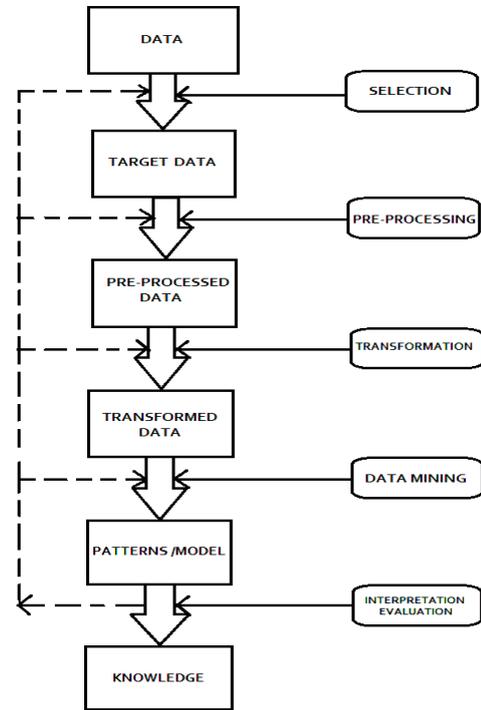

Fig -2: Dataflow diagram for processing of dataset

4. CONCLUSION

The crops are usually selected by its economic importance. However, the agricultural planning process requires a yield estimation of several crops. In this sense, five crops were selected for this work using the data availability as the key measure.

India is a nation in which agriculture plays a prime role. In the prosperity of the farmers, prospers the nation. Thus our work would help farmers in sowing the right seed based on soil requirements to increase productivity and acquire profit out of such a technique. Thus the farmer's can cultivate the right crop increasing his yield and also boost the overall productivity of the nation keeping demand to supply ratio in hindsight.

However at times due to some natural events, there would be a certain amount of change in the particular region which this technique will never be able to identify and would react to such changes after a major unhealthy event would have occurred.

5. SCOPE AND FUTURE WORK

Using data mining methods, specified above in this paper, the crop dataset is analysed and determined the optimal parameters for the wheat crop production. Multiple linear regressions are used to find the major attributes and form the equation for the yield prediction.

Various data mining techniques are implemented on the input data to assess the best performance-yielding method.

In future, one can aim at an improving dataset with a large number of attributes and also implement yield prediction techniques to overcome some small changes which tend to give inaccurate results.

ACKNOWLEDGEMENT

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