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Decision Support System for Farmer

Mr. Dilip M Dalgade[1], Sagar Narsaiah Konda[2], Shubham Gopal Mallick [3], Manasa Sathaiah Samala[4]

[1]Assistant Professor, Department of Computer Engineering, Rajiv Gandhi Institute of Technology, Mumbai, Maharashtra, India
[2,3,4] Students, Department of Computer Engineering, Rajiv Gandhi Institute of Technology, Mumbai, Maharashtra, India

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Abstract - *Guide to farmer is an important aspect for cultivating the crops and providing the proper suggestion which are related to farming. The crop cultivation methods and plant diseases identification is the key to preventing the losses in the yield and quantity of the agricultural product. The studies of cultivation as per weather in area wise semantics and the plant diseases detection mean the studies of cultivation methods and visually observable patterns seen on the plant. Farmers need to identify the diseases in proper time and take decisions accordingly. Hence, image processing is used for the detection of plant diseases through leaf images and show the percentage of the disease infected and provides suggestions of the products like pesticides and fertilizers and their quantity to be used by the farmers. Farmers need to know the actual prices of their yield in the market and as a result most of their yields are sold at low prices. The proper need of the alerts of the prices of the various crops and their market price week analysis helps the farmer to make better decision to sold their yields at high prices are achieved by this project. Weather also plays an important role in making proper decisions regarding farming activities and weather predictions help the farmers are achieved all the results are showed in tabular and graphically and predictions achieved are by using statistical analysis and using of linear regression thus making farmer easier to analyze and take proper decisions.*

Key Words: **Disease Detection, Weather Forecasting, Market Price Statistics, linear regression, graphical results, Predictions.**

1. INTRODUCTION

Disease Detection, Weather Forecasting, Market Price Statistics, linear regression, graphical results, Predictions
Our project aims to provide guideline to the farmer for selecting the crop cultivation as per the weather present his area. Project guides the farmer for selecting the crops based on the weather conditions as well as the crops available. Once the farmer selects the crop for the cultivation guidelines will be provided for that particular crop by the notification facility through sms. If plants are infected by some diseases then farmer captures the crop photo and takes it to the nearest Agri center where suggestions based on the infections are provided by comparing the photo by using our image Comparison Module. Another aspect like market price analysis, weather analysis are given to the farmer so that farmer can make decision regarding the agricultural activities and farmer will be able to sold his yield at good profits by analyzing the market value.

2. DISEASE DETECTION MODULE

The basic purpose of this module is to help farmers to take decision regarding the plant care while it is infected with some diseases thus by using proper fertilizers and pesticides from time to time in proper proportion thus avoiding the loss of yield.

This is accomplished by building a web platform in which farmers can interact with expert, share their experiences and knowledge. In Agriculture sector plants or crop cultivation have seen fast development in both the quality and quantity of food production, however, the presence of pests and diseases on crops especially on leaves has hindered the quality of agricultural goods. There is therefore a need to identify these diseases at an early or superior stage and suggest solutions so that maximum harms can be avoided to increase crop yields. The disease detection module shows the severity and percentage of the infection caused due to the disease along with suggestions that need to be taken by the farmers.

3. WEATHER PREDICTION MODULE

Weather conditions need to be known by the farmer from time to time because unawareness of weather condition may mislead the farmer to wrong decisions thus making a huge loss. This module helps the farmer to get the weather information from time to time and provide the suggestions from time to time based on the weather such that farmer will be able to make right decision from time to time and thus make a high yield.

4. MARKET PRICE MODULE

The market prices of agriculture yields have raised considerably in recent years. Many researches have been performed to understand the fluctuations in the market prices for the yield and results have been observed that the predictions may not be done more in advance since the sudden change in the weather by some natural disasters cannot be predicted in present tine. However, there are relative few studies on a specific market and certain

produce. This article, based on actual data collected by crawler technology, attempts to carries on trend estimate of certain produce price on a specific market by using time series model. But forecasting of the prices for a short period of time is possible this can be achieved by historical prices of the cultivation and using machine learning algorithm to predict but accepting only the results of the shorter period of time.

5. LITERATURE REVIEW

There is limited access to the market information, literacy level among the farmers is low, multiple channels of distribution that eats away the pockets of both farmers and consumers [3].Climatic conditions directly affect the performance of crops [4] and are therefore of principal importance. Crop losses due to pests and diseases are a major threat to incomes of rural families and to food security worldwide [1,2].There is a need of the decision support system for the farmer for the high yields to be produced benefitting the farmer. This can be achieved when there is proper knowledge about the environmental conditions, Market Conditions and knowledge about the timely planning of Agricultural Activities. Project Aims at the solution of all the above mentioned issues by using a web portal.

6. SYSTEM DESIGN

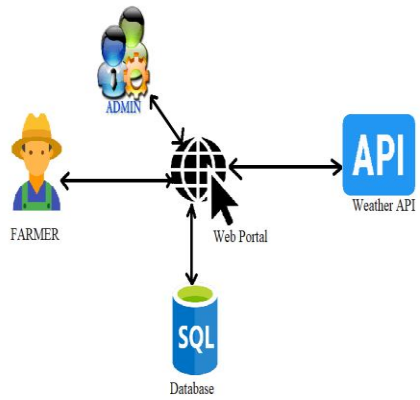

Fig 1- Architecture of the Web Portal System

The System Consist of a Web Portal that Consist of two types of user's farmer and the Administrator. The web portal displays the weather and the weather predictions that are fetched from the weather API and the Current Day Market Price for various crops.

The Current Day Market Prices are updated by the administrator from time to time so that farmer always gets the updated values also the values are stored in the database so that it can be used for Analysis Purpose.

7. METHODOLOGY

For the Weather Information we have used the weather API. The Rainfall Prediction Module is based on Multiple Linear Regression.

$$y = \beta 0 * Cloud\ cover + \beta 1 * Temperature + \beta 2$$

y is the prediction of the rainfall and β0,β1 are coefficients for Cloud Cover and temperature respectively and β2 is constant.

For the Prediction we have considered the training data set of Nashik District for the Month of September from year 1901 to 1970.

Year	Temperature	Cloud Cover	Rainfall
1901	26.06	61.240	65.325
1902	25.074	61.240	373.352
…..	…….	……..	…….
1970	25.490	63.329	325.589

Table 1- Input Training Set for September Month of Nashik District

Following Results were Obtained for Rainfall Prediction

Year	Actual	Predicted	Error
1973	371.380	350.658	5.58%
1974	193.854	197.365	-2.07%
1975	290.919	275.369	5.34%

Table 2-Predicted Values for Month of September

Working of the Algorithm

a. From year 1901 to 1970 the inputs are given as training data

b. From year 1971 to 2002 is used for testing the algorithm

c. The Coefficients are derived using multiple linear regression formula's of curve fitting

d. Then using Coefficients the rainfall value of the year 1971 is predicted and compared with actual value

e. The error that is between the actual and predicted is calculated and 15% of the error percentage is added back to the Training Data set

f. And the Steps c & d repeated until No Change is found in successful iterations

g. The coefficients are fixed after results find no change and this coefficients are used for predictions of future years

Do steps for all other Months prediction

8. OBSERVATION AND RESULTS

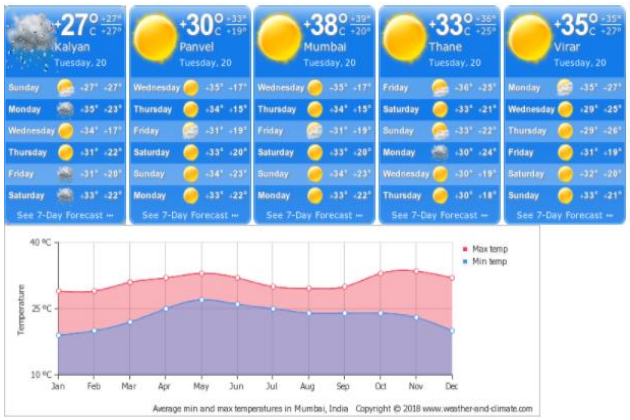

Fig 2- Weather information and Prediction

Fig 3-Market Price Information

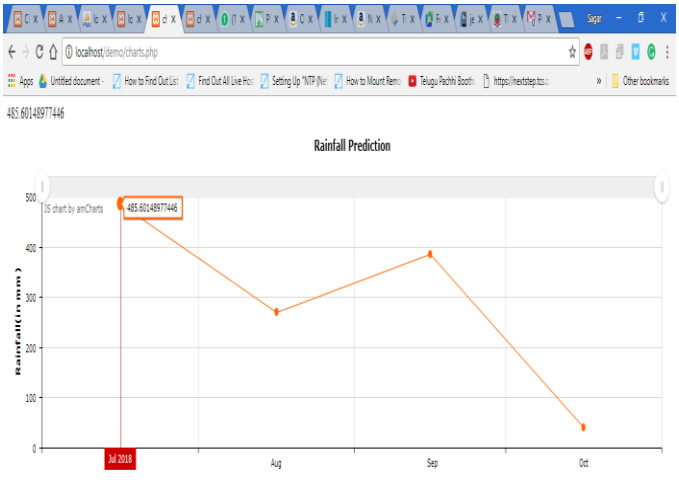

Fig 4- Rainfall Prediction for Current Year

9. OBJECTIVES OF THE PROJECT

a. Awareness of possible Prevention /treatment /Suggestion / automatic notification methods. Of the types of chemicals or treatments necessary for control.

b. Awareness of the market prices from time to time so that farmer can make decisions about selling his yield at proper time.

c. Awareness about the present and upcoming weather conditions to the farmers and provide suggestions based on the weather conditions

d. Suggestions of the products based on the disease infections to the plants

10. CONCLUSIONS

In this paper we have discussed about the problems caused due to the use of traditional approach of providing guidelines providing accurate and Information of use to the customers as well as the farmers and solutions for that through the use of mobile and provide new approach.

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