

Manage Agriculture with an App

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Abstract - The project speaks of an application that would help the farmers to plan their activities with respect to agriculture. It mainly focuses on weather forecasting which analyses a pool of data and then provides prognosis on whether the conditions would be favorable for farming. The prediction is done by taking into account the current situation of weather conditions and then the new or upcoming conditions could be predicted. It further helps the user to know about the market status and accordingly plan. With new government schemes being displayed on his phone he would be regularly informed about them and take benefit from them. It would have an online portal which would accept their questions and provide remedies for their problems. This could be also done by assigning an expert to answer the queries of the user. It also focuses on providing online learning through which the user can make use of videos to learn about new effective ways of farming and also various schemes made for their benefit. Thus they can have YouTube videos in the same application. All this would be available in the same application thus saving the overall memory of the mobile phone and reducing the hassle of downloading too many applications for different objectives.

Key Words: Multiple Regression, tokenization, API, Android Studio, settext, etc.

1. INTRODUCTION

India is known as a country of agriculture, but agriculture is a very complex process. Constant efforts are being made to make agricultural practices increasingly easier. The productivity from agriculture mainly depends upon a variety of factors like the fertility of the soil, the season, climate, quality of fertilizers and various external factors. In recent years a number of new techniques and technologies have appeared. Among them Big Data is one of the major advancements which talks about storing a big junk of data and then predicting the data entries estimated from the previous trends of data entry. The Big Data technology can be extensively used for weather forecasting.

The basic aim of our project is to build an application which will have the features such as Weather forecasting, Market Price Prediction, News information, Natural Language

translation and Discussion platform. All the above features are available individually on different platforms in the systems present today but we aim to combine all these into one platform. The main feature of our application is Market Price Prediction where we aim to find the prices of different vegetables at different places and also predict the future prediction about the prices. For this technique we are basically using a model from where we can get the approximate price of the vegetables.

There are many government schemes whose objective is to provide help to the farmers. Mostly the farmers are unaware of these kind of services. So news feeds of such kind of service should be placed which uses the basic architecture of the android application. Language barrier is the biggest barrier in India as every state; in fact, each area of India has a different dialect. To overcome this, an application should support different languages to make the application user friendly. There should be a place where the users register their grievances and get them answered by the experts. There should be a session which provides online learning. In this, the application uses YouTube videos for the purpose of educating the farmers on the topics the farmers feel they need special attention on.

The market status should also be display. The market status also makes use of Big Data as it observes the common trend of prices in the market and subsequently makes the predictions. It also accounts for the rise and fall in the market and how it would affect the external factors which are depending on the market.

2. PROBLEM DEFINITION

Farmers in different regions, especially in underdeveloped areas of India, have to be more connected to new powerful technologies in market for best quality products. Language shouldn't be a barrier while communicating or asking doubts on the software application. Due to unexpected changes in climate goods get wasted which effects on farmer's income. It will be more beneficial if they have slightest idea of upcoming weather. They also need a good market to sell their goods where they will get expected profit from it. Also farmers should always be aware of new schemes for their profit or any news related to agriculture.

3. BACKGROUND

3.1 Multiple Regression

Multiple regression is an extension of linear regression, which is made use of when there are more than two independent variables or parameters under consideration. Like linear regression, this is also used for prediction. The variable to be predicted is dependent on the parameters being supplied at the prediction end and hence it is called as a dependent variable. It is mainly important because it helps to identify the strength of the effect that the dependent variable has because of the independent variables. So basically it assists us in understanding that how much the dependent variable changes when changes are being made on the independent variable side. Its basic equation can be written as,

$$y = B_1 * x_1 + B_2 * x_2 + \dots + B_n * x_n + A$$

In this equation, x_1 is the value of the first independent variable; x_2 is the value of the second independent variable, and so on. Whereas, B is the same coefficient and A is an independent variable. To make sure, that our model fits the multiple regression model we have to take care of the following:

$$Error_Point = (Actual - Prediction)^2$$

Here, Error is the error in the model, actual is the actual value and prediction is the value predicted by the model.

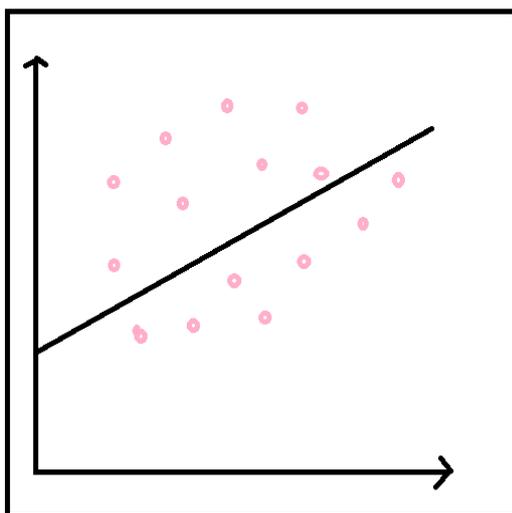


Figure 1: Price Prediction Feature

3.2 Linking through API

API is the abbreviation for application programming interface. In simple words, API communicates with a program. It is mainly used for making the process of

collecting data easier and faster. The architecture of an API has three important parts, namely:

- I. User
- II. Client
- III. Server

Mostly API keys are necessary for using certain APIs. In this app, this technology is used for displaying the newsfeed and weather forecasting feature. Through this facility, we were able to reduce the overall size of the app, making it more practical for the users using the app.

4. IMPLEMENTATION

The entire app is implemented using a domain server on which the data used for the app is stored. Whenever a request is made on the app, the operation of fetching data from the server starts and the retrieved data is being displayed on the app. The diagram down below is a representation which shows what happens at the backend of the app.

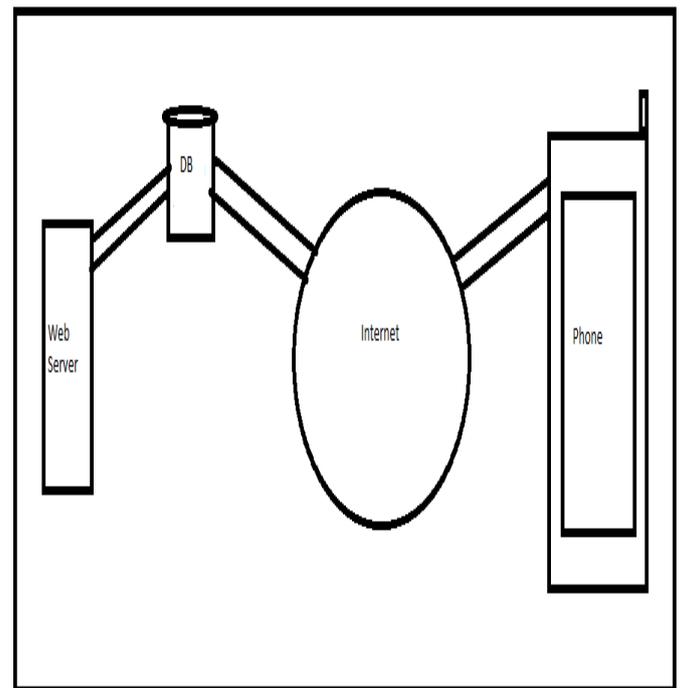


Figure 2: Diagram of the entire process

4.1 PRICE PREDICTION

A sample dataset is available her for their prediction model. For our project a dataset of various vegetables and fruits is available on different government websites. This dataset will help us to train the model. The data will be stored on a server. We will feed the data to the multiple regression

model to get the output of market price prediction. Multiple Linear Regression is the best way to predict the next outcome from the available dataset. The dataset is being stored in the database of the server, while performing the analysis and prediction process, the data is retrieved and the regression is performed on it and then it shows the result on the app. Hence, according to the data provided the price prediction is being done and hence providing proper dataset to the database is essential, as the prediction is solely based on it.



Figure 3: Price Prediction Feature

4.2 NATURAL LANGUAGE PROCESSING

The process of conversion of text from one language to another is known as Machine Translation. MT system translates text or speech from one natural language to another language. Machine translation is needed to translate the text to our own native language or from to other commonly known language.

The algorithm which they used first reads the sentence break it into tokens and then stores them in sets and deletes it from the original sentence. After that it check the synonyms and then check for the grammar i.e. noun-noun, subject verb-agreement to name a few. Android Studio has a function called settext. This function can translate a line or passage into a particular predefined language. User will have

different options of regional languages like Marathi, Hindi, Bengali, etc. This will help user to select the language in which he/she is comfortable so that user will be able to use the application with less difficulties.

4.3 Weather Forecasting

This can be done by the use of API and linking with websites which provide the weather condition information. Then this is displayed on the app, this would decrease the size of the app.

JSON is used by Openweathermap weather API for the purpose of exchanging data. This results in displaying of the current weather conditions, the forecast and historic weather condition information. This is done by the user pressing the button in the application and getting redirected to the link of the Openweathermap weather API.

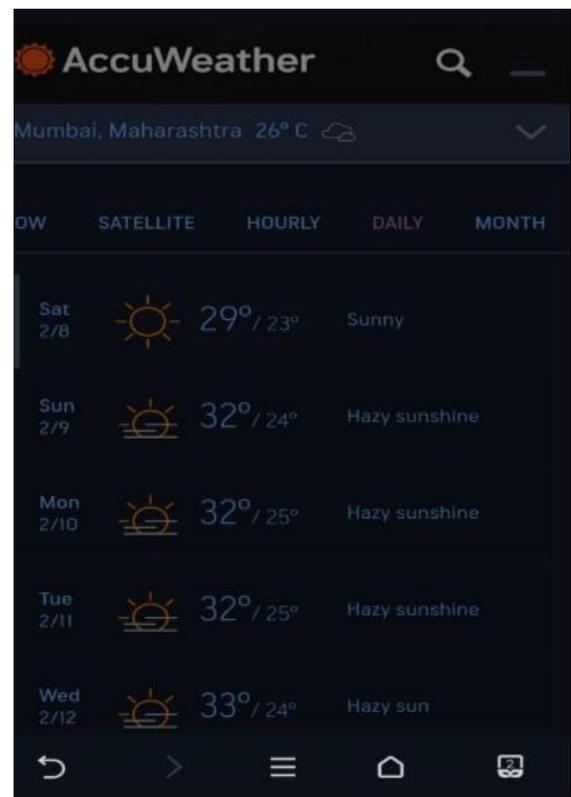


Figure 4: Weather Forecasting Feature

4.4 DISCUSSION PLATFORM

There are several stages in Hadoop data processing such as: firstly, the use of tokenization mechanism in indexing the document by converting all characters into lowercase and deleting all punctuation. The process continues with identifying the unique words with its frequency and make weighting of the words. They have used the concepts of machine learning as Machine learning serves optimization criteria or groupings by using sample data or past

experiences. In machine learning, it has a set of models connects to several parameters; and the learning process is carried out through implementation of computer programs to optimize model parameters using training data or past experience. Such data is stored in the database of the server so that it is readily accessible and it can be made available to users who are facing similar difficulties.

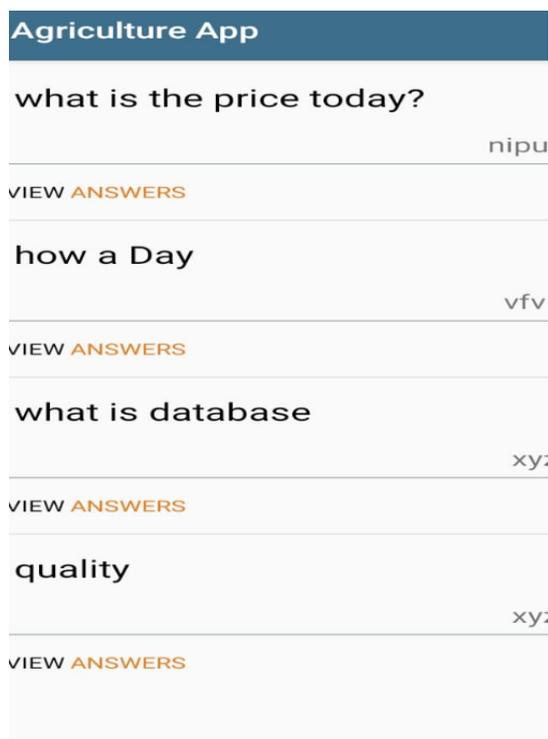


Figure 5: Discussion Platform Feature

4.5 NEWS FEED

News for the farmers is a very important thing to keep them up to date with the latest technology and the schemes that the government is making for them. For this we can link our website/app with any of the government website. This can be done easily with the help of android. Following are the steps to create the feed:

1. Create intent filters in your manifest.
2. Add code to your app's activities to handle incoming links.
3. Associate your app and your website with Digital Asset Links.
4. Add firebase app indexing



Figure 6: News Feed Feature

5. CONCLUSION

This entire software is build keeping in mind the requirements of a farmer and how technology can play its role in helping them to stay updated to all the recent advancements taking place for their benefits. This software will also help them know many things about agriculture by providing them with videos, a discussion forum where they can ask their queries and get it solved straight from the experts, weather forecasting which will help them to get information about the weather so that they can be ready for it. This software tries to covers all the problems which a farmer can face and help to provide them a solution for this and in this process helps us to serve our farmers and contribute in the development of the Indian society.

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