We-Farm

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INTRODUCTION

"India is a land of villages, and farmers are the soul of the country". Majority of Indians are directly or indirectly involved in agricultural activities. It would not be wrong to say that farmers are the backbone of our economy. As suggested by many scientists, agriculture is a profession that should be practiced by most educated people of a country because of the level of complexity involved in this profession, such is the value of farming. Many farmers of our country are illiterate and use the conventional crops and agricultural practices. The farmers contact the municipal head who advice the farmers based on some traditional methods like type of the soil, climatic conditions and rainfall to predict the crop that should be grown. Over the years due to change in weather, change in type of soil due to use of pesticides, availability of new crops (which they may not be aware of like cross pollinated seeds) and other factors have resulted in rapid decline of yield as in many areas as compared to the past which have led to suiciding farmers or they get stuck into cycle of debt. One of the major issues is that farmers are not getting the right price for their harvest due to monopoly of few individuals in the mandi or selection of wrong vendor and many other reasons. Other issue which persist is unavailability of news/trends related to agriculture or unawareness related to government schemes for farmers, due to lack of proper place where all consolidated content related to agriculture is present. To solve this major issue, we decided to take the opportunity to engineer a project that may solve this issue raging in society. We tried to establish contacts with the farmers, block development officers and other government officials, to understand the root cause of these issues. Our application is developed to address this section of the society. We-Farm is an application which comprises of a mobile application as well as a web application. We-Farm gives the farmers/ government officials the opportunity to predict crops, to check weather data, to stay in touch with current news and trends, this application also digitalizes the whole process of selling and buying crops.

FIELD VISIT AND SURVEY

We conducted a field survey with 11 questions. Questions were asked from farmers, block development officers and government officials working in the field of agriculture belonging to all parts of the country. Main aim of the survey is to understand whether problems identified by our team, exists or not and to understand their importance. This field survey also helped us in giving a confirmation about our project and features to be included. After thorough analysis of field survey, some problems have been identified which needs dire attention and the below will be pillars of our project:

• Predict Crops for farmers
• Weather Data for specific locations
• Information about current trends / news/ and schemes of agriculture
• Question – Answer Forum for farmers so that queries can be attended to

After collecting 86 responses, a staggering 93% feel the need for a solution which covers all the problems of farmers in one place.

PROPOSED WORK

We propose a mobile application and a web application which can be used by farmers, Block Development Officers and government officials (working in the field of agriculture). We-Farm will be an application catering to numerous problems faced by farmers as observed above. Hence we have titled our project We-Farm which signifies our attempt to help farmers and represents we are standing by their side during times of crisis.

Target User: Farmer, Block Development Officers and Other Government Officials. Mobile Application will have numerous features catering to various facets of problems faced by farmers. We-Farm will be able to predict the most suitable crop that should be grown on basis on various inputs location, duration of sowing, soil contents and weather data. This feature will help farmers getting over the problem of poor yield or failed crops. Next feature is to provide on spot weather data of any location. Next comes the question – answer forum which help the user in posting his/her query, which could be easily answered by any other user using the app. Following the above features comes, presenting news related to farmers in one place (news other field will not be shown). Other features including personal voice assistant and e-commerce option to buy seeds from within the application.

Website end of We-Farm is to digitalize the process of buying and selling of harvest in mandi, it can be stated like an Amazon for farmers. Once the farmer makes a request to sell their product or buy seeds from other sellers, the admin which is the local municipal head or BDO can approve their request. So, we try to connect the farmers one to one by removing a middle man. With the help of our website, farmers will be able to buy crop seeds, sell seeds and also see the latest ongoing Government schemes. They can also check their order status. While for the admin, they can see the details of farmers and approve their request to sell or buy.

IMPLEMENTATION AND WORKING (MOBILE APPLICATION)

Our mobile application WE-FARM is a one place stop for solutions to the farmers. When you open the application, the front page contains a button which on pressing displays a list of options to choose from. This includes- Personal Assistant, News, Weather Forecast, Chat Forum, E-Commerce, Crop Prediction.

Crop prediction: This module provides the user with the facility to input the data about the different constituents of their field, weather data and regional information to get the best crops that can be grown during that time frame. After getting the input from the user, the data is sent to the server which after running the predictive model on the data returns the different types of crops that can be grown in decreasing order of relevance. The output also provides a video guiding the user about the crop and its important features, these videos are retrieved using YouTube player API. Also, detailed information for better cultivation requirements and insights of the particular crop can be viewed separately.

Weather forecast: The user will be notified of the weather change and can also view a detailed analysis of the weather condition in his area for a range of 2 weeks. This data is automatically retrieved using the GPS facility of the device to get the coordinates of the location and passing the same to the OpenWeatherMap API that returns the data for the location in JSON format.

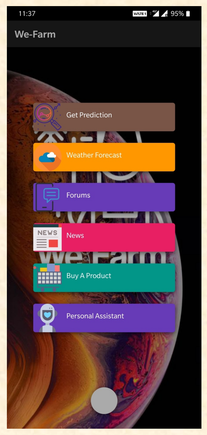
Chat Forum: The application has an in-built chat forum in which the user can interact with fellow users, BDO (Block Development Officer) as well as with the representatives of the agricultural community to get their queries cleared as well as provide feedback and suggestions.

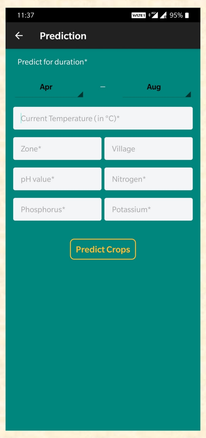
Personal Assistant: An AI configured chatbot already trained on agriculture related queries and topics is also available to aid the queries of the user. It uses a NLP based model for speech-to-text recognition so that the user ask the queries to the bot and then a text-to-speech model is used to read the result to the user.

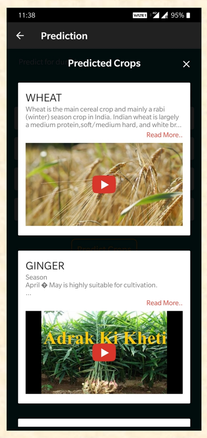
E-Commerce: To help the farmer from the hassle to go to the mandi and sell their crops in a lower price because of the monopoly of the buyers there, the application has an in-built e-commerce where the farmer can sell their produce at the price decided by the government for that day so that they are not cheated by the buyers. Also, the farmers can buy quality seeds from the e-store based on his needs at government subsidized prices.

News: To keep the users up to date with the latest government schemes and news in the agricultural sector the user is notified with the latest news using the TOI news API.

SCREENSHOTS (MOBILE)



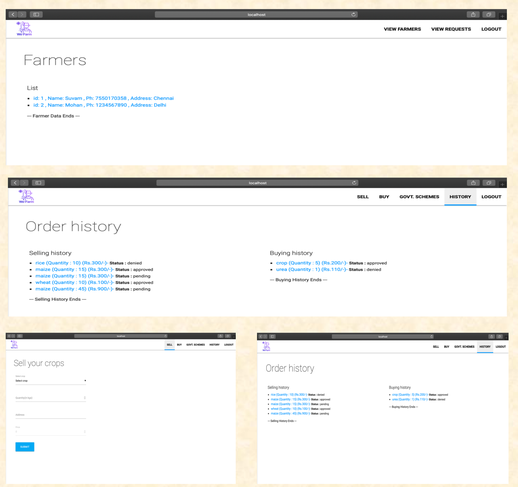




IMPLEMENTATION (WEBSITE)

This project encouraged us to use one of the latest technologies as our tech stack for the completion of this project, namely Node.js with its different frameworks like express.js and also view template engines like pug for rendering the HTML web pages. Data is stored at two different places i.e. Google Firebase console as well as locally in mysql database for faster results. This technique gives our application the flexibility to store the data on the cloud as unstructured data, providing security to database and also giving us the access to many api's available on cloud. Using firebase helped us in making data available anywhere, at any time and also making our system scalable with some improvements. It is often advised to use mysql as database as relational database structure helps in querying the data quite easily. We have used express js which itself is a framework of node js which provides an environment for the execution of javascript and making different routes using express framework. Different authentications have been added using morgan validation which is a middleware in node js explicitly used for authentication purposes. We explored many other middlewares like Joi for authentication but found out that morgan actually optimizes the validations.Form data is updated to firebase in key value pairs which is handled using express-json. Different rest api protocols have been used appropriately in this application including the information of the forms being handled using POST protocols which makes the application more and more secure as well as optimized. We have also maintained the sessions of the users logged in to avoid any unauthorized access of data..

SCREENSHOTS (WEBSITE)



CONCLUSION

Our proposed solution We-Farm was successfully designed, developed and deployed. We-Farm performs all the desired functions properly. Both parts of We-Farm mobile application as well as website has been implemented and are working properly according to set standards. We-Farm is a novel solution, when taken to market, it is expected to perform beyond its limits and help the farmers grow again and continue contributing to our economy.