LE FARM: ONE STEP PLATFORM FOR FARMERS

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Abstract – *Development in the field of agriculture is essential to earn valuable foreign exchange. Despite the existence of Government initiated FARMER'S PORTAL, the actual implementation of the scheme suffers from various shortcomings and lapses. Corruption, improper working, less accuracy, improper evaluation, maintenance issues etc. are some of the problems in the existing system. A helping hand throughout farming process would help people witness the growth as well as the trade of their product. To improve the existing scheme thus enabling the people, belonging to different regions to get and give their products with monitoring would bring an enhancement to the farming life. Crop prediction and fertilizer prediction, updates of new machinery and market price, information about new variety of crops from the Government organization like "Krishi Bhavan", buying products of their interest, selling their products directly, witnessing the status of entire trading, thus reducing the complexities of planning, sowing, treating, selling and buying.*

Key Words: **Isolation Forest, Random Forest, Anomaly Detection, Crop Prediction, Fertilizer Prediction**

1. INTRODUCTION

All sectors are being developed and the world is promoting it, as it reduces staff capacity and complexity, increases accuracy and all output, making everything much easier and faster. Agriculture is a broad economic sector and plays an important role in the development of the global economy. Technological advances in the field of agriculture will ensure increased capacity for certain agricultural activities. Our website has the following features:

• Everything a farmer needs in one step.
• A helping hand in the whole farming process.
• The whole trading process has been simplified.
• Suggestion for crop yield and crop prediction.
• Updates of new equipment and market price.
• A platform for sharing knowledge and information.
• Information about new plant varieties.
• Better and clearer marketing

2. SCOPE

The main objective of this project is to create an easy-to-use platform to assist farmers throughout farming process. It will be a challenge for many farmers as they do not have the knowledge of the new technologies and styles farming. The success of this project will provide its fruitful benefits to customers and farmers, provide information and integrate various aspects of services that they are not yet aware of.

3. OBJECTIVE

The objectives of this project are:
• Connecting Farmer to the Customer directly.
• Providing knowledge to the farmers.
• Robust product search and detailed product information.
• Real-time availability lists with price and inventory levels.
• Predictions of crop yield and fertilizers.
• Transparent marketing.
• Newmarket updates.

4. EXISTING SOLUTIONS

4.1 Farmers' Portal

This project was initiated by the government. It aims to make available relevant information and services to the farming community and the private sector through information and communication technology, in addition to the existing delivery systems provided by the department. Once in the Farmers' Portal, a farmer will be able to get all relevant information on specific subjects around his / her home / block / district or region. This information will be sent in the form of text, SMS, email, and audio / video in a language he or she understands. These levels can be easily achieved with the India Map featured on the home page. The lack of many points in the existing system makes it ineffective and at the same time, if the right adjustments are brought into the system, this can be considered one of the best policies adopted by our Government. High levels of corruption, poor system performance, incorrect suggestions, failure of proper testing, maintenance issues etc. are some of the problems facing the existing system [4].

4.2 Agri App

It is an application to purchase plant solutions. There is access to planting calendars, news and videos in this app. Also, Kisan can talk to an agricultural expert. Technical issues are reported. There are a few plant selections options for plant care. Products are expensive and delivery takes a lot of time. Also, the app offers unusual updates [9].

4.3 IFFCO Kisan App

It is a small android app in terms of memory. The latest agricultural advice is given here. Mandi prices, various farming tips etc. are provided by the app. Kisan call center services are available. This app is free. The slow performance of the app makes it impossible for users to use the app properly. A few reports of inability to register have been reported. Customized search not available. Many jobs have been terminated or are coming soon [10].

4.4 FarmBee

The Pomegranate Expert. This app provides a mandi value based on the user's location. Simplified communication of farm recording data and activities is provided. Ticket creation and expert discussion are available. No crop selection is provided in this application. a slow and internal error on the server while Sign up was reported by many users. This app cannot provide the latest news like plant market rate, new equipment etc. [11].

5. PROPOSED SYSTEM

Our project aims to provide the users with an improved farming portal where the complexities of crop prediction, fertilizer prediction, buying and selling are made much easier.

5.1 Anomaly Detection

Anomaly Detection or the unsupervised anomaly detection is a mechanism for identifying the unexpected or rare events in a dataset, more specifically known as the outliers in a specific dataset which can be recognized as an anomaly concerning other values present in the dataset. One such anomaly detection mechanism is the Isolation Forest algorithm [8].

5.2 Isolation Forest

The isoltion forest algorithm is an unsupervised machine learning algorithm, which works with anomaly detection as its basic functionality. In a given dataset, its primary aim is to separate the outliers from the inliers. It does such a function by randomly partitioning the domain space. It first imports sklearn package as: from sklearn. ensemble import Isolation Forest. Once the package has been imported, the required data is read in csv format using pandas [3]. After that the algorithm of the decision tree. Random separation of domain space in a particular element from a set of given features is mainly done to find the value of the division between the maximum and minimum value of that feature. This in return will produce a shorter path to the trees in the event that there are potential points compared to the standard points. Here, general points will always be grouped together compared to anomaly points. Therefore when a decision-making tree approach is implemented, exporters will lead to providing shorter routes from root nodes while importers will be producing a larger route as the comparative amount required to differentiate items is very similar to the comparative value required to distinguish an outsider. As a result, anomaly points can be better obtained using a smaller amount of memory compared to other algorithms that perform the same function [6], [8].

To implement it in the project, the isolation forest module is imported from the isolation function is called with the required parameters and fit() function is called on each dataset one by one to generate the model. Once the models are produced and stored, user inputs are transferred and activated to each model using the prediction () to work with the parameters needed to produce the result. In this regard, the name of the plant will be produced as output when the season, pH, height, soil type and temperature are given as input [7].

5.2 Random Forest

Random forest is a supervised learning algorithm that is used for classification. Random forest algorithm creates decision trees on different data samples and then predict the data from each subset and then by voting gives better the solution for the system. In this project, Fertilizer name will be generated as the output when temperature, humidity, moisture, soil type, crop type, nitrogen, potassium and phosphorus are given as input [8], [12].

6. SYSTEM DESIGN

The system is divided into four modules: (1) Login (2) Buying/Selling (3) Crop Prediction (4) Fertilizer Prediction.

6.1 Login Module

Every user has to register to use this website. Admins, Buyers and Sellers can login using their username and password. After login, if the username and password is valid, the system directs to homepage. If the credentials are invalid, access will be denied. Articles, blogs, notifications etc. are available in the homepage. Farmers can share their success stories to others by putting up articles, which others can read. Admin can add details of new machineries, any farming news, important notifications etc. which will be available in the homepage. Through these notifications, people won't miss any important updates regarding farming activities. Also, they'll be regular in accessing all the facilities or seeds, fertilizers etc. given from government authorities like Krishi-bhavan.

6.2 Buying/Selling Module

To break the supply chain of indirect sales, we can make use of this application so that the seller can be connected directly to the customer and the selling can be done accordingly. Since the seller will be dealing with the customer directly, the prices of the products offered by the seller to the customer will be affordable. Farmers as well as admins can sell items. The farmer is no longer forced to sell his goods at a lower rate. Also, they do not need to deal with any mediators. Buyers can find items with the seller they like. Vendors can also choose at their own discretion. This website will make marketing clearer and easier. Retailers and buyers are divided into different areas. Farmers can sell their produce on the farm online. Vendors and admins can add a variety of items they wish to sell. There are various categories of things. Customers can view items and choose according to their locations. Customers can buy farm products / equipment. They can pay online for their orders. Merchants can see a list of buyers. Buyers can edit / delete items. Buyers / sellers can track orders. This forum provides effective marketing.

6.3 Crop Prediction Module

Initially a data set is made for each of the crop based on different parametric values [1]. This dataset is run through isolation forest algorithm to create the model. So, when a user provides the relevant data about his/her land, according to the collected data the suitable crop for the user will be predicted. The predicted result may contain more than one result based on land details provided by the user. The user can choose the crop from the result displayed. By using Isolation Forest algorithm, crop is analyzed and predicted. Results and suggestions can help to increase yield rates [5],[12].

6.4 Fertilizer Prediction Module

There are different types of soil for crop yields. The process of supplying essential vitamins to plants by bringing fertilizer to the irrigation water is called fertigation. Depending on the type of soil, fertilizer can be applied to the soil to produce a better yield. Fertilizer ensures an equal distribution of fertilizer throughout plants and better absorption of nutrients. According to the latest technology, climate such as temperature, humidity, humidity etc. in the soil can be analyzed and fertilized such as nitrogen, phosphorus and potassium fertilizers. Depending on the crop, fertilizer varies. It is not the same amount of fertilizer for all plants. Therefore, providing the right amount of fertilizer for a crop is an important factor in the process of cultivation. Depending on the quality of the soil, fertilizer can be predicted. The level of potassium, nitrogen, phosphorus is given as a supplement. This can be found on the ground card or in other testing methods. The amount of these nutrients is estimated. It gives the output such as how much fertilizer for each category to be applied to a particular crop. The right fertilizer can be selected to increase the yield. Proper management of genetic material has placed a great deal of limitations on the environment and human health. The unsustainable use of nitrogen and phosphorus fertilizers has caused groundwater pollution. Therefore, farmers have taken this into account as much attention to nutrient and water management and incorporated the concept of plant nutrition and soil moisture content into their farming strategies. Improper use of N, P and K leads to contamination of groundwater sections [2],[12].

7. TECHNOLOGY USED

7.1 PHP

PHP is the abbreviation for 'PHP: Hypertext Preprocessor'. PHP is a server language embedded in the server side. It is used to manage information,

session tracking, dynamic content and build all commerce sites. PHP scripts can only be performed on a PHP-installed server. Client computers accessing PHP documents require a web browser only. PHP file contains PHP tags and ends with the extension '.php'. PHP is an open web language, which is why it is completely free. There are no costs involved in purchasing expensive licenses or software [8].

7.2 HTML

HTML stands for Hyper Text Marking Language. The standard language of the documents of the documents designed to be displayed in a web browser. Web browsers receive HTML documents from a web server or local storage and render documents on web multimedia pages. HTML defines web page layout by topic and initially includes document visibility indicators.
HTML elements are elements of HTML page layout. With HTML formatting, images and other objects such as interactive forms can be added to the translated page. HTML provides ways to create structured text by defining formal semantics in text such as titles, paragraphs, lists, links, quotes and more [8].

7.3 CSS

CSS stands for Cascading Style Sheets. CSS is a World Wide Web basic technology, along with HTML and JavaScript. CSS is designed to enable presentation separation and content, including layouts, colors, and fonts that will lead to improved content access, flexibility and control over presentation features, enable more web pages share formatting by specifying the appropriate CSS in a separate file. pages share a file and its formatting [8].

7.4 JavaScript

JavaScript or JS is a programming language compliant with ECMAScript specification. JavaScript is advanced, frequently integrated with time, and a multi-paradigm. It has curly-bracket syntax, dynamic typing, model-based orientation, and first-class functions. Combined with HTML and CSS, JavaScript is one of the basic technologies of the World Wide Web.

As a multilingual language, JavaScript supports event-driven, active and dynamic programming styles. It has a programming interface (API) for text processing, dates, general expressions, standard data format, and a Document Object Model (DOM) [8].

7.5 MySQL

MySQL is an open-source relational management system (RDBMS). Its name is a combination of "My", the name of the daughter of the founders of Michael Widenius, and "SQL", an acronym for United. Relationship database organizes data into one or more data tables where data types may be related; this relationship helps to organize the data. SQL is the use of a language editor to create, modify and extract data from a relationship database, and to control user access to a database. In addition to data and SQL data, RDBMS such as MySQL works with an active program to use the database database in a computer system, manages users, allows network access and helps assess database integrity and backup performance. MySQL is a free and open source software [8].

7.6 Python

Python is an interpreted high-level general-purpose programming language. The Python architecture philosophy emphasizes the readability of the code with its remarkable use of input. Its language is structured, and its object-oriented approach aims to assist editors in writing clear, logical code for small and large projects [8].

7.7 Machine Learning

Machine learning is the study of computer algorithms that improve automatically through experience and by the use of data. It is seen as a part of artificial intelligence. Machine learning algorithms create a model based on sample data, known as "training data", making predictions or decisions without explicitly planning to do so. Machine learning algorithms are used for a variety of purposes, such as medicine, email filtering, speech recognition, and computer vision, where it is difficult or impossible to develop general skills to perform the required tasks.

The subset of machine learning is closely related to computer statistics, which focus on computer-generated forecasts; but not all machine learning is mathematical learning. The study of the application of mathematics brings methods, theoretical and practical contexts into the field of machine learning. Data mining is a coherent field of study, focusing on the analysis of experimental data by unsupervised learning. In its application to business problems, machine learning is also called forensic analytics [2],[8].

7.8 XAMPP Server

XAMPP is a free and open source web server application package developed by Apache Friends. It provides MySQL database (MariaDB), Apache web server, PHP and Perl (such as Apache modules and active command line) all in one packet. Available for applications such as Windows, MAC and Linux applications. No configuration required to integrate PHP and MySQL. XAMPP is an open source package that is very easy to install and use. It has a very simple installation process and how to manage configuration changes. It also provides PhpMyAdmin which is a GUI tool for managing your MySQL data [8].

8. CONCLUSION

We are trying to build an efficient e-farming platform that would fulfil all needs of farmers and give the complete solution. No other project exists until today, which can provide all these aspects under one platform. Once implemented fully, it can be used as a replacement for Government initiated Farmer's Portal. As of now we have considered four crops only. So as an extension to our work, a greater number of crops can be added to it. By the availability of more datas, our dataset can be much more elaborated and with the extension in the parameters, the prediction can be made much more precise. Farmers being able to directly deal with the collectors than with intermediates to sell their crops will increase the commerciality of the application. Further innovation can be added any time to extend this project and that will lead to greater functionality of the current system.

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