Site Specific: Crop Suggestion System using Android And IoT

[1]Mhaske Pooja ,[2]Vikhe Priyanka, [3]Mhaske Smita, [4]Prof. S. Y. Raut

Department of Information Technology
Pravara Rural Engineering College, Loni
Pravaranagar, Tal. Rahata, Dist. Ahmednagar

Abstract

India is known as an agricultural country ,where the recommendations are given by traditional methods .During the past years, sophisticated farm management systems have emerged to replace outdated complex and monolithic farm systems and software tools. Smart precision farming systems are expected to play an important role in improving farming activities. present ,recommendations for farmers are based on communication between farmers and experts and different experts have variety of recommendations. present , recommendations for farmers are based on communication between farmers and experts and different experts have variety of recommendations. The application provides recommendations to farmers for identification of appropriate crop .Smart precision farming systems are expected to play an important role in smart farming activities. The system provides recommendations to farmers for identification of crop. This model can be used by farmers android based mobile devices. The application provide crop suggestion . Suggestions regarding crop given to the user.

Keywords-*Android, Nitrogen, Phosphorous, Potassium Crop Recommendation, Crop Rotation , Fertilizer Recommendation, Data mining .*

Introduction

India is known as an agricultural country ,where the recommendations are given by traditional methods.During the past years, sophisticated farm management systems have emerged to replace outdated complex and monolithic farm systems and software tools.Smart precision farming systems are expected to play an important role in improving farming activities.present,recommendations for farmers are based on communication between farmers and experts and different experts have variety of recommendations.

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Suggestions regarding crop given to the user Such an example is the Future Internet program launched by the European Commission. In the context of our work, we have specified a farm management system that takes advantage of the new characteristics that Future Internet offers. These software model that can be used to build farming related specialized modules.

We present this farm management system and provide an operational example. We also analyze the technological enablers that will make this architecture a reality Also the recommended fertilizers can be purchased from the site.

Literature Survey

Alexandros kaloxylos et. Al [1] Designing the seamless support and inte-gration of different stakeholders and services. Introduction of automatic and cognitive elements in overall management process.Agriculture is one of the most important areas of human activity worldwide. As the population rises there is a need to increase the agricultural production.Agricultural modernization due commercialization,land-saving and labor in- tensive production between 1870 and the 1920s doubled agricultural produc-tion per land area Stefanos Anikalidakis et. Al [] System aims ef?ciently managing water supply in cultivated ?elds in an automated way.Agriculture plays a vital role in the economy and, in many cases, in the survival of nations, since it provides the basic subsistence for the entire population of a country while at the same time

V. Stajanovic et. al [] - Developed AGRI-AG application demonstrate that mobile devices are capable of steaming and displaying so map of farm AGRI data.Delivering secure and sustainable provision of food, water and energy, particularly in the face of climate change and reduced carbon targets is a huge challenge.Precision Agriculture (PA) and sustainable intensification has been advocated as a scalable solution to modern global food security challenges by saving time, energy, water and money

Minisheng Liao et. al []-System shows a great potential to provide quantita-tive information with high spatiotemporal resolution to floral farm. System will effectively contribute to updating strategies in the future.Phalaenopsis is one of the most important floral exports in Taiwan, Germany, the Netherlands, Thailand, the United States, and China (Griesbach, 2000). The total trade of fresh orchids reached 17.1 billion USD world-wide in 2014 (UN Comtrade, 2015). In Taiwan, orchids are also important to floral farmers. The official statistics in 2014 showed that orchids accounted for over 70floral exports, of which Phalaenopsis accounted for about 90export orchids, and the export sales exceeded 133 million USD

Macronutrients Of The Soil

The soil quality is determined by the NPK value of the soil. The 'N' is the nitrogen content of the soil, 'P' is the phosphorous content and 'K' is the potassium content of the soil. Based on the NPK contents, the value of soil can be predicted. The nitrogen in the soil is responsible for the colour of the leaves. If low quantity of nitrogen is found in the soil then plants will have slight yellowish leaves and quantity is moderate or high it will have greener leaves. The phosphorous content in the soil is responsible for the reproductive system of the plant. Its value will predict thegrowth of fruits and flowers of the plants. The potassium content of the soil is responsible for its overall growth. Its value will predict how stronger the plant roots will be and will also determine the overall growth process of the plant.

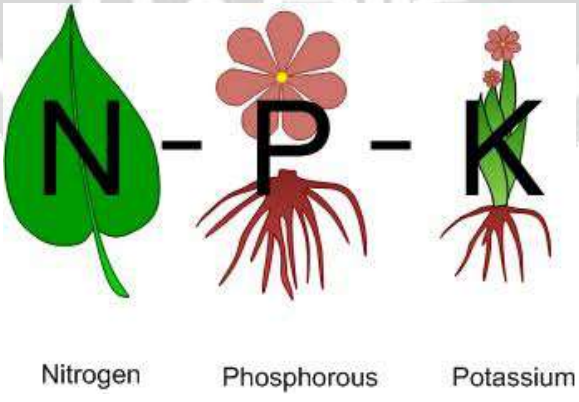


Fig. 1 NPK Nutrients

Crop Recommendation

The dataset for which we have taken the data as a training set and tried applying the algorithms on it by taking the data of past as a test set and then view the output.This obtained output is compared with the actual output.Crop with maximum points can be recommended to the farmer. The market trend of the crops is saved in

the database. While recommending more than one of the crops,the first factor determined will be the year factor that will be followed by market factor and the ratio factor. For recommending the crop to the user, we are using the random forest algorithm.

KNN Algorithm

K-Nearest Neighbors (KNN) is one of algorithms used in Machine Learning.KNN is referred to as a non-parametric machine learning algorithm.It is a "supervised" classification method in that it uses the class labels of the training data. Unsupervised classification method is "clustering" methods on the other hand, do not employ the class labels of the training data.The nearest neighbour algorithm is the algorithms used to determine a solution to the travelling salesman problem.The k-means clustering algorithm attempts to split a given data set.Nearest neighbor Algorithm determine the distances between each point and the closest point to it, K nearest neighbors is a simple algorithm that stores all available cases and predict the numerical based on a similarity measure (e.g., distance functions). Classification is done by a majority vote to its neighbors. The data is assigned to the class which has the most nearest neighbors. it interacts with several other industries.

SVC Algorithm

The clustering is the method of classification data set into groups.

SVC algorithm is partition algorithm, Classified data set into groups according to some criterion in an attempt to organise data into a more suitable form.

There are many ways of achieving of goal.Clustering may proceed according to some parametric model or by grouping according to some distance or similarity measure as in clustering.

A natural way to put cluster boundaries is in regions in data space where there is data.

This is the method taken in support vector clustering (SVC), which is based on the support vector approach.

In SVC data points are mapped from data space with feature space using a function.

closest point associated by SVC to the same cluster.

SVC Algorithm is the Support Vector Domain Description (SVDD) it is the method of regioning in data space for input examples.

SVDD is nothing but the kernel based learning. In its "linear" version looks for the smallest sphere that distributed the data.

SVD used in connection with a kernel function, it looks for the smallest inclosing spheres in the feature space wich is defined by the kernel function.

While in feature space the data is described by a sphere, It mapped the data to data-space.

SVDD provides a decision function that tells whether a given input is inside the feature-space sphere or not, indicating whether a given point belongs to the support of the distribution.

SVC is a nonparametric clustering algorithm that does not make any assumption.

Navie Bayes algorithm

Naive Bayes is a classification algorithm.naive bayes is technique for binary and multi-class classification problems. This is the technique by wich can understand when described using binary or categorical input values.

It is called naive Bayes because it calculate the probabilities for each hypothesis and simplified to make their calculation tractable. it try to attempt to calculate the values of each attribute value P(d1, d2, d3....h), they are

working conditionally on independent given target value and calculated as P(d1|h) * P(d2|H) and so on.

For representation of naive Bayes it uses probabilities as follows:

Class Probabilities: The probabilities for each class in the given training dataset.

Conditional Probabilities: The conditional probabilities of each input value given for each class.

If continuous features do not have normal distribution, then it use transformation and various methods to convert it in normal distribution.

It uses the "Laplace Correction" to predict the class of test data set.

It Remove correlated features, as the highly correlated features wich are in twice in the given model.Naive Bayes classifiers has limited options for parameter .

We learn a Naive Bayes Model From Data,Learning a naive Bayes model from training data is fast.

Class probabilities are calculated and class probability is nothing but the frequency of each instances that are dividead by number of instances.

Naive Bayes can be extended to real-valued attributes, that commonly by assuming a Gaussian distribution.

Naive Bayes classifiers are highly scalable algorithm its require a number of parameters linear in the number of variables in a learning problem.

Naive Bayes is a simple technique for constructing the classifiers and models that assign class labels to given problem instances it represented as vectors of feature values. It is the algorithm for training classifiers,the value of a features is independent of the value of any other feature in given the class variable.

CROP ROTATION

Crop rotation returns different nutrients to the soil and restores its fertility. An element of crop rotation is the sufficient use of nitrogen, phosphorous and potassium through the use of green manure and fertilizers. Crop rotation also decreases the build-up of pathogens and pests that often occur when one type species is continuously produced. It can also improve soil structure and fertility by alternating between different leguminous plants. Crop rotation is one component of poly culture.In agricultural field, crop rotation is very essential. A farmer can yield crops for entire year and the fertility of soil is maintained. For recommendation of crop to produce, the previous crop production by the farmer is taken as an input. We are using sequential algorithm like forest algorithm on the previous data. A pattern can be generated to find out the type of crop that has been yielded over the years.

Bolt

BOLT is an Internet of Things platform it include Hardware and Cloud platform.it enables user to build IoT products and projects.

Using Bolt, users can control and monitor devices from any part of the world.It is fully integrated platform for project.Even though now a days IoT is growing at an exceptional speed,but its difficult to find to match up with development speed. This is because of the many different elements required to build a project.

Bolt provide just the right tools to help build the projects.Bolt Cloud offers various advanced features such as Remote Configuration, Code Editor, etc. bolt is Station mode in which it can connect to WiFi networks.bolt provide functionality, When not connected to any WiFi network then it can used own WiFi hotspot to which users can connect.

It is Platform provide remotely configure the pins on Bolt WiFi module.The Bolt Cloud gives you the option to code directly on the dashboard besides uploading the codes that you have saved offline. Bolt provide the

function of control and monitor data over the internet.It can create personalised dashboards to visualise the data, monitor the device health.

Build scalable IoT systems in just a days time.

Bolt is an IoT platform that helps enterprise and to connect their devices to the internet.Bolt is an IoT platform to easily and quickly build products and services.

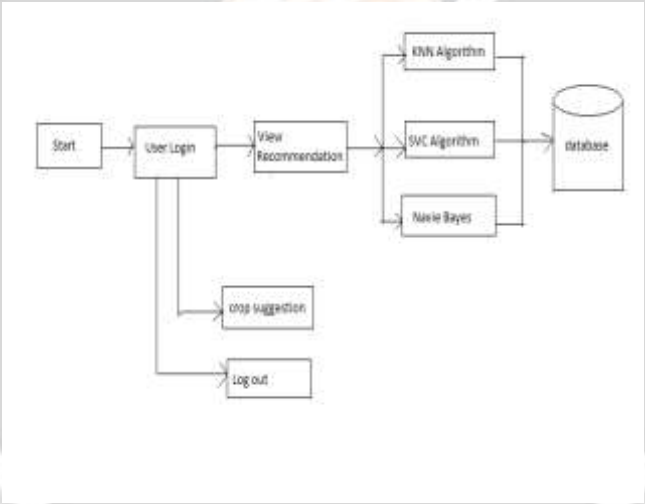
The platform consists of three main components, Bolt hardware module, Bolt cloud, and analytics.

The hardware module is a WiFi chip with a built-in function.

Bolt IoT Platform Features as a Wifi or a GSM chip,robust Communication,Security.

System Architecture

This architecture provide the facilities to user has to create an account and log into it. database is used which enables crop recommendation to the users. This provide users to open their accounts to view recommended crops. System provide predictions on basis of past data . This application is very useful in terms of its functions as it provides both recommendation as well as the feature to purchase recommended products



Advantages

1. It is beneficial for the farmers to increase their crop yield.

2. It is user friendly.

3. Requires less memory.

4. Available in multiple languages.

5. Convenient for buying fertilizer after suggestion

Applications

1. The amounts of fertilizer for various crop types are

suggested.

2. The future scope of the application of this project is bridging this application for windows as well as android OS.

3. And region-wise recommendation of fertilizer quantity as well as crops depending on climate

Conclusion

This paper summarizes an efficient recommendation system for fertilizers and crops based on the NPK values and region. This application also allows users to purchase the recommended fertilizers from the purchase portal. If used on a large scale, it would benefit the farmers in terms of crop production. the application is user friendly so everyone can use it.

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Pravara Rural Engineering College, Loni
Pravaranagar, Tal. Rahata, Dist. Ahmednagar