

# Crop Recommendation

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**Abstract**--Precision farming means it is a administration technique that increases efficiency and financial comes back with a reduced impact on the environment. Precision farming is based on the utilization of data innovation to a portrayal of inconstancy in the field, variable-rate tasks and the basic leadership framework. Precision farming development includes three technology levels and three strategies. It utilizes a constant spectrophotometer and was created to depict soil fluctuation in ranchers' fields.

In order to balance productivity with environmental concerns, precision farming provides a new solution using systems approach. Precision farming is based on propelled data innovation. Coordinating rural practices to meet site-particular prerequisites, depicting and displaying variety in soils and plant species are additionally incorporated into precision farming. The primary point of accuracy cultivating is to increment monetary returns and at decreasing the vitality input and the natural effect of farming.

**Keywords:** Machine learning, Android app, Soil grid, REST API.

## I. INTRODUCTION

Machine learning is a service of artificial intelligence (AI) that offers systems to without human intervention learn and get better from experience (knowledge) without being overtly programmed. Machine learning focuses on the growth of computer programs that can right to use statistics data and use it for study or be trained for themselves.

Broadly, there are three types of & Machine Learning Algorithms.

- Supervised Learning. The way it works: this set of rules consists of a target / final results variable (or based variable) which is to be expected from a given set of predictors (impartial variables).
- Unsupervised Learning.
- Reinforcement Learning

Grouping is a utility of information mining that allots questions in an accumulation to board classifications or classes. The objective of classification is to accurately redirect the board class for every case in the data. For example, a classification model may possibly be used to classify loan applicants as near to the ground, intermediate, or far above the ground credit risks[1].

In supervised machine learning observed training sets are available. An algorithm implements classification particularly in a tangible accomplishment is supported or branded as a classifier. In unsupervised machine learning a vast amount of data is given to the program and program will find the patterns and relation between them. Hidden patterns in the data can be discovered by using unsupervised machine learning technique.

Machine learning brings computer science and statistics together to improve the prediction power. Data scientists, data

analysts use the machine learning and also who wants to use the raw data to predict or find trends in data. In agriculture there will be vast amount of data and also it increases day by day, in order to find the accurate prediction of crop prediction machine learning techniques can be used[2][3].

## II. RELATED WORK

Title: Yield Recommendation System for Precision Agriculture.

Year of Publication: 2<sup>nd</sup> January, 2016

Author Name: S.Pudumalar, E.Ramanujam

Journal: IEEE2 Transaction

In this paper the discourse is done with respect to the prerequisites and arranging required for building up a product display for accuracy cultivating. The author gives the rudiments of precision farming and move towards building up a model. It portrays the accuracy horticulture standards to little, open ranches at the individual rancher and product level. It likewise influences the level of control over changeability. To convey guide warning administrations to even the littlest rancher at the level of his/her littlest plot of harvest, utilizing the most available innovations, for example, SMS and email are the principal destinations. In Kerala State where the normal holding size is much lower than the vast majority of India and this model has been intended for this situation.

Merits:

1 It depicts the exactness horticulture standards to little, open ranches at the individual rancher and product level.

Demerits

1. Suitable for smallest plot.

Title: Study of order calculations for detailing yield forecast exactness in accuracy agribusiness

Author Name: Saiyyad Mohammad Ali Muzffar Ali.

Year of Publication: February 2018

Journal: International Journal of Advanced Research in Computer Engineering & Technology & (IJARCET).

Title: Analysis of Soil Behaviour and Prediction of Crop Yield using Data Mining Approach

Author Name: Supriya D M

Year of Publication: 5, May 2017

Journal: International Journal of Innovative Research in Computer Science and Communication Engineering.

Yield prediction contributes to the proper selection of crops for sowing which is very popular among farmers these days. An interesting challenge is predicting and yielding of the crops. In earlier days yield prediction was performed by considering the farmers experience on a particular field and crop. Yield prediction uses the data mining techniques in order to predict the category of the analysed soil datasets. Yielding of crops will be indicated by prediction. Naïve Bayes and K-Nearest Neighbour methods are used for predicting the crop yield.

Merits

Yield prediction uses the data mining techniques in order to predict the category of the analysed soil datasets.

Demerits

Complexity of tools and techniques requires new skill.

Title : A Model for Prediction of Crop Yield

Author Name : E. Manjula, S. Djodiltachoumy

Year of Publication :November-2006

Journal : IEEE International Conference

In prior days yield expectation was performed by considering agriculturists encounter on specific field and product. One of the significant issue that remaining parts to be fathomed in light of accessible information is yield forecast. One of the better decisions for this is information mining systems. For assessing what's to come year's harvest generation distinctive Data Mining systems are utilized and assessed in farming. A framework to anticipate trim yield from past information proposed and executed in this exploration. It can be accomplished by applying affiliation administer mining on farming information. Formation of a forecast demonstrate which might be utilized to future expectation of harvest yield is focussed in this exploration. In this paper it shows a short examination of product yield expectation utilizing information mining strategy in view of affiliation rules for the chose locale i.e. locale of Tamil Nadu in India.

Merits

Investigation of harvest yield expectation utilizing information mining method in view of affiliation rules for the chose district.

Demerits

Lack of local technical expertise.

Title: Application of Machine Learning Techniques for Yield Prediction on Delineated Zones in Precision Agriculture.

Author Name : Anshal Savla, Himtanaya Bhadada1, Parul

Dhawan1, Vatsa Joshi

Year of & Publication : JUNE 2015

Journal : IEEE Transaction

Normalization is the procedure in which information is sorted out in a database. It incorporates number of steps. A table into number of littler tables that are less repetitive is refracted.

Outside keys are characterized in old tables that allude to the essential keys in the new ones and no data is lost amid the procedure. So as to disengage the information standardization has been finished. With the goal that the progressions done in the qualities of one table can be sent to the whole database effectively. Keeping in mind the end goal to ensure the information production of tables and characterizing the connections between them is finished. In order to organize the data set data normalization is a useful concept. The data system can become slow, inefficient and inaccurate without data normalization. The data is sorted out into intelligent gatherings where each gathering successfully depicts the little piece of information. Information in vast database can be adjusted effectively. By normalizing the data set ease of access and speedy control of information is done.

Merits

In order to organize the data set data normalization is a useful concept.

Demerits

Lack of understanding of geostatic necessary for displaying special variability of crops and soils using current mapping software[4].

### III. METHODOLOGY

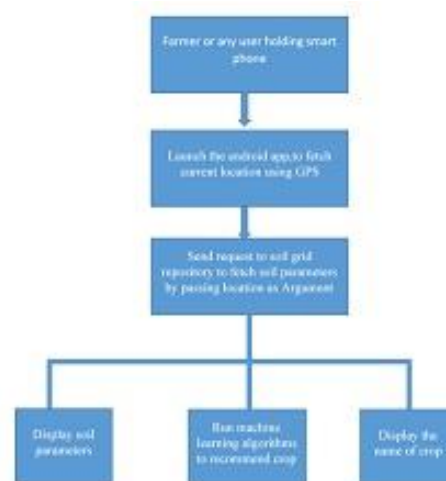


Figure 1: Block diagram

1. Users have to launch the android app in a smart phone
2. Give permission to fetch location
3. Geolocation of the place get fetched automatically and displayed
4. Click the button fetch parameters, this will invoke REST API request to soil grid repository to fetch soil parameters and displays the fetched soil parameters
5. Now click the button Recommend crop, this will analyse the current location soil parameters with trained data set present in the system (Server) and for this purpose it makes use of machine learning and recommends the crop[5].

In the proposed application system is designed to fetch parameters of the soil from soil grid database using REST API

provided by the open soil grid community, user has just permit the browser to trace the location, longitude and latitude of the location is fetched automatically and it is further given to API which returns soil parameters, these parameters are analyzed with the dataset being saved in the database and crop recommendation is done[6].

### Objective of the project

1. To implement machine learning concept to predict the crops
2. To make use of ensemble technique for prediction
3. To help farmers plant the right crop increasing his yield and also increasing the overall productivity of the nation.

## IV. RESULTS AND DISCUSSION

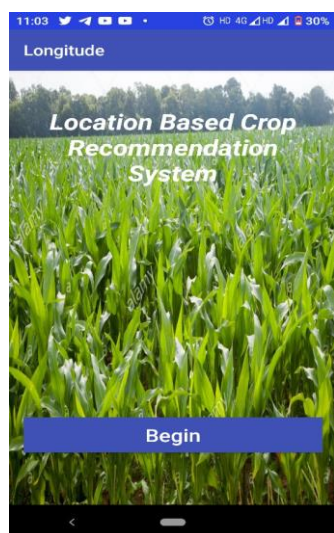


Figure 2: First screen of the app



Figure 3: Screen showing the current location fetched from GPS



Figure 4: Soil parameters fetched from Soil grid using Geo location

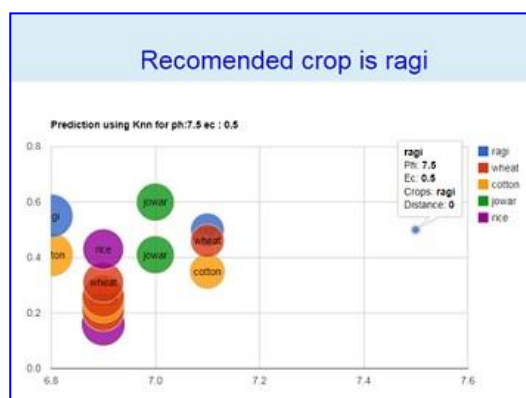


Figure 5: Image showing crop recommended after predicting the result using pre built model.

## V. CONCLUSION AND FUTURE SCOPE

The future project is an attempt to create use of machine learning concept in crop recommendation, by implementing KNN, Naïve Bayes algorithms. Real time soil test report from district agriculture department is collected and used as training data. Testing data is the data that is directly fetched from the soil grids using REST API. Having Normalizing the raw data implemented KNN algorithm for crop recommendation and Naive bayes for yield calculation. The whole process is illustrated graphically Chart API. Hope it finds useful in precision agriculture which is gaining recognition in India. Project could be further improved by increasing volume of observation' s i.e soil test data and also can be implemented by using other machine learning algorithms.

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