**Crop Yield Prediction based on Indian Agriculture using**

**Machine Learning**

**Alternative title:**

Crop recommendation system through soil analysis using classification in machine learning

**Aim:**

To be precise and accurate in predicting crop yield and deliver the end user with proper recommendations about required fertilizer ratio based on soil parameters.

**Abstract**

India is the land of agriculture and it is the major source of economy.70% of Indian population directly relies on agriculture. The common problem existing among the young Indian farmers is to choose the right crop based on the soil requirements. Due to this, they face a serious setback in productivity. Our work proposes to help farmers determine the soil quality by doing analysis on its various parameters and to suggest crops based on the results obtained using data mining approach. The system uses the Classification algorithm of Random Forest to improve the efficiency of Crop Recommendation System. The system maps the soil and crop data to predict the list of suitable crops for the soil and it also provides the information about nutrients which are deficient in soil for the particular crop. Hence it leaves upon the user to decide on the crop to be sown. Thus, the system helps to provide knowledge to the dilettante farmers.

**Introduction**

 Agriculture is the backbone of India. As we known, food stands first in the basic need of survival; agriculture sector needs to be given the highest preference in development. Indian agriculture sector accounts for 18 per cent of Indian agriculture gross domestic product (GDP) and provides employment to 50% of the country’s workforce. The main reason for considered Agriculture sector is because it plays a crucial role in developing the country’s economy. The proposed System uses the Crop Selection as the area of research since it the first and most important step in the process of agricultural development and the success of this step guarantees the result of production. Agriculture development provides assistance to the crop producers with the help of various agricultural resources. As a result, it provides high productivity with low consumption of resources.

**Existing system**

The existing system predicts the crop yield by using the soil parameters and recommend Fertilizer .It uses the crop yield information to make the end users decide on the crop to be sown. Hence the system is not simple enough for dilettante farmers to understand.

**Proposed system**

The proposed system obtains the soil and crop parameters and maps those to list the suitable crops. It passes the various inputs to the controller which uses the Random Forest Algorithm for classification. The proposed system provides easy accessibility to the users. They are also easy to use and understand by the dilettante farmers. It improves the visualization and understandability.

**Module Description:**

* **Data Preprocessing**
* **Applying machine learning algorithm**
* **Listing the suitable crops for the soil provided as input**

**Data Pre-Processing:**

 Data is pre-processed after collection of various records. The dataset contains a total of 103 records, where 6 records are with some missing values. Those 6 records have been removed from the dataset and the remaining 101 records are used in pre-processing.

**Applying machine learning algorithm:**

The Recommendation System requires Classification and Clustering Algorithms to perform mapping of Datasets. The proposed system Random Forest Algorithm to perform Machine Learning. On an analysis conducted within various algorithms, the Random Forest was found to provide highest efficiency and precision compared to Decision tree, Random Forest etc. Hence the Random Forest algorithm is used in the proposed system to find the suitable crop list.

**Listing the suitable crops for the soil provided as input:**

The system uses Supervised Machine Learning Algorithm to recommend suitable crops with higher accuracy and efficiency. The system lists the suitable crops based on the soil and leaves it upon the farmers to decide on the crop to be sow

**Software Requirements:**

* Operating System : Windows 7 , 8, 10 (64 bit)
* Software : Python and Anaconda
* Tools : Jupyter Note Book

**Hardware Requirements:**

* Hard Disk : 500GB and Above
* RAM : 4GB and Above
* Processor : I3 and Above

**ARCHITECTURAL DIAGRAM:**

Gathering the Soil parameters

Gathering the Crop parameters

Input from farmers

Acquiring

Input from farmers

List of crops

Prediction

Mapping of data