**Intelligent Crop Recommendation System using Machine Learning**

**Alternative Title:**

Crop recommendation system through soil analysis using classification in machine learning

**Aim:**

Predict the crop yield and deliver the end user with proper recommendations about required fertilizer ratio based on soil parameters. We also recommend the crop price using machine learning.

**Abstract**

India is one of the leading countries worldwide in terms of farm output. Even after being a leading producer of agricultural products, India still lacks farm productivity. Farmers have very less income because of the lack of farm productivity. There needs to be an increase in productivity, in order to get more income for the farmers. To increase productivity, farmers should know which crop would suit the specific piece of land. If the right type of crop is cultivated in that piece of land, then automatically, the yield of the crop will increase. Hence, crop recommendation systems can be very beneficial for farmers. Many factors do effect the growth of crops. Temperature, humidity, pH, rainfall, amount of potassium, nitrogen, phosphorous in soil all of these are the factors on which the yield depends. Many farmers have no idea about what crop to be grown in which area that will lead to maximum yield as well as profit. Hence in this paper we are going to explain how machine learning algorithm can be used to predict the crop and price prediction.

**Existing system**

Now a day’s, dilettante farmers are hard to understand the cultivation process, crop type, climate change, etc. Farming is that the spine for every nation's economy. Future agriculture depends on dilettante formers. But new farmers not so strong at farming, So Machine learning help to solve their problems The existing system predicts the crop yield by using the soil parameters and recommend Fertilizer using machine learning. 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 system prepared predict major crops yield in a particular district in Tamil Nadu. The client on their first login has to register themselves on the Web application created by flask. The login details are stored in SQLite database. Once the user login into the system they gets all the access for predicting crop yield and using the input such as location, nitrogen, phosphorous, potassium and pH values depends on their forming land environment.. We can also find the primary nutrients of soil by given the input as crop name. It passes the various inputs to the controller which uses the Random Forest for classification. We recommend to the former how much fertilizer required in ratio based on soil parameters and the crop price using machine learning techniques.

**Module Description:**

* **Dataset collection**
* **Implementation**
* **Prediction**

**Dataset Collection:**

Our crop prediction project dataset are collected from kaggle.com. Data is pre-processed after collection of various records. The dataset contains a more number of records, where some records are with some missing values. Those missing records have been removed from the dataset and the remaining records are used in pre-processing.

**Implementation:**

The Classification Algorithms to produce the best results. We are using Random Forest Algorithm to predict the crop using ML. On an analysis conducted within various algorithms, the Random Forest was found to provide highest efficiency and precision compared to Decision tree. Because RF contain number of decision tree algorithm, that take the average to improve the predictive accuracy of dataset. Hence the RF algorithm is used in the proposed system to find the suitable crop.

**Prediction:**

Preprocessed data are trained and input given by the user goes to the trained dataset. After prediction the predict value given as an output on web application (Flask Framework).

**Software Requirements:**

* Operating System : Windows 7 , 8, 10 (64 bit)
* Software : Python and Anaconda
* Framework : Flask, HTML
* Database : SQLite

**Hardware Requirements:**

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

**Architecture Diagram**

Crop Type

Type

Crop Price

Soil parameters

Data Collection

Preprocess

Algorithm implementation

Model Creation

Database

User Input