CROP PREDICTION BY MONITORING TEMPERATURE AND RAINFALL USING DECISION TREE

Abstract

Agriculture is the major source for the largest population in India to earn money and carry out their livelihood. Precision agriculture is already adopted in other countries, but we still need to involve IoT and cloud computing technologies for better production of crops. At present the climate differs in many areas around India due to various factors from human activities such as air pollution, deforestation, sewage and from natural changes such as distance of sea, wind direction, proximity to the equator. As per the changes in the climate, a farmer needs to predict which crop should be cultivated at which time.

Objectives

- To predict temperature using DHT 11 sensor
- To predict rainfall using soil moisture sensor
- Load crop dataset into R-Tool
- Construct decision tree to predict crop
- Gain information regarding crop for cultivation as per temperature and rainfall changes.
- Predict climate changes accuracy by using SVM, KNN and random forest algorithm.

Problem Definition

Nowadays, farmers are struggling to produce the yield because of unpredictable climatic changes, decrease / increase in rainfall and drastically decrease in water supply. So that an agricultural data has been collected, stored and analyzed for useful information. It is used to promote new advanced methods and approaches such as data mining that can give the information of the previous results to the crop yield estimation.

Introduction

The farmers are struggling to produce the yield because of unpredictable climatic changes and range of rainfall. The experiments conducted to analyze a small number of traits contained within the dataset to decide their effectiveness when compared with standard statistical techniques. Feature selection is very important to classify the crop data. In this research work, decision tree concept was used to build a model in finding a solution of which crop is better for cultivation. ID3 algorithm is used to classify the crops and a solution to increase their yield by analyzing the climatic changes. This work helps to predict the best crop for analyzing the temperature and rainfall.

Literature Survey

1. K.K Joshi and P. Patidar, "An Approach to Construct Decision Tree using Sliq and Knn for Land Grading System", ISSN: 2277-5528, Impact Factor: 2.745 (Sijf), pp: 231-236.

   Joshi K. K., and Patidar P., presented a method on Agricultural Data mining. Feature selection techniques were applied and relevant attribute only selected for further use. Some feature selection techniques were used ID3 Decision Tree Basics, Entropy, Information Gain and Supervised Learning in Quest (Sliq) Algorithm. They compared those feature selection techniques and results are visualized.

2. Brijain R Patel and Kushik K Rana, "A Survey on Decision Tree Algorithm for Classification" The International journal of Engineering development and research, Vol. 2, Issue 1, 2014

   Brijain R Patel and Kushik K Rana explained on classification and prediction are the techniques used to make out important data classes and predict probable trend .The Decision

Tree is an important classification method in data mining classification. It is commonly used in marketing, surveillance, fraud detection, scientific discovery.

3. Prachi H. Kulkarni and pratik D. Kute, " Internet Of Things Based System For Remote Monitoring of Weather Parameters and Applications", International Journal of Advances in Electronics and Computer Science, Vol. 3, Issue 2, February 2016

Prachi H. Kulkarni shared about the proof of concept for an IoT device that collects data regarding physical parameters, using a sophisticated microcontroller platform, from various types of sensors, through different modes of communication and then uploads the data to the Internet. The presented device has been designed for remote monitoring of weather parameters.

Proposed Method

The current climatic and rainfall received data can be fetched by implementing IoT. All those values get uploaded towards R. The captured data get analyzed with the agriculture dataset which helps to predict the climatic changes from the previous year. This will give a solution of cultivating which crop will be more profitable for the farmer. The changes in rainfall, humidity, temperature and pH level can be detected by using KNN, SVM and random forest.

Expecting Output

This work helps to predict the best crop for analyzing the temperature and rainfall. This will help farmers to increase the yield and income level. The climatic changes can be predicted by comparing KNN, SVM and random forest. The Random forest algorithm gives best accuracy while comparing with other algorithms. The obtained accuracy of ID3 algorithm is 95.83 % and it is better than other algorithms.