**Review of Smart farming using Machine Learning and Deep Learning Techniques**

The research work helps to identify how to manage crops and harvest them in a smart way. In recent times, farmers have been facing various challenges, this includes crop failure due to less rainfall, infertility of soil and so on.

Nearly 58 percent of the country’s primary source of livelihood is farming. Farmers till date have adopted conventional farming techniques. These techniques were not precise thus caused less productivity and consumed a lot of time. Precise farming helps to increase the productivity by precisely determining the steps that needs to be practiced at its due season. Predicting the weather conditions, analyzing the soil, recommending the crops for cultivation, determine the amount of fertilizers, pesticides that need to be used are some elements of precision farming.

Precise Farming uses advanced technologies such as IOT, Data Mining, Data Analytics, Machine Learning to collect the data, train the systems and predict the results. With the help of technologies Precise farming helps to reduce manual labor and increase productivity. It guides an individual for smart farming.

The aim of this work is to help an individual cultivate crops efficiently and hence achieve high productivity at low cost. It also helps to predict the total cost needed for cultivation. This would help an individual to pre-plan the activities before cultivation resulting in an integrated solution in farming. The proposed work is a Web application developed through Django framework.

The dataset used was taken from Kaggle. It contains attributes such as temperature, humidity, average rainfall, soil Ph, nitrogen requirement ratio, potassium requirement ratio and phosphorous requirement ratio essential for predicting a crop.

The proposed work uses 10 classification algorithms to find the best model for future prediction. These include Naïve Bayes, Logistic Regression, SVM, Decision Tree, Bagging Classifier, XGBoost Classifier, Random Forest Classifier, Ada Boost Classifier, LGBM Classifier, Gradient Boosting and KNN. The training and testing ration was kept to be equal i.e. 50:50. Six algorithms obtained a score of more than 90%. The Random Forest model hyper tuned with Randomized CV was selected as the best model since its accuracy is 95.45%.

Values of temperature, humidity, average rainfall and soil Ph need to be passed into the model to predict the crops. The values for temperature and humidity were obtained using the latitude and longitude of the current location.

Thus, the model predicts the top 5 crop names that can be grown in the current location and also suggests the GDD – Growing Degree Days and the amount of NPK – Nitrogen, potassium and phosphorous required.