**Abstract**

Food is very important for every living being and for humans it come from fields.Now we have around around 1.2Billon of population yet resources are same , hence we need to increase the amount of yield of food i.e. crops.To help farmers we can use various methods in this modern era rather that tradition methods. We can also choose which crop to plant in the fields.We can predicts the crop type to implant in the fields.There were various methods that were used but they harly considered various factors which actually might be profitable for the farmer as well as society and which can fullfill the demand of the food shortage in this era.Thus we use modern methods such as Mechine learning , Artificial Interligence.Farmer just have to give their soil sample to the laboratory and get their soil’s chemical/elemental information and can provide to the “Crop-Adviser” which can tell them which can tell which crop to plant in his/her fields based on past weather information and their soil nutrients.These prediction would be almost correct with less than 1% failure.

**Keywords : Prediction,Decision tree , random forest , train set , xgboost , accuracy Crop ,SVM , Random forest , Classification**

**Introduction :**

In the era of Technology and science what we cannot compromise is Air , food and water . We have are facing many tragedies and population is keep increasing and the food we are producing is still limited. We can save crops from external harm with pesticides and chemicals but cannot effect subatomic factors. Our motive is to somehow increase the production of the crops so the requirements of the food get satisfied.We are getting help of mahine learning In our study. Machine learning methods/approches/models are used in various problmes such as customers’ phone use 1( Witten et al., 2016) , perform forecasts of the pollution in the atmosphere 2( Jorquera H, Perez R et al., 2001), classifying soils in combination with GPS-based technologies 3(Verheyen, K., Adrianens, M. Hermy and S.Deckers et al., 2001) , Agriculture land grading 4( Zelu Zia et al., 2009) and many more. Machine learning is used for various predictions and different fields of works and its developing more and more by upcoming years. There are a lot of models developed which are used in machine learnig such as K-means , Regression , Neutral network , Decison tree , gradient boost etc. and these are very frequently used and reseacher are discovering more and more models to increase the throughput from models.We are using few models which are predictining the prediction of crop based on their features given in data set.

**Related work :**

There are verious works and researches done for prediction of crop prediction system using various machine learning models/methods and archived different results according to there methods in the agriculture field.Some of works are as following :

**[1] : “There are numerous work that has been done related to disease prediction system using different Machine Learning algorithms and achieved different results for different methodsin medical field.”**

**http://modern-journals.com/index.php/ijma/article/view/688**

**Authors:** Dr.G.Suresh, Dr.A.Senthil Kumar, Dr.S.Lekashri, Dr.R.Manikandan

Authors described the dataset and done data preprocessing and authors found out in their total 103 records 6 had missing values hence they removed the records . Afterwoard author various models and found out SVM gave the most accurate or noteworthy results.

**[2]: “****Analysis of agricultural crop yield prediction using statistical techniques of machine learning”**

**https://sci-hub.se/https://www.sciencedirect.com/science/article/pii/S221478532101052X**

**Authors :** [JanmejayPant](https://www.sciencedirect.com/science/article/pii/S221478532101052X" \l "!), [R.P.Pant](https://www.sciencedirect.com/science/article/pii/S221478532101052X" \l "!), [ManojKumar Singh](https://www.sciencedirect.com/science/article/pii/S221478532101052X" \l "!), [DeveshPratap Singh](https://www.sciencedirect.com/science/article/pii/S221478532101052X" \l "!), [HimanshuPant](https://www.sciencedirect.com/science/article/pii/S221478532101052X" \l "!)

Crop yields are very important and prediction of amount of yield , crop choosing playes a major roles in farming.It benefits farmer as well as every living being who lives on food.Authors used Random Forest Regressor , Gradient boost regressor ,SVM and Decision tree regressor . They cleaned the dataset and extracted the important features auch as type of crop, year of production , average rainfall etc.They found out Decision tree has higest score of 96% wherese SVM had -20% score.

[3]: **“Crop Yield Prediction using Machine Learning Algorithm”**

Author: D.Jayanarayana Reddy , Dr M. Rudra Kumar

https://ieeexplore.ieee.org/abstract/document/9432236

Agricultue is the main stucture of Indian Economy and most of the lives are depended on it.Author used various paper in which different approach of ML models were used and found out that feature chosed on those models were baded opon geological position , scale and crop features.According to author **“The present research shows several existing models that consider elements such as temperature, weather condition, performing models for the effective crop yield prediction. “**

**[4]: “Coupling machine learning and crop modeling improves crop yield prediction in the US Corn Belt”**

**Author:** [Mohsen Shahhosseini](https://www.nature.com/articles/s41598-020-80820-1" \l "auth-Mohsen-Shahhosseini), [Guiping Hu](https://www.nature.com/articles/s41598-020-80820-1" \l "auth-Guiping-Hu), [Isaiah Huber](https://www.nature.com/articles/s41598-020-80820-1" \l "auth-Isaiah-Huber), [Sotirios V. Archontoulis](https://www.nature.com/articles/s41598-020-80820-1" \l "auth-Sotirios_V_-Archontoulis)

https://www.nature.com/articles/s41598-020-80820-1

This work indicate , coupling crop modeling and machine learning improves corn yield prediction in the US Corn Belt.Authors used five methods (linear regression, LASSO, LightGBM, random forest, and XGBoost),Linearn regression shows that there is linear relationship between predictors and responsive variable,normality,no multicollinearity and homoscedasticity.Whereas Random Forest shows that random forest addresses both bias and variance components of the error and is proved to be powerful.

**[5]: “**Farming Made Easy using Machine Learning**”**

**Authors:** [Manasi Jadhav](https://ieeexplore.ieee.org/author/37088896587); [Neha Kolambe](https://ieeexplore.ieee.org/author/37088895766); S[hreya Jain](https://ieeexplore.ieee.org/author/37088893014); [Sheetal Chaudhari](https://ieeexplore.ieee.org/author/37992226200)

The work is it’s is a very useful.It can predict weather forcast , recommended crop , fertilizers reccomendation.They used Decision tree as the ML model.

**https://ieeexplore.ieee.org/abstract/document/9588245**