# MACHINE LEARNING BASED CROP CULTIVATION FOR AGRICULTURES

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Farmers usually plan the cultivation process-based o n t their   previous experiences. Due to the lack of precise knowledge   about   cultivation, they   end   up   cultivating   undesirable crops. To help the farmers take decisions   that can make their farming more efficient and profitable, the research tries to establish an intelligent information prediction analysison farming inIndia. However, this   way of farming here is still   at   the   initial stage. Observing at the present state of affairs long-faced by farmers in geographic area, we've determined that there's a risein   suicide   rate   over   the   years. the   explanations behind   this   includes weather,   debt, family problems and           frequent amendment in           Indian           government norms. typically, farmers aren't privy to the crop that suits their soil quality, soil nutrients and soil composition. The work proposes to assist farmers check the soil quality reckoning on the analysis done supported data  processing approach. Therefore, the  system  focuses  on  checking  the  soil quality to predict the crop appropriate for cultivation in step with their soil kind and maximize the crop yield with recommending applicable chemical.


Key Words: Self-Organizing Map, Back-Propagation Neural Networks, Application Programming Interface.

## 1. INTRODUCTION

As per the statistics of 2016 around 272.82 million farmers dwell in geographic area. With this myriad range of farmers and increasing suicide rates, we wish to assist farmers to know the importance of previous crop prediction, to flourish their basic information regarding soil quality, understanding location-wise weather constraints, so as to realize high crop yield through our technology answer. Most of the prevailing system hardware primarily based that makes them pricy and tough to keep up. conjointly they lack to provide correct results. Some systems counsel crop sequence reckoning on yield rate and value. The system projected tries to beat these drawbacks and predicts crops by analysing structured knowledge. [8]The project being "Prediction of soil quality mistreatment data processing approach" definitelyfocuses on agricultural aspects. Being a very software system answer, it doesn't permit maintenance issue to be thought-about a lot of. conjointly the accuracy level would be high as compared to hardware primarily based solutions, as a result of parts like soil composition, soil type, pH value, climate all inherit image throughout the prediction method.

## 2. LITERATURE SURVEY

Agriculture sector plays a significant role in Indian economy, as seventy % households in India depends strictly on this field. Agriculture in India contributes to concerning Revolutionary Organization 17 November of Gross price another as of 2016-17.But there's endless decline in agriculture's contribution to Gross price another. Food is crucial always and that we rely on agricultural outputs, thus farmers play a reallyvital role. the subsequent comparison is shown below:

The study in [1] used Multiple Linear Regression (MLR) technique for crop analysis.

Decision tree algorithmic rule and Classification is employed to perform analysis of over 362 datasets and supply result.The coaching dataset here is classed into as organic, inorganic and land for predicting the kind of soil. Results computed by this method are correct moreover as reliable.
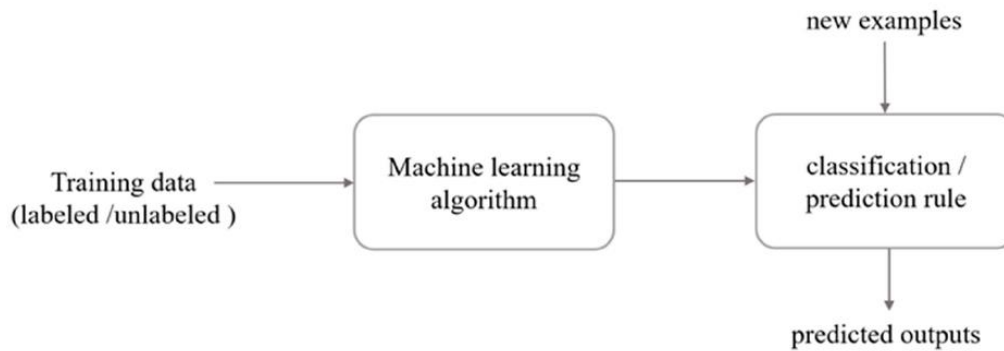
The study in [2] fed knowledge to a Back-Propagation Network to judge the check knowledge set. Back Propagation Network uses a hidden layer that helps in higher performance in predicting soil properties. Back Propagation Network here, is utilized to develop a self-trained perform to predict soil properties with parameters. this offers additional accuracy and performs higher than the historically used ways, however, generally the system becomes slow and inconsistency is seen within the output.

In [3] 2 regression supervised machine learning ways are used: Support Vector Machine (SVM) and connectedness Vector Machine (RVM) to point out effectiveness in soil quality prediction. a sensible wireless device for sensing soil wet and meteorological knowledge. The wireless device provides a slip-up rate of 15 August 1945 and ninety fifth accuracy. However, it's not been tested for real time knowledge. The paper [4] involves a check for Soil Fertility and Plant Nutrient by victimization back propagation algorithmic rule. The results are correct and allows improvement in soil properties. It performs higher as compared to ancient ways. However, system is slow inefficient and not stable.

According to paper [5], 3 ways are used which has call tree, Naive mathematician Classifier, and KNN Classifier that analyses soil and predicts crop yield, but rule based mostly induction and SVM may be used for additional accuracy as results aren't correct. In this research for extracting useful information and to predict, they used data mining technology, for the selected region they used multiple linear regression . Decision Tree algorithm was used for prediction which is supervised learning algorithm and multiple linear regression which is generalized prediction model [3]. To predict the structured object instead of discrete or real values they used Decision Tree algorithm. The expected loss was calculated from training data from classification.

## 3.PROPOSED SYSTEM

The system aims to assist farmers to cultivate correct crop forbetter yield production. To be precise and correct inpredicting crops, the project analyze the nutrients gift in the soil and therefore the crop productivity supported location. It can beachieved exploitation unsupervised and supervised learningalgorithms, like Kohonen Self Organizing Map (Kohenon'sSOM) and BPN (Back Propagation Network). Dataset canthen trained by learning networks. It compares the accuracyobtained by completely different network learning techniques and therefore he most correct result are going to be delivered to the tip user. Alongwith this, the end user is provided with proper recommendations about fertilizers suitable for every particular crop.

1.　A Typical Machine Learning Approach

### 3.1. Crop Management

### 3.1.1. Yield Prediction

Yield prediction, one of the most significant topics in precision agriculture, is of high importance for yield mapping, yield estimation, matching of crop supply with demand, and crop management to increase productivity. Examples of ML applications include in those in the works of an efficient, low-cost, and non-destructive method that automatically counted coffee fruits on a branch. The method calculates the coffee fruits in three categories: harvestable, not harvestable, and fruits with disregarded maturation stage. In addition, the method estimated the weight and the maturation percentage of the coffee fruits. The aim of this work was to provide information to coffee growers to optimise economic benefits and plan their agricultural work. Another study that used for yield prediction is that by the authors of, in which they developed a machine vision system for automating shaking and catching cherries during harvest. The system segments and detects occluded cherry branches with full foliage even when these are inconspicuous. The main aim of the system was to reduce labour requirements in manual harvesting and handling operations. In another study, authors developed an early yield mapping system for the identification of immature green citrus in a citrus grove under outdoor conditions. As all other relative studies, the aim of the study was to provide growers with yield-specific information to assist them to optimise their grove in terms of profit and increased yield. In another study, the authors developed a model for the estimation of grassland biomass (kg dry matter/ha/day) based on ANNs and multitemporal remote sensing data. Another study dedicated to yield prediction, and specifically to wheat yield prediction, was presented in another study. The developed method used satellite imagery and received crop growth characteristics fused with soil data for a more accurate prediction. The authors of presented a method for the detection of tomatoes based on EM and remotely sensed red green blue (RGB) images, which were captured by an unmanned aerial vehicle (UAV). Also, in the work of [80], authors developed a method for the rice development stage prediction based on SVM and basic geographic information obtained from weather stations in China. Finally, a generalized method for agricultural yield predictions, was presented in another study. The method is based on an ENN application on long-period generated agronomical data (1997–2014). The study regards regional predictions (specifically in in Taiwan) focused on the supporting farmers to avoid imbalances in market supply and demand caused or hastened by harvest crop quality.

### 3.1.2. unwellness Detection

Disease detection and yield prediction are the sub-categories with the upper range of articles presented during this review. one amongst the foremost vital considerations in agriculture is tormentor and unwellnesscontrol in out-of-door (arable farming) and greenhouse conditions. Theforemost wide used observe
in tormentor and unwellness management is to uniformly spray pesticides over thecropping space. This observe,although effective, features a high money and vital environmental value. Environmental impacts can be residues in crop product, facet effects on spring water contamination, impacts on nativewildlife and eco-systems, and so on. cubic centimetre is associate degree integrated a part of exactitude agriculture management,where agro-chemicals input is targeted in terms of your time and place. within the literature a toolis bestowed for the detection and discrimination of healthy holy thistle plants and peopleinfected by fungus Microbotyum asterid dicot genus throughout vegetative growth. within the work of authorsdeveloped a replacement methodology supported image process procedure for the classification of arasitesand the automatic detection of thrips in strawberry greenhouse atmosphere, for time period management. The authors of bestowed a technique for detection and screening of Bakanae unwellness in rice seedlings.More specifically, the aim of the study was the correct detection of microorganism Fusarium fujikuroi fortwo rice cultivars. The machine-driven detection of infected plants raised grain yield and was less time-consuming compared with oculus examination.

### 3.1.3. Crop Quality

The penultimate sub-category for the crop class is studies developed for the identificationof options connected with the crop quality. The correct detection and classification of crop qualitycharacteristics will increase product value and scale back waste. within the 1st studythe authors bestowedand developed a brand new technique for the detection and classification
of biological science and non-botanicalforeign matter embedded within cotton lint throughout harvest home. The aim of the study was qualityimprovement whereas the minimising fibre injury. Another studyregards pears productionand, more specifically, a way was bestowed for the identification and differentiation of Karla scentedpears into deciduous-calyx or persistent-calyx classes. The approach applied millilitre ways withhyperspectral coefficient imaging. the ultimate study for this sub-category was by the authors of in which a way was bestowed for the prediction and classification of the geographical origin forSensors 2018, 18, 2674 fourteen of twenty-ninerice samples. the strategy was supported millilitre techniques applied on chemical parts of samples. More specifically, the most goal was the classification of the geographical origin of rice, for twodifferent climate regions in Brazil; Gosia and river do Sul.
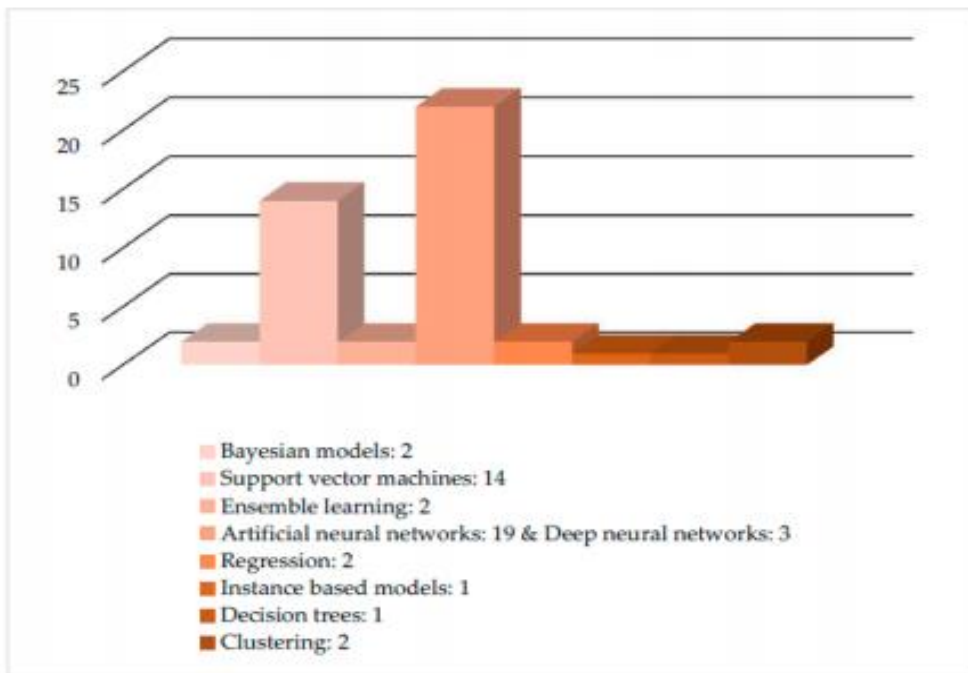
Bayesian models: 2
Support vector machines: 14
Ensemble learning: 2
Artificial neural networks: 19 & Deep neural networks: 3
Regression: 2
Instance based models: 1
Decision trees: 1
Clustering: 2

Fig . Machine learning Model with their Total Rate



Yield prediction   Disease detection   Weed detection
Crop quality   Species recognition   Animal welfare
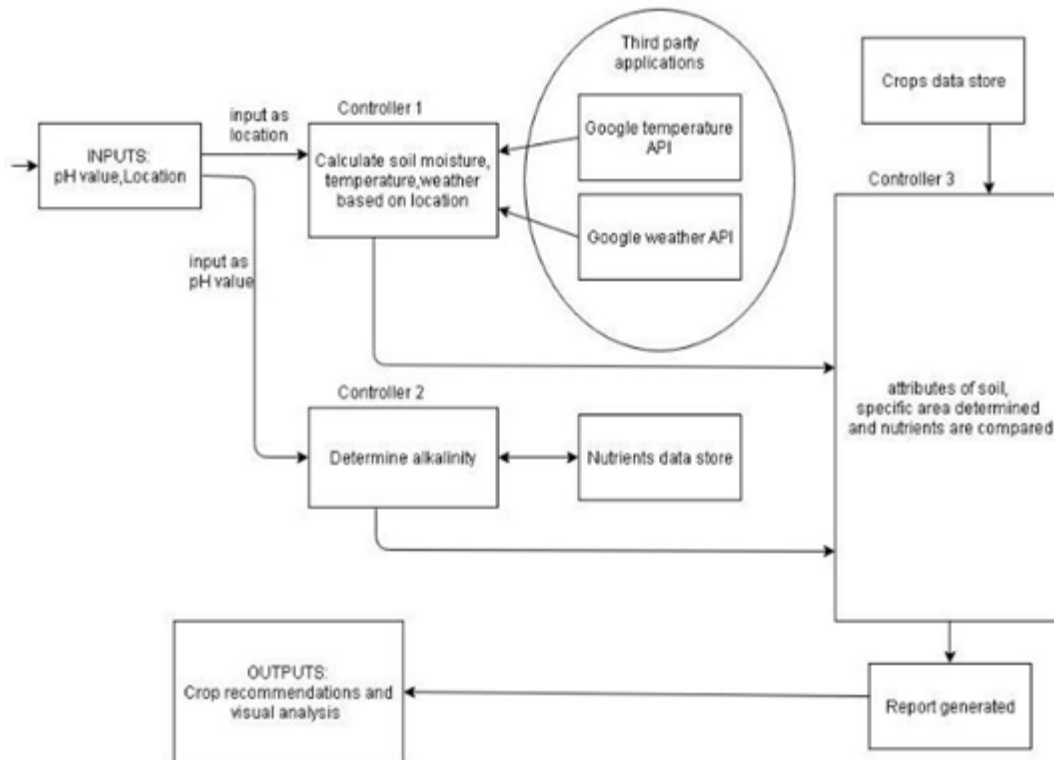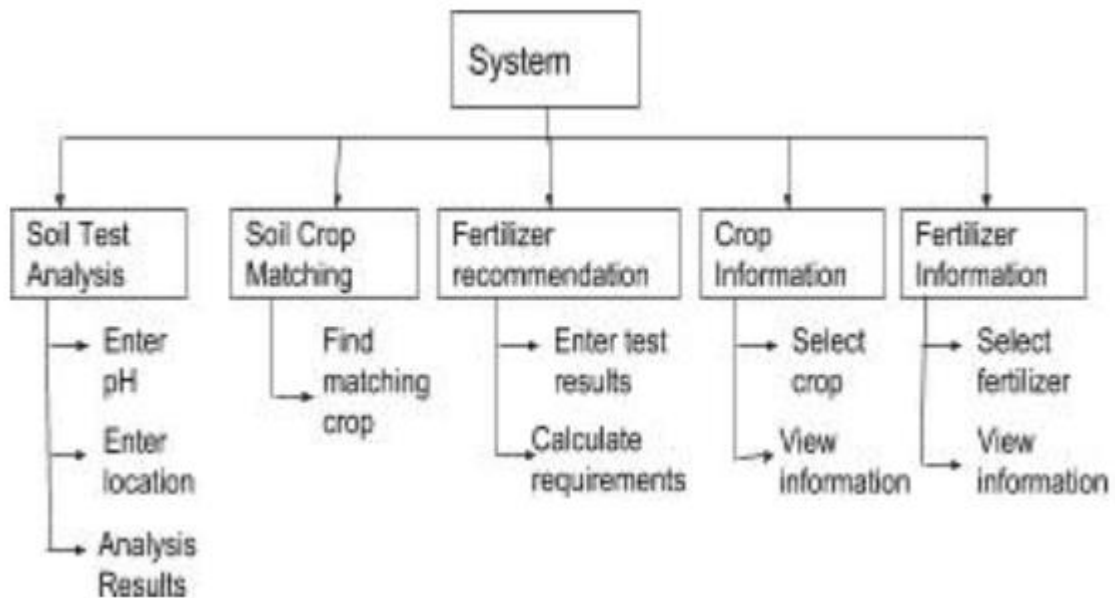Livestock production   Water management   Soil management

Fig. Total no of Machine Learning model according to each sun-Category of the four main category.

## 4.SYSTEM ARCHITECTURE



**2. Block Diagram of Proposed system**



**3. Module Diagram**

## 5.DISCUSSION AND CONCLUSION:

The system uses supervised and unverified Machine learning algorithms andprovides best result supported accuracy. The results of the 2 algorithms are going to be associated and therefore the one giving the most effective and correctoutput will be elect. so, the system can enable scale back the difficulties long-faced by the farmers and stop them from trying suicides. it'll act as a medium to produce the farmers economical info needed to induce high yield and so maximize profits that continuously will scale back the suicide rates and reduce his difficulties.total. More specifically, five ML models were implemented in the approaches on cropmanagement, where the most popular models were ANNs (with most frequent crop at hand—wheat). In livestock management category, four ML models were implemented, with most popularmodels being SVMs (most frequent livestock type at hand—cattle). For water management inparticular evapotranspiration estimation, two ML models were implemented and the most frequentlyimplemented were ANNs. Finally, in the soil management category, four ML models wereimplemented, with the most popular one again being the ANN model.

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