EFFICIENT USE CROP YIELD PREDICTION FORECASTING AND FERTILIZER RECOMMENDATION

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ABSTRACT

India being an agriculture country, its economy predominantly depends on agriculture yield growth and agro industry products. Any farmer is interested in knowing how much yield he is about to expect. Along with it, percentage of nutrients like Nitrogen (N), Phosphorous (P), and Potassium (K) Location is used along with the use of third-party applications like APIs for weather and temperature, type of soil, nutrient value of the soil in that region, amount of rainfall in the region, soil composition can be determined. All these attributes of data will be analyzed train the data with various suitable machine learning algorithms for creating a model. The system comes with a model to be precise and accurate in predicting crop yield and deliver the end user with proper recommendations about required fertilizer ratio based on atmospheric and soil parameters of the land which enhance to increase the crop yield and increase farmer revenue. Keeping accurate data is an important aspect of agricultural risk management. Propose to use machine-learning techniques to develop a prediction model for crop yield production.

1. INTRODUCTION

The rapid technological developments during the last few years have introduced radical changes in the working environment in the agricultural sector. Agriculture has entered a new era in which the key to success is access to timely information and elaborated decision making. The up-to-date and skilled farm manager has to choose between various productions options utilizing the latest advancements in research and technology. It can capture information related to all crops grown in the recent past, and thus can help farmers make decisions on what to grow next. Weather information: The cloud can store region-specific weather information and as well as the weather forecast for specific durations. [1]

Agriculture seeks to increase and improve the crop yield and the quality of the crops to sustain human life. However, in the current time, people tend to take more immediately rewarding jobs. There are fewer, and fewer people involved in crop cultivation. In addition, the continuous increase of human population makes the cultivation of the crops at the right time and right place even more important, as the climate is changing and the shifts from normal weather pattern are more frequent than before industrialization. Food insecurity is a problem that cannot be avoided, and humans must make use of new innovative

technologies to make use of existing soil, water and air conditions to obtain larger crops. [6]

The knowledge gap between traditional ways of cultivating and new agricultural technologies can be overcome if software can be designed to model of interactive impact of climate factors, especially the impact of extreme events (e.g. heat stress, frost and excess water) occurring at different crop stages. The climate change definitely affects the local and world food production, so designing software to model crop cultivation requires new hypotheses for climate change studies, scenarios for climate change adaptation, and policy makers that can limit the devastating effects of weather on food supply. This knowledge provided by machine learning can help the farmers with crop cultivation by predicting chances of crop losses or prevent losses altogether. [9]

2. RELATED WORK

2.1 K.E. Eswari and L.Vinitha are investigated that Crop prediction is an important agricultural problem. To address this problem, clustering and classification techniques are used for crop yield prediction. It is the one of the most commonly used intelligent technique based on data analytics concepts to predict the crop yield for maximizing the crop productivity. Machine learning techniques can be used to improve prediction of crop yield under different climatic scenarios. The Baysian network Classification is a supervised learning model which means temperature and rainfall analyzes the crop data used for classification and probability values of Rice, Coconunt, Arecanut, Black pepper and Dry ginger crops. .The Baysian network Classification analysis technique is used for exploring the dataset. The experimental results showed that the performance of other techniques on the same dataset was much better compared to SMO. [1]

2.2 Shruti Mishra, Priyanka Paygude, Snehal Chaudhary, Sonali Idate are clearly discussed about agriculture is the most important sector that influences the economy of India. It contributes to 18% of India's Gross Domestic Product (GDP) and gives employment to 50% of the population of India. People of India are practicing Agriculture for years but the results are never satisfying due to various factors that affect the crop yield. To fulfill the needs of around 1.2 billion people, it is very important to have a good yield of crops. Due to factors like soil type, precipitation, seed quality, lack of technical facilities etc the crop yield is directly influenced. Hence, new technologies are necessary for satisfying the growing need and farmers must work smartly by opting new technologies rather than going for trivial methods. For evaluating performance Accuracy is used as one of the factors. The classifiers are further compared with the values of Root Mean Squared Error (RMSE), Mean Absolute Error (MAE) and Relative Absolute Error (RAE). Lesser the value of error, more accurate the algorithm will work. [2]

2.3 Anna Chlingaryana, Salah Sukkarieha, Brett Whelanb are said Accurate yield estimation and optimised nitrogen management is essential in agriculture. Remote sensing (RS) systems are being more widely used in building decision support tools for contemporary farming systems to improve yield

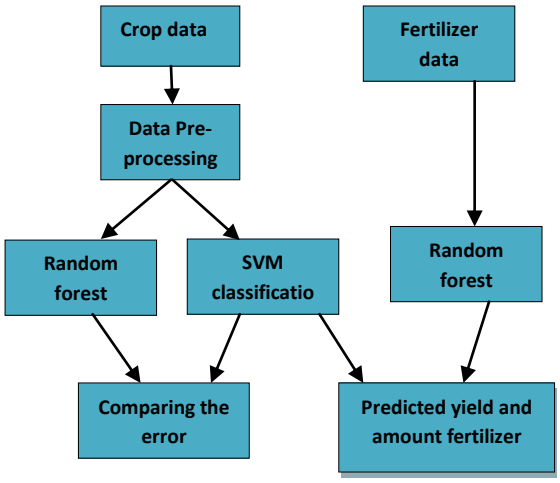
production and nitrogen management while reducing operating costs and environmental impact. However, RS based approaches require processing of enormous amounts of remotely sensed data from different platforms and, therefore, greater attention is currently being devoted to machine learning (ML) methods. This is due to the capability of machine learning based systems to process a large number of inputs and handle non-linear tasks. [3]

2.4 Dakshayini Patil et al is clearly shows High harvest generation is reliant on appropriate climatic conditions. Inconvenient regular atmosphere conditions, for example, low precipitation or temperature extremes can drastically diminish edit yield. Growing better strategies to foresee edit efficiency in various climatic conditions can help rancher and different partners in vital basic leadership as far as agronomy and harvest decision. This paper reports utilization of various information mining methods will anticipate rice trim yield for Maharashtra state, India. Precipitation, least temperature, normal temperature, most extreme temperature, reference trim evapotranspiration, range, generation and yield for the Kharif season (June to November) were the parameters choosen for the study for the years 1998 to 2002. WEKA tool was used for dataset processing. [4]

PROBLEM IDENTIFICATION

Farmers are faced with having to make difficult decisions as to how to remain productive and sustainable with changing climates and market economic pressure. This could benefit them to attain greater reap productivity if the conditions are suitable or help them to decrease the loss due to unsuitable conditions for the reap produce. Sometimes the quality of the information is low, which cannot satisfy the producers' reality needs and hence bother producers in applying practical information and have less impact on farmers. Different agencies with different agricultural information resources characteristics exist. It often offers advisory problem to farmers as to whom they should consult. Framers face serious problems in drought conditions. Type of soil plays a major role in the crop yield. Suggesting the use of fertilizers may help the farmers to make the best decision for their cropping situation. The number of studies Information and Communication Technology can be applied for prediction of crop yield. By the use of cloud computing, can also predict the crop yield. By fully analyze the previous data we can suggest the farmer for a better crop for the better yield. [8]

4. SYSTEM ARCHITECTURE



EXISTING SYSTEM

In India, climate conditions vary unconditionally. In the time of drought, farmers face serious problems. So this

taken into consideration they used some machine learning algorithms to help the farmers to suggest the crop for the better yield. They take various data from the previous years to estimate future data. The main factors that take into consideration are minimum temperature, maximum temperature, average temperature, and previous year's crop information and yield information. Using Hierarchical classifier is the previous data into two classes that are high yield and low yield. Yield of the crop depends on the perception, average, minimum and maximum temperature. [3] This attribute is taken into consideration to get a good decision on the yield of the groups. They all collected the dataset with these attributes and send as input to the Bayesian network and classify into the two classes named true and false classes and compared with the observed classifications in the model with a confusion matrix and bring the accuracy. [10]

PROPOSED WORK

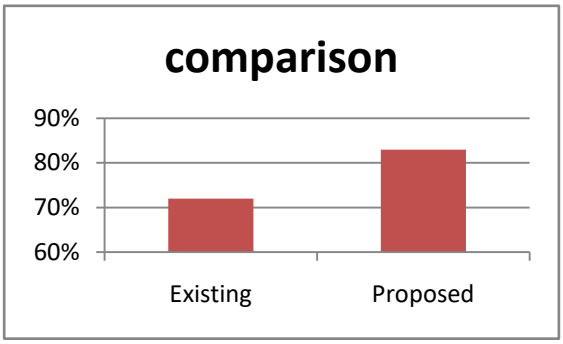
The challenge in it is to build the efficient model to predict the most efficient model to predict the output of the crop so try with the different algorithms and compare all the algorithms and which one has the less error and loss chose that model and predicts the yield of that particular crop. Generally, machine learning algorithms will predict the most efficient output of the yield. Previously yield is predicted on the bases of the farmer's prior experience but now weather conditions may change drastically so they cannot guess the yield. So, technology can help them to predict the yield of the crop weather to go for that crop or no. machine learning model will understand the pattern of the crop and yield based on the several conditions and predicts the yield of the area in which he is going to crop. [13]

RESULT AND DISCUSSION

In this study, an effort is made in order to know the crop production analysis and is processed by implementing the SVM algorithm.

8.1 Comparison Analysis

The following table shows the accuracy details of the various algorithm used in the existing and proposed work,



And finally to conclude that the comparison result should be proposed system algorithms are svm classification and the random forest algorithm was produce the 10% higher accuracy results while comparing the existing algorithm of hierarchal classification.

CONCLUSION AND FUTURE SCOPE

Crop prediction still remains a challenging issue. The aim of this project is to propose and implement a model-based system to predict the crop yield production from the collection of past data. This has been achieved by applying various machine-learning algorithms and other techniques on agriculture data. While the random forest regressor has a good performance, upon a close inspection it reveals that it has a tendency to under

predict at high yield values. Alternatively, a new model could be constructed that maps each individual measurement directly to the yield. Considering how each location's seasonal weather trends are likely to determine the yield, the problem of predicting outcome from individual measurements will be a challenging task.

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