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USING MACHINE LEARNING PREDICT CROP YIELDS

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Abstract - Agriculture is one of the major revenue producing sectors of India and a source of survival. Numerous seasonal, economic and biological patterns influence the crop production but unpredictable changes in these patterns lead to a great loss to farmers. These risks can be reduced when suitable approaches are employed on data related to soil type, temperature, atmospheric pressure, humidity and crop type. Whereas, crop and weather forecasting can be predicted by deriving useful insights from these agricultural data that aids farmers to decide on the crop they would like to plant for the forthcoming year leading to maximum profit. This paper presents a survey on the various algorithms used for weather, crop yield, and crop cost prediction.

***Key Words*:** unpredictable, forecasting, humidity, algorithms.

1.INTRODUCTION

In developing countries, farming is considered as the major source of revenue for many people. In modern years, the agricultural growth is engaged by several innovations, environments, techniques and civilizations. In addition, the utilization of information technology may change the condition of decision making and thus farmers may yield the best way. For decision making process, data mining techniques related to the agriculture are used. Data mining is a process of extracting the most significant and useful information from the huge number of datasets. Nowadays, we used machine learning approach with developed in crop or plant yield prediction since agriculture has different data like soil data, crop data, and weather data. Plant growth prediction is proposed for monitoring the plant yield effectively through the machine learning techniques.

It is also applicable for the automated process of farming is the beginning of a new era in Bangladesh that will be suitable for the farmers who seek experts to take suggestion about the appropriate crop on specific location of their land and don't want to forget any step of the cultivation throughout the process. Although, the opinion from experts is the most convenient way, this application is designed to give accurate solution in fastest manner possible. This research's main objective is to bring farming process a step closer to the digital platform.

2. LITERATURE SURVEY

G Rasul, Q. Z. Chaudhry, A. Mahmood, K. W. Hyder, "Effect of. 28–40Temperature Rise on Crop Growth & Productivity", Pakistan Journal of Meteorology, vol. 8, no. 15, pp. 7-8, 2011. This paper discusses an analysis of ERS SAR imagery of agricultural crops in Flevoland, The Netherlands, over a four-fear period (1993 to 1996) to study the stability of multitemporal radar signatures from one year to the next. Direct comparisons of the multitemporal profiles of crop signatures are made to derive limits on their stability and to examine the differences between them from one year to the next. Sharp rises (of several dB) in temporal crop signatures are linked to variations in rainfall, freezing, and incident angle (due to imaging passes from different orbit tracks). Model simulations confirm the plausibility of these mechanisms and emphasize their importance for quantitative monitoring of agricultural crop development. The possibility of timing critical phases of the crop growth cycle is highlighted using field-to-field variations with particular regard to the emergence and closure of sugar beet. The interyear comparison also enables generalized comments to be made regarding the performance and stability of crop classification algorithms from one year to another. Only summer months are consistently identified as helping to distinguish broad-leaved crops from cereals. There is some evidence that other times of the year assist in distinguishing specific crops, but this evidence is not stable from one year to another.

3. PROBLEM STATEMENT

The unpredictability of weather patterns, fluctuations in market demand, and the complexity of crop growth dynamics contribute to uncertainties in yield predictions. Additionally, traditional forecasting methods often lack granularity and fail to leverage the full potential of available data sources, resulting in suboptimal decision-making.

4.OBJECTIVE & SCOPE

Objective: The main aim of this project is to predict the yield predication of the crop millet, in the different type of soli and weather condition

Scope: The scope of this project is to investigate a dataset of crop records for agricultural sector using machine learning technique. To identifying crop predicting by farmer is more difficult. We try to reduce this risk factor behind selection of the crop

5. MATERIALS & METHODS

Operating System	Windows 7 or High
Main Technology	Machine Learning
Programming Language	Python Programming 3.11.8
Tools	Anaconda - Jupyter Notebook 7.0.8

Table -1: Software requirements

Processor	Intel Core Or Ryzen
Speed	2.42 GHz
HDD	120 GB
RAM	4 GB (Minimum)

Table -2: Hardware requirements

6. SYSTEM DESIGN

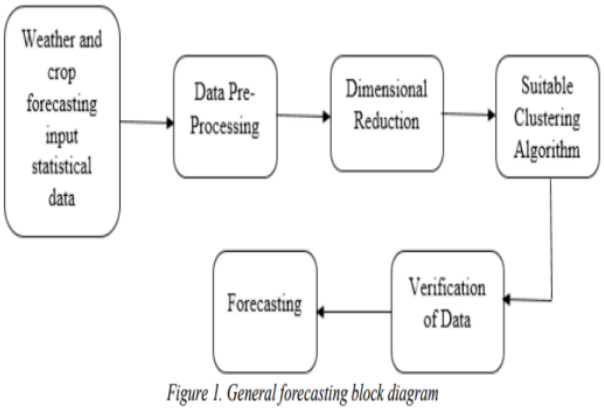

Figure 1. General forecasting block diagram

Chart -1: System Architecture

7. DATA FLOW DIAGRAM

The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.

The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.

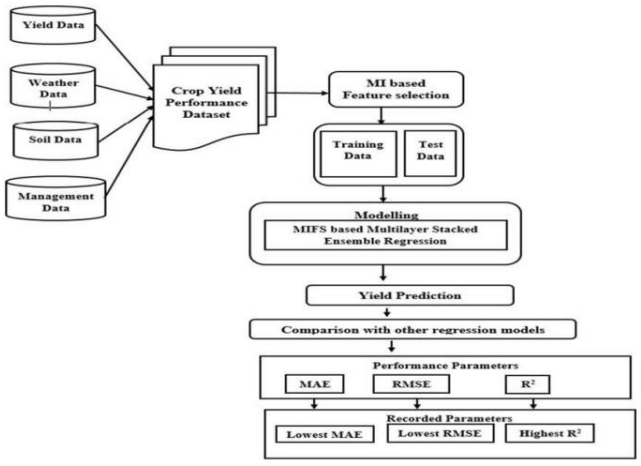

Chart -2: Flow Diagram

8. SOFTWARE ENVIRONMENT

Machine Learning is a system that can learn from example through self-improvement and without being explicitly coded by programmer. The breakthrough comes with the idea that a machine can singularly learn from the data (i.e., example) to produce accurate results. Machine learning combines data with statistical tools to predict an output. This output is then used by corporate to makes actionable insights. Machine learning is closely related to data mining and Bayesian predictive modeling. The machine receives data as input, use an algorithm to formulate answers.

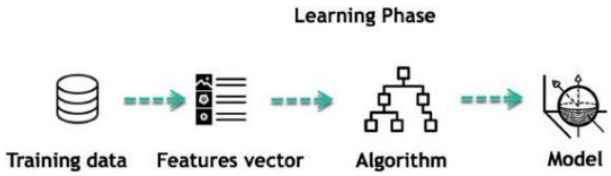

Fig -1: Learning Phase of Machine learning

9. IMPLEMENTATION & RESULTS

1.Dataset and Pre-processing: We needed dataset of fake and genuine profiles. Various attributes included in dataset are number of friends, followers, status count. Dataset is divided into training and testing data. Classification algorithms are trained using training dataset and testing dataset is used to determine efficiency of algorithm. From the dataset used, 80% of both profiles (genuine and fake) are used to prepare a training dataset and 20% of both profiles are used to prepare a testing dataset.

2.Feature Selection: Features are selected to apply classification algorithms. The classification algorithm is discussed further. Attributes are selected as features if they are not dependent on other attributes and they increase efficiency of the classification. The features that we have chosen are discussed further. After selection of attributes, the dataset of profiles that are already classified as fake or genuine are needed for the training purpose of the classification algorithm. We have used a publicly available dataset of 1337 fake users and 1481 genuine users consisting of various attributes including name, status count, number of friends, followers count, favourites, languages known etc.

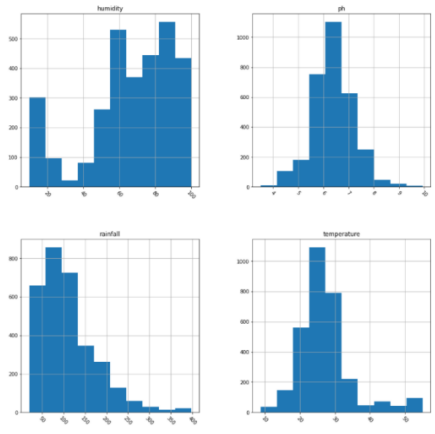

Fig -2: Crop data analyzed in Different Conditions

10. CODING

The total coding is in the below hyperlink, kindly check it.

Coding

11. CONCLUSIONS

There are numerous systems that utilize various methodologies to manipulate data, to derive insights and help indecision making for farmers. But the major concern is that they focus either on one crop prediction or forecast anyone parameter like either yield or price.This scheme is employed to forecast the weather,yield and price of major crops of Karnataka based on historical data. Especially, for Mysore region, because they are the largest producer of coffee, ragi, and coarse cereals and also the largest rice producing district in Karnataka.The statistical data and predicted output are accessible for the farmers through a stand-alone user friendly application. This aids farmer to decide on the crop they would like to plant.

12. FUTURE WORK

- Using neural networks so that they may give better results.
- Taking an extra parameter cost so that predicting of crop becomes easier.
- To optimize the work to implement in Artificial Intelligence environment.

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