Design of Hybrid Model for Intelligent Crop Recommendation System using Machine Learning Algorithms

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Abstract: Farmers used to hire via word of mouth, but due to weather conditions, they are no longer able to do so. Agricultural aspects and parameters are employed to supply information that may be used to research greater approximately. Agricultural facts, Crop forecast, rotation, water requirements, fertilizer requirements and safety problems may be resolved. Due to the varying climatic conditions in the environment, a green technique of selling crop cultivation and assisting farmers with their manufacture and management is essential. Tamil Nadu, being a coastal state, has agricultural unpredictability, which reduces productivity. Increasing production should be possible with more people and land area, however it cannot be attained. Farmers used to rely on word-of-mouth, but this is no longer possible owing to climate variables. Agricultural elements and characteristics provide data that may be used to get insights into AFGRI-facts. The expansion of the IT world pushes several highlights in Agriculture Sciences to provide farmers with useful agricultural information. In this contemporary context, the ability to employ new technical approaches in the sector of agriculture is desirable. Machine Learning Techniques use data to create a well-defined model that assists us in making predictions. Crop forecast, rotation, water requirements, fertilizer requirements and crop protection area challenges that may be resolved. Because of the environment's changeable climatic elements, an effective approach to aid crop cultivation and assist farmers in their production and management is required. This might help aspiring farmers improve their farming practices. With the use of data mining, a farmer may be presented with a system of suggestions to assist the main crop production. Crops are recommended for implementation based on climatic parameters and quantity. Data analytics lays the path for the development of valuable extractions from agricultural databases. Crop data has been evaluated, and crop suggestions have been made based on productivity and season.

Keywords-Data set, Random Forest (RF), Data Preprocessing, and Multiple Linear Regression (MLR).

I.INTRODUCTION

Tamil Nadu, India's seventh-largest state, has the sixth-largest population. It is the world's largest producer of agricultural products. Tamil Nadu has major source of income is agriculture. Agriculture has a positive tone in this hypothetical planet. The Cauvery River is the primary source of water. The Cauvery delta areas are known as Tamil Nadu rice bowl. The main crop farmed in Tamil Nadu is rice. Other crops planted include paddy, sugarcane, cotton, coconut and peanuts. Bio-fertilizers are effectively manufactured. Several places farming is the most common source of income. Agriculture has a significant influence on a country's economy. Agriculture cultivation is deteriorating due to changes in natural elements. Agriculture is directly affected by environmental elements such as sunshine, humidity, soil type, rainfall, maximum and minimum temperatures, climate, fertilizers, and pesticides and so on. Knowledge of correct harvesting of crops is in demand to flourish in Agriculture. Farmers confront substantial challenges such as crop management, predicted crop yield and crop productive output. Farmers or cultivators want adequate crop cultivation assistances iceman young people are interested in agriculture these days. The impact of the IT industry on analyzing real-world problems is increasing. Data in the agricultural industry is growing by the day. The main crop farmed in Tamil Nadu is rice. Other crops planted include paddy, sugarcane, cotton, coconut and peanuts. Bio-fertilizers are effectively manufactured. Several places farming is the most common source of income. Agriculture has a significant influence on a country's economy. Agriculture cultivation is deteriorating due to changes in natural elements. Agriculture is directly affected by environmental elements

such as sunshine, humidity, soil type, rainfall, maximum and minimum temperatures, climate, fertilizers, and pesticides and so on. Knowledge of correct harvesting of crops is in demand to flourish in Agriculture. Farmers confront substantial challenges such as crop management, predicted crop yield and crop productive output. Farmers or cultivators want adequate crop cultivation assistances iceman young people are interested in agriculture these days. The impact of the IT industry on analyzing real-world problems is increasing. Data in the agricultural industry is growing by the day.

II. LITERATURE REVIEW

2.1 DATA MINING AND WIRELESS SENSOR NETWORK FOR AGRICULTURE PEST/DISEASE PREDICTIONS

In this study, A. K. Tripathi et al. claim that data-driven precision agricultural features, notably pest/disease control, need dynamic crop-weather data. An experiment was carried out in a semiarid environmentto better understand crop-weather-pest/disease relationships by utilizing wireless sensory and field-level surveillance data on the closely connected and interdependent pest (Trips) - disease (Bud Necrosis) dynamics of groundnutcrop. Data mining techniques were utilized to transform the data into valuable information/knowledge/relationships/trends, as well as the linkage of the crop-weather-pest/disease continuum. These dynamics, derived from data mining approaches and taught using mathematical models, were validated using surveillance data. Data from the Khari (monsoon) and Rabi (post-monsoon) seasons might be utilized to construct a real-time to near-real-time decision support system for pest/disease forecasts.

2.2 ANALYSING SOILDATA USING DATA MINING CLASSIFICATION TECHNIQUES

In this work, V. Rajeswar et al, suggest that soil is an important vital component in agriculture. The approach aims to forecast soil type using data mining classification algorithms. Methods/Analysis: Data mining classification algorithms such as JRip, J48, and Naive Bayes are used to forecast soil type. These classifier algorithms are used to extract knowledge from soil data, and two categories of soil are taken into account: red and black soil. Findings: This study summarizes Data Mining and agricultural Data Mining. The JRip model can give more accurate findings from this data, and the forecast's Kappa Statistics have been enhanced. Application/Improvement: To address Big Data challenges, effective solutions that use Data Mining to improve the accuracy of categorization of large soil data sets may be developed.

2.3 *THE IMPACT OF DATA ANALYTICS IN CROP MANAGEMENT BASED ON WEATHER CONDITIONS*

Agriculture, according to A. Swarupa Rani et al., is the most important application field, particularly in developing nations like India. Data mining is critical for making decisions on a variety of agricultural challenges. The purpose of data mining is to extract information from current data sets and turn it into a unique human-readable format for future usage. Crop management in a certain agricultural region is dependent on the region's climatic circumstances since climate has a large influence on

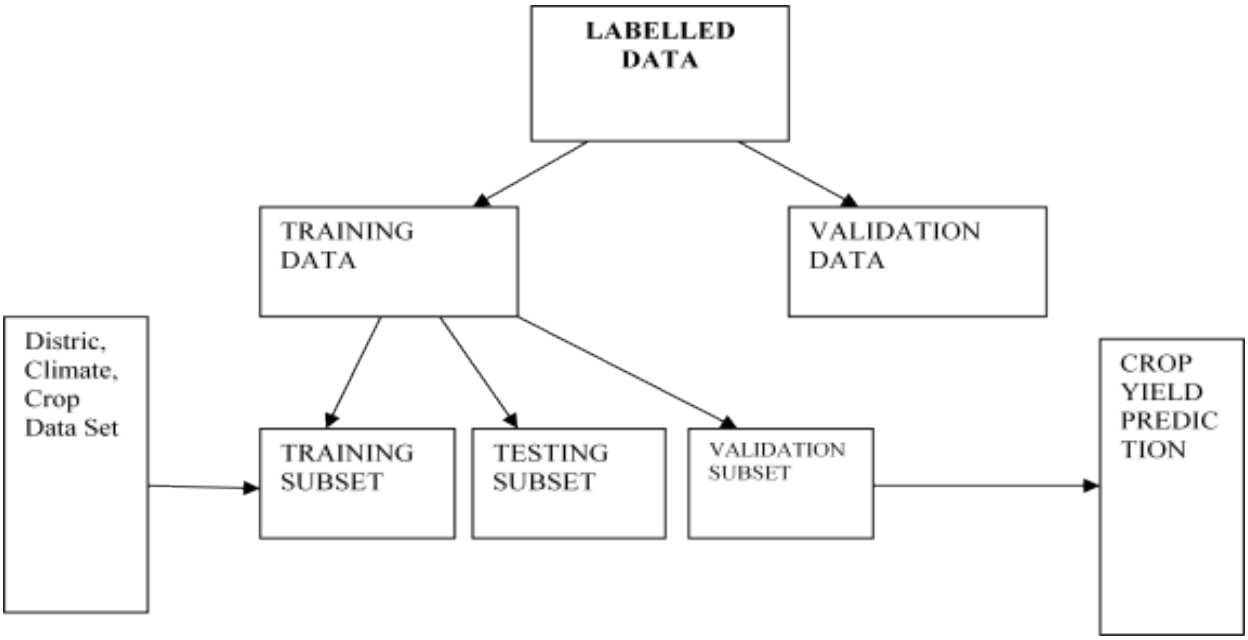
Crop yield. Real-time weather data can assist in optimal crop management. The use of information and communications technology allows for the automation of extracting significant data in an effort to obtain knowledge and trends, allowing for the elimination of manual tasks and easier data extraction directly from electronic sources, transfer to a secure electronic system of documentation, and reduction of production costs, higher yield, and higher market price. It was also discovered how data mining may be used to assess and anticipate beneficial patterns from massive amounts of constantly changing climate data.

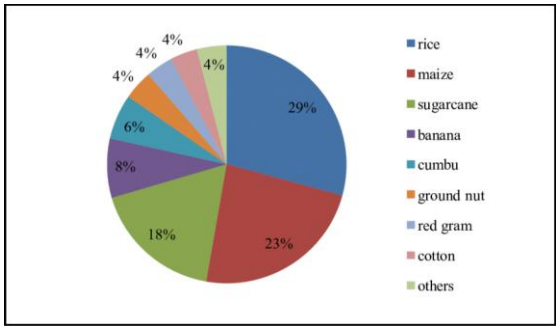
2.4 SPIKING NEURAL NETWORKS FOR CROP YIELD ESTIMATION BASED ONSPATIO TEMPORAL ANALYSISOF IMAGETIME SERIES

In this study, Pretax Bose et al. suggest this research introduces spiking neural networks (SNNs) for distant sensing patio temporal analysis of picture time series that take use of extremely parallel and low-power xeromorphic hardware platforms. The creation of the first SNN computational model for crop yield estimate using normalized difference vegetation index image time series in this study exemplifies this approach. It describes the construction and testing of a methodological framework that uses the spatial accumulation of time series of Moderate Resolution Imaging spectra radiometer 250-m resolution data and historical crop yield data to train an SNN to forecast crop yield in real time. Their search also includes an examination of the optimal amount of characteristics required to maximize the out comes from our experimental data set. The suggested method was used to estimate the production of winter wheat (Triticumaestivum. L) In Shandong province, one of China's primary winter wheat-growing regions.

III.*EXISITING SYSTEM*

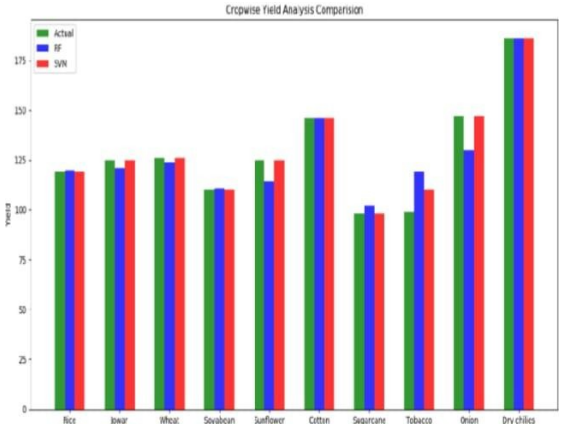
Farmers confront substantial challenge such as crop management, predicted crop yield, and crop productive output. Farmers or cultivators want adequate crop cultivation assistances increment young people are interested in agriculture these days. The impact of the IT industry on analyzing real-world problems is increasing. Data in the agricultural industry is growing by the day. With the growth of the Internet of Things, there are ways to capture massive amounts of data in the sector of agriculture. There is a need for a system that can clearly assess agricultural data and extract or use important information from the spreading data. It is necessary to understand and how to extract insights from data.





VI.*PROPOSED SYSTEM*

Machine Learning (ML) approaches are currently being employed in a variety of disciplines to provide practical and effective solutions. To forecast agricultural yield, multiple ML methods based on classification, clustering, and neural networks can be utilized. In this work, we propose a method based on K-Nearest Neighbors (KNN) algorithm which detects the weather quality and predicts the suitable crop for cultivation. Our system uses crop and meteorological data as inputs. In addition, our method suggests the fertilizer based on the crop predicted. The test results show that our method accurately predicts the crop selection and yield which helps the farmers to great extent. The value of crop management has been extensively researched. Farmers require modern technologies to help them raise their crops. Proper prognosis of crops may be conveyed to agriculturists in time basis. Machine Learning methods were utilized to assess agricultural parameters. Some of the strategies in different parts of agriculture are explored through a literature research. Blooming Neural networks, soft computing approaches plays key part in delivering suggestions. Farmers may be provided more specific and appropriate advice based on parameters such as productivity and season, allowing them to produce a higher volume of goods.



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