International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 07 | July - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

CROP YIELD PREDICTION BASED ON MACHINE LEARNING

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ABSTRACT

In order to find relevant information and draw recommendations, the data analysis process involves analyzing, cleaning, and modeling the data. India has a large population, hence it is important to protect the world's food supply despite climate fluctuations.Framers face serious problems in drought conditions.The agricultural output is significantly influenced by the kind of soil. Advising farmers to utilize fertilizers might assist them in making the best choice possible for their farming circumstances. There are several studies Information and Communication Technology (ICT) may be used for agricultural yield prediction. We can also anticipate the agricultural production by using data mining. We can advise the farmer to plant a better crop for a higher yield by thoroughly analyzing the prior data.

Information from traditional farmers is transferred to educated farmers through smart agriculture. to calculate estimates of overall physical production functions for the yields of various crops in a given condition, taking into account a newly designed weather index as an input.To adequately compare our actual result, also known as the target, with the prediction model, which provides farmers with the analysis of rice production based on available data, regression and coefficient of determination analysis as well as average error rate were conducted.

To increase crop production, several data mining approaches were employed to estimate the crop output. For operational projects, it is crucial to accurately and promptly evaluate the state of agricultural crops and predict possible crop yields. The goal of this study is to employ a variety of forecasting techniques to assess agricultural yield estimations in Ghana due to the significance of crop yield prediction. Crop yield prediction, which offers information to decision-makers.

INTRODUCTION

The first and most important industry for the growth of Indian riches is agriculture. In terms of agricultural output, India comes in second. Numerous factors, including climatic, geographic, biological, political, and economic factors, have an impact on the production of plant crops. It can be difficult for farmers to grow a variety of crops, especially if they are ignorant of market prices. In recent years, there has been a need to use technology to spread knowledge of farming. Food insecurity is a result of seasonal climate changes that work against vital resources including soil, water, and air. A smart system that can solve the problem of diminishing crop yield is required in one scenario where agricultural production rates are continuously falling short of meeting demand. As a result, to address this

In order to aid locals and deal with these problems, our goal is to provide assistance tools, such as support for farmers in particular. Generally speaking, people have trouble accessing and believing in promotional efforts that go along with training for teachers on how to increase agricultural output and strengthen financial position. Due to the seriousness of some of the issues currently in the foreground and widespread reluctance to rely on the assistance of the community, any resources and products related to assistance should be carefully chosen, designed, and evaluated. This will help to ensure positive outcomes and successful adoption. There is no software program in existence that makes recommendations based on several features of crops, including the nature of the ground and various meteorological factors like temperature and rainfall. Moreover, there are existing hardware-based programs that run enabling.

There is no software solution at all that suggests relying on several factors, such as the kind of ground and meteorological factors like climate and precipitation. Furthermore, the hardware foundation of the existing equipment makes it expensive and challenging to maintain.
The suggested method recommends a mobile application that, by accurately estimating the yield, may help farmers decide what to plant that will be most profitable. GPS is used to help determine the user's position, and the user is asked for feedback on the soil type and area. A database of soil and meteorological data is used to identify the harvest output in each place according to user location. The outcome is sent to the user's application upon completion of the processing at the server side. already produced.

LITERATURE SURVEY

Forecasting crop growth is an important aspect of the agribusiness and is mostly based on factors like soil, natural features like precipitation and temperature, and the amount of compost used, particularly nitrogen and phosphorus.

However, because these factors differ from one location to another, ranchers are unable to establish comparison yields for each region. Agricultural planning must always take development needs into account.

The MRFE is a creative approach that has been developed for selecting ineligible features in this study. It uses a positioning strategy and a change crop informative gathering to determine the highest reasonable yield for a given location.

According to the literature, the key aspect taken into account when recommending crops is soil type. Few studies have made extensive use of criteria.

Current systems don't discuss metrics reporting, nor do they apply machine learning or deep learning concepts.
We are unable to determine a crop's price and profit using the current technique.

The existing research reveals that the design of the crop recommendation system is only applied to certain crops or specific geographic regions.
The yield is estimated based on farmers' historical experiences, but the weather might change dramatically.

To potentially replace the updateable supervised machine learning classification models, a machine learning model for crop yield prediction, fertilizer recommendation, and market price prediction is being developed. This model will compare supervised algorithms to predict results with the highest degree of accuracy.

Methodology is the specific procedures or techniques used to identify, select, process, and analyze information about a topic. In a research paper, the methodology section allows the reader to critically evaluate a study's overall validity and reliability.
Implementing the live price prediction system. So that the result obtained will be in dynamic and will vary according to the day to day scenarios.
Machine learning (ML)-based agricultural yield prediction systems often have a number of parts and processes. Here is a general description of a system for predicting agricultural yield using machine learning:

Collect pertinent data from the appropriate sources to forecast crop yields. This can contain information about previous crop yields, meteorological data (such as temperature, rainfall, humidity, etc.), soil data (such as nutrient levels, pH, moisture content, etc.), satellite images, and any other pertinent data.

Our goal is to pressure the government to assist ranchers using our expectations. The vast majority of distributors claim they have outperformed their competitors, yet there are no articles or other public notices that their work is just being used to benefit farmers.

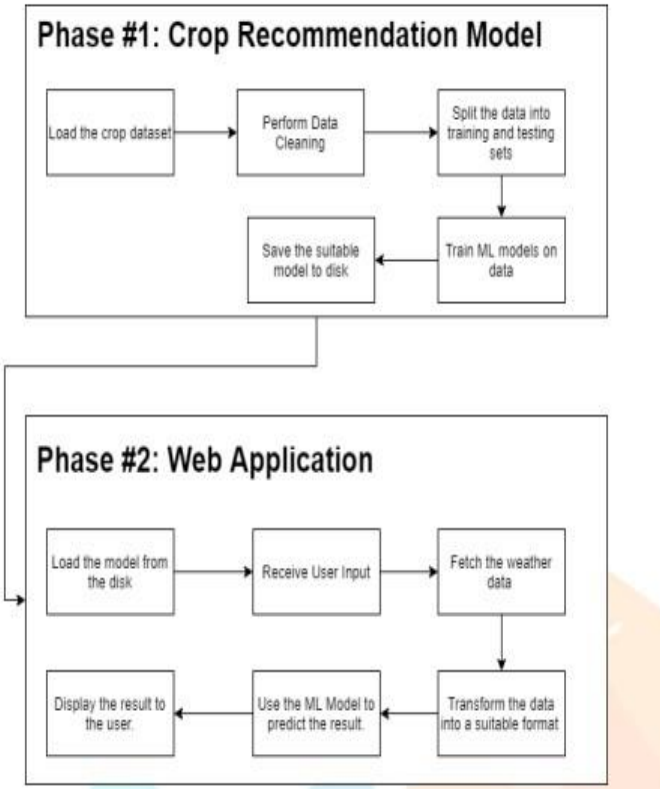
The key benefit of the suggested approach is the use of machine learning to determine the crop's price.

Farmers may use it to predict crop earnings and decide how much fertilizer to use while cultivating their crops.

The project's main objective is to generate the maximum crop with the least amount of input.

By utilizing early issue management and detection approaches, farmers may boost crop output.

ARCHITECTURE



RESULT

Our goal is to pressure the government to assist ranchers using our expectations. The vast majority of distributors claim they have outperformed their competitors, yet there are no articles or other public notices that their work is just being used to benefit farmers.
In agriculture, predicting crop yields is a crucial undertaking, and several methods have been employed to do it. Here are several popular approaches and their outcomes for predicting crop yields:

Crop yields have been predicted using statistical models such as time series analysis, multiple linear regression, and linear regression. As input factors for these models, historical yield data, meteorological variables (such as temperature and rainfall), soil properties, and management techniques are taken into account. Statistical models' output might vary depending on the quality and accessibility of the data, but when they are trained on pertinent and precise datasets, they can produce predictions that are realistic.

Models for Simulating Crop Production: Models for Simulating Crop Production, such as the Agricultural Production Systems Simulator (APSIM) and the Decision Support System for Nanotechnology Transfer (DSSAT), simulate crop production.
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Decision trees, random forests, support vector machines (SVM), and neural networks are a few examples of machine learning (ML) models that have been used to forecast agricultural yield. These models are capable of capturing intricate correlations between input variables and historical data patterns and linkages. Multiple elements, including meteorological information, satellite imaging, soil characteristics, and management techniques, may be included into ML models. The quality of the data, the choice of features, the model's architecture, and the environment in which it is used all affect how well ML models forecast crop yields. ML models have demonstrated promising outcomes, frequently beating conventional statistical models.

CONCLUSION

Our goal is to pressure the government to assist ranchers using our expectations. The vast majority of distributors claim they have outperformed their competitors, yet there are no articles or other public notices that their work is just being used to benefit farmers.
The crop recommendation system makes crop suggestions to the user based on historical data as well as current geographic and meteorological conditions. Depending on the input, a certain crop may be advised. One classifier algorithm and one association rule are now used by the suggested

recommender model, which would increase productivity and profit, to help farmers choose the best crop for their particular agricultural region.

This implementation considers qualities and the approach over suggestion, and the course of action may be enhanced with new classifier algorithms.
There are several limitations to the technique, similar to how a farmer cannot accurately locate their location using latitude and longitude in reality. Selecting their state and district.
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The research attempts to predict the price and return of the specified crop before it is sown. The user interface of this online application is typically user-friendly and it makes use of efficient machine learning technologies and algorithms. For predicting the appropriate price and demand in the marketplaces, the acquired training datasets provide enough data. Consequently, the method helps farmers alleviate their issues and stops them from attempting suicide.

FUTURE ENHANCEMENT

Our goal is to pressure the government to assist ranchers using our expectations. The vast majority of distributors claim they have outperformed their competitors, yet there are no articles or other public notices that their work is just being used to benefit farmers.
We want to deploy our program in as many places as we can (using a GPS module) in order to further increase accuracy and probability, and we want to extract the dataset particular to those sites.
Adding chat portals would make the application more user-friendly and provide another opportunity for enhancement.
As a result, by ensuring that the information is available in most situations and by generating more precise projections, the possibility of the Farmers making a profit is raised.Our goal is to pressure the government to assist ranchers using our expectations. The vast majority of distributors claim they have outperformed their competitors, yet there are no articles or other public notices that their work is just being used to benefit farmers.

Enhancing crop yields is essential for guaranteeing food security and the sustainability of agriculture. Here are some upcoming improvements that might increase agricultural yield:

Precision agricultural: Crop management practices may be improved at a finer scale using precision agricultural tools including remote sensing, GPS-guided equipment, and variable rate technologies. Application of inputs like fertilizer, water, and pesticides may be accurate and targeted with the integration of real-time data on soil conditions, weather patterns, crop health, and nutritional requirements. Precision agricultural developments can assist to enhance crop yields, decrease environmental impact, and optimize resource use.

Climate-Smart Agriculture: Agriculture faces several difficulties as a result of climate change. Future improvements have to concentrate on creating climate-smart agriculture methods that can withstand shifting climatic circumstances. This involves the use of crops that can withstand heat or drought.
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It is significant to stress that potential future improvements call for multidisciplinary cooperation, involving researchers, farmers, politicians, and industrial partners. In order to promote these developments and tackle the difficult problems involved in developing sustainable and high-yielding agricultural systems, it is crucial to keep funding research, technological innovation, and information exchange.

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