International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 06 | June - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

AUTOMATED SYSTEM FOR SEED RECOMMENDATION FOREFFICIENT FARMING

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***Abstract*:** The agricultural sector faces numerous challenges, including the need to make timely and efficient decisions in the face of a complex array of environmental factors. To help farmers make informed decisions about the types of seeds to purchase based on a variety of factors, a project could be developed that leverages data analysis and machine learning algorithms to provide farmers with personalized recommendations. The project would begin by collecting data on a variety of factors, including the season, Kharif, soil conditions, climate conditions, and budget. This data could be gathered through a variety of sources, including weather stations, soil sensors, and farmer surveys. Once the data has been collected, it would be fed into a machine learning algorithm that would use predictive analytics to generate recommendations for farmers. The algorithm would be trained on a large dataset of historical data, including information on seed varieties, weather patterns, and soil conditions. Using this data, the algorithm would be able to identify patterns and make predictions about the types of seeds that are most likely to perform well under specific conditions.. Overall, this project has the potential to significantly improve the efficiency and productivity of the agricultural sector by providing farmers with the information they need to make informed decisions about seed purchases. By leveraging machine learning and predictive analytics, the project could help farmers achieve better crop yields, improve sustainability, and increase profitability.

I. INTRODUCTION

A farmer's decision about which crop to grow is generally clouded by his intuition and other irrelevant factors like making instant profits, lack of awareness about market demand, overestimating a soil's potential to support a particular crop, and so on. A very misguided decision on the part of the farmer could place a significant strain on his family's financial condition. Perhaps this could be one of the many reasons contributing to the countless suicide cases of farmers that we hear from media on a daily basis. In a country like India, where agriculture and related sector contributes to approximately 20.4 per cent of its) , such an erroneous judgment would have negative implications on not just the farmer's family, but the entire economy of a region. For this reason,we have identified a farmer's dilemma about which crop to grow during a particular season, as a very grave one. The need of the hour is to design a system that could provide predictive insights to the Indian farmers, thereby helping them make an informed decision about which crop to grow. With this in mind, we propose a system, an intelligent system that would consider environmental parameters (temperature, rainfall, geographical location in terms of state) and soil characteristics (pH value, soil type and nutrients concentration) before recommending the most suitable crop to the user.

II. PROBLEM STATEMENT

. Failure of farmers to decide on the best suited crop for his land using traditional and non-scientific methods is a serious issue for a country where approximately 50 percent of the population is involved in farming. Both availability and accessibility of correct and up to date information hinders potential researchers from working on developing country case studies .With resources within our reach we have proposed a system which can address this problem by providing predictive insights on crop sustainability and recommendations based on machine learning models trained considering essential environmental and economic parameters.

III. LITERATURE SURVEY

In this literature review of this project, the team sought out and studied various patents, research papers, documents, and newspapers and magazine articles from various scenes. The paper [1] states requirements and why they tend to move into precision agriculture [2] which is due to globalization are discussed. Precision agriculture is site-specific farming. Though Precision agriculture has shown an improvement with time, there exist some issues. As mentioned above site- specific methods of such systems are needed to be supervised to get an improved result. Only a few of the outcomes are provided a particular result. Nevertheless, the situation is farming is indispensable since if any default or a mistake occurs, it might lead to serious damage to resources and as well as the plants. In this research, it is proposing a system where the major factors are taken into consideration at the same time and come up with a solution so that the system will not be complicated for the user. As mentioned above in the sentence, the major factors taken into consideration at once is unlike other models proposed in previous researchers, this

system considers all the major factors which are essential for plant growth, are processed together using various algorithms whereas the other models consider only parameters at once keeping the other factors constant.
As an example, some tests are carried out to find the rate evaporation and how the plant growth is affected when there's no sufficient water present. And a derived equation is presented as a result [3]

ETo = K pan × E pan

ETo: reference crop evapotranspiration Kpan: pan coefficient E

pan: pan evaporation

Even though an equation is proposed, there are some limitations [4]. Mainly this could be done only for a land with a less area. This is not suitable for commercialization as the profit will be low when you use less area for cultivation. The second limitation is the average rainfall of Sri Lanka mostly suitable for many crop types to grow without any deficiency. Therefore, the water level alone itself is not a big issue environmental factors have a mutual relationship with each other in plant growth. The ultimate goal of the previous researches is also to predict the best crop type. But once the farmer or user has cultivated

IV. REQUIRED TOOLS

Software System Requirements:

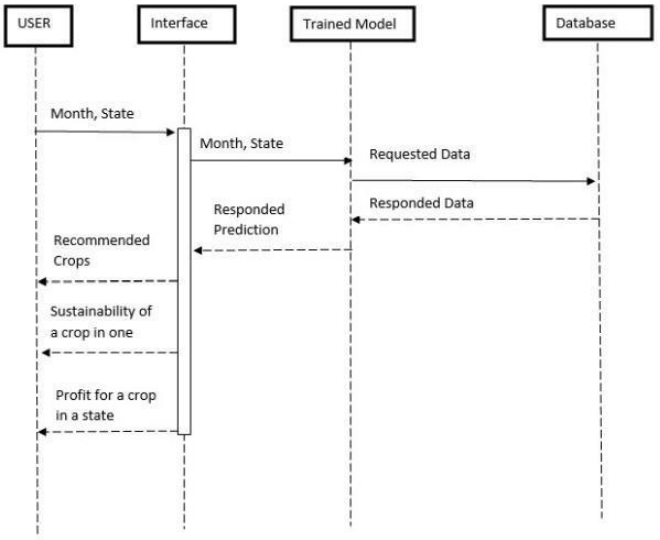
- Operating System: Windows XP/7/8/8.1/10, Linux and Mac
- Coding Language: Python
- Tools:

1. Pandas
2. NumPy
3. TensorFlow
4. Keras
5. Sickitlearn

V. METHODOLOGY

System Development methodology is the the development of a system or method for a unique situation. Having a proper methodology helps us in bridging the gap between the problem statement and turning it into a feasible solution. It is usually marked by converting the System Requirements Specifications (SRS) into a real world solution. System design takes the following inputs: • Statement of work. • Requirement determination plan. • Current situation analysis. • Proposed system requirements including a conceptual data model and metadata (data about data)

SEQUENCE DIAGRAM:
A sequence diagram shows object interactions. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.



. Fig:-Sequence Diagram

VI. EXPERIMENT RESULTS

Fig-Home screen

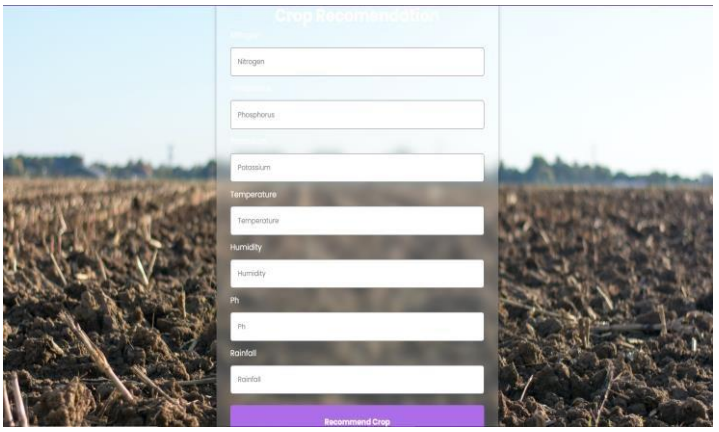


Fig:- Crop recommendation page where we have to give the mentioned details for the crop to be recommended

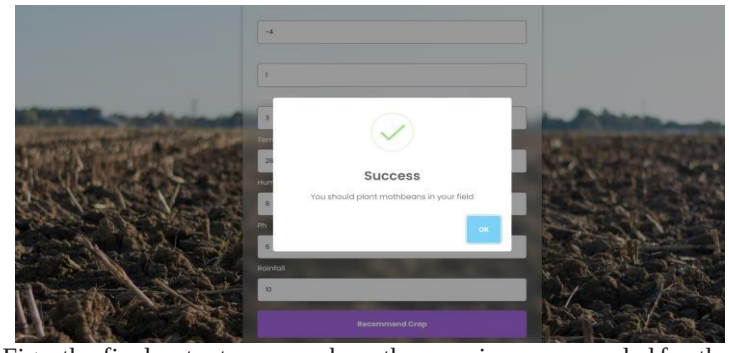


Fig:- the final output screen where the crop is recommended for the given values

Here we can see that moth beans crop is recommended for the given values

VII. ARCHITECTURE DIAGRAM FOR PROPOSED METHOD

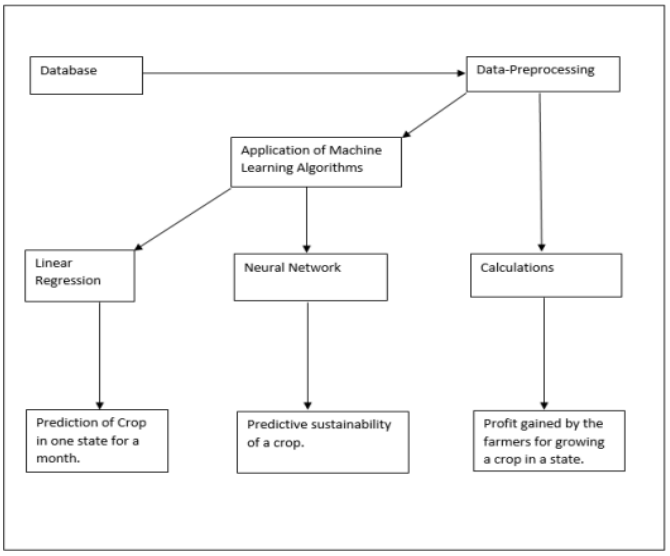


Fig: System Architecture

VIII. CONCLUSION:

This system helps the farmer to choose the right crop by providing insights that ordinary farmers don't keep track of thereby decreasing the chances of crop failure and increasing productivity. It also prevents them form incurring losses. The system can be extended to the web and can be accessed by millionsof farmers across the country.We could achieve an accuracy of 89.88 percent from the neural network andan accuracy of 88.26 percent from the linear regression model

IX. Future Enhancement:

Further development is to integrate the crop recommendation system with another subsystem, yieldpredictor that would also provide the farmer an estimate of production if he plantsthe recommended crop.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany a successful completion of any task would be incomplete without the mention of people who made it possible. Success is the epitome of hard work and perseverance, but steadfast of all is encouraging guidance.So, it is with gratitude that we acknowledge all those whose guidance and encouragement served as beacon of light and crowned our effort with success.We would like to thank Dr.VSK Reddy, Vice Chancellor, MRUH, Hyderabad for providing an excellent academic environment in the college and her never-ending support for the program.We would like to express our gratitude towards Dr. Thayyaba Khatoon, Professor and HOD, Department of Artificial Intelligence & Machine Learning, MRUH, Hyderabad,who provided guidance and gave valuable suggestions regarding the project.We consider it a privilege and honour to express our sincere gratitude to our internalguide Sanjay Kumar J. H , Asst.
Professor, Department of Artificial Intelligence & Machine Learning, , MRUH , Hyderabad, for his valuable guidance throughout the tenure of this project work.We would like to thank all the faculty members who have always been very cooperative and generous. Conclusively, we also thank all the nonteaching staff and all others who have done immense help directly or indirectly during our project.

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