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Yield Predict: A Crop Yield Prediction Framework for Smart Farms

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Abstract: *In today's world the most important thing for living in the Indian economy is agriculture.In recent years, machine learning approaches are gaining popularity with the advent of big data. Adoption of these approaches in the agricultural sector has immense potential to increase crop productivity and quality. As we know, India's economy primarily depends on agriculture. For successful production of crop we must ensure whether a particular crop will yield in particular soil and weather condition Machine learning (ML) plays a significant role as it has decision support tool for Crop Yield Prediction (CYP) including supporting decisions on what crops to grow and what to do during the growing season of the crops. This script makes novel by the usage of simple parameters like State, district, season area and the user can predict the yield of the crop in which year he or she wants to.*

Keywords: A Crop Yield Prediction Framework for Smart Farms.

I. INTRODUCTION

It is an agricultural practice that can help farmers and farming businesses predict crop yield in a particular season when to plant a crop, and when to harvest for better crop yield. Predictive analytics is a powerful tool that can help to improve decision-making in the agriculture industry. It can be used for crop yield prediction, risk mitigation, reducing the cost of fertilizers, etc. In our research, which we found in the previous research papers is that everyone uses climatic factors like rainfall, sunlight and agricultural factors like soil type, nutrients possessed by the soil (Nitrogen, Potassium, etc.) but the problem is we need to gather the data and then a third party does this prediction and then it is explained to the farmer and this takes a lot of effort for the farmer and he doesn't understand the science behind these factors. To make it simple and which can be directly used by the farmer this paper uses simple factors like which state and district is the farmer from, which crop and in what season as in (Kharif, Rabi, etc.).Crop yield prediction is an essential predictive analytics technique in the agriculture industry

II. FUNCTION REQUIREMENT

The Functional Requirements Definition reports and tracks the fundamental information expected to effectively portray business and handy necessities. The Functional Requirements Definition report is created within the midst of the design Phase of the endever. Its objective gathering is that the endever boss, errand gathering, wander bolster, client/customer, and any accomplice whose information/respect into the necessities definitions system is required.To implement machine learning for crop yield prediction. A large dataset of crop yield data is required. This data should include information about the crop, such as the type of crop, the location, and the date of planting.

III. NONFUNCTION REQUIREMENT

Non-Functional Requirement (NFR) specifies the quality attribute of a software system. They judge the software system based on Responsiveness, Usability, Security, Portability and other non-functional standards that are critical to the success of the software system. Failing to meet non-functional requirements can result in systems that fail to satisfy user needs.

IV. HARDWARE REQUIREMENTS

Hardware specifications are technical descriptions of the computer's components and capabilities. Processor speed, modeland manufacturer. Processor speed is usually indicated in gigahertz (GHz). the upper the quantity, the faster the

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pc. Random Access Memory (RAM). this is often typically indicated in gigabytes (GB). The more RAM in an exceedingly computer themore it can do simultaneously. fixed disk (sometimes called ROM) space. this is often typically indicated in gigabytes (GB).
Processor Intel Pentium/Core – 1.7GHz and above
Memory 1GB and above
Storage 80GB minimum fee space
Graphics 1GB

V. SOFTWARE REQUIREMENTS

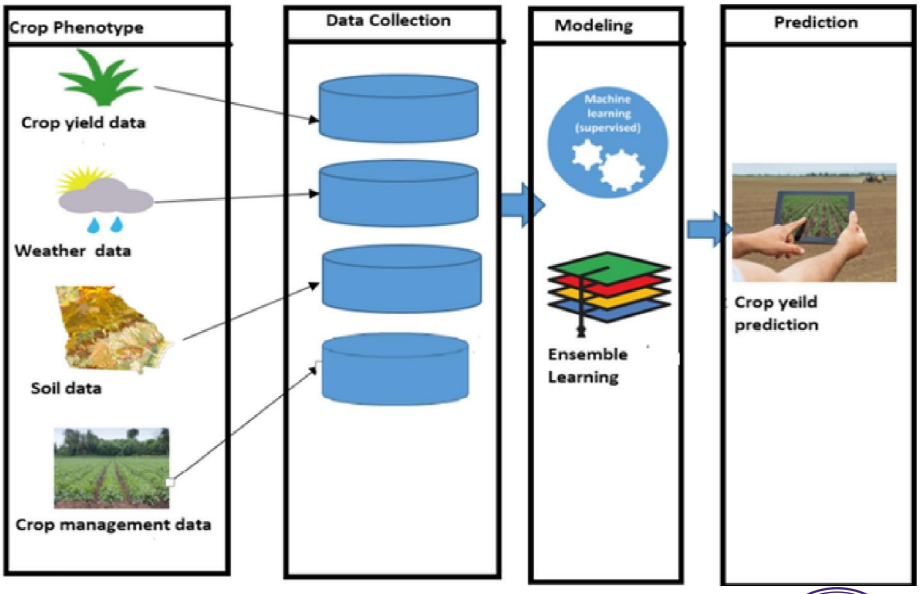
Operating System - Windows 7,8,10
Programming Language - Python
Framework –Pycharm

VI. LITERATURE SERVEY

Agriculture is a major source of livelihood in India and Indian farmers put in their heart and soul to feed people. Farmers deal with crops, fertilizers, pests and pesticides. Hence, Irri great aims to serve Indian farmers via all three modules of Crop Recommendation, Fertilizer Recommendation and Pesticide Recommendation.
Crop recommendation has been an area which is explored a lot, but all of the systems vary based on parameters that are fed into the ML model. Most of the ML models use Random Forest, some use Decision Tree, while others use Ensemble methods via Majority Voting Mechanism. Fertilizer Recommendation does not work much in AI.
Main reason can be disintegrated data, but Irri great collected all the data from various sources and integrated it to have a well-formed dataset. A dictionary-based solution is implemented in Irri great. Thirdly, Pesticide Recommendation is not at all touched area, researchers have just restricted it to Pest Detection only, but The project extends the idea of identification of pest, along with a dictionary-based solution for the corresponding pesticide, available in India.

VII. PROPOSED SYSTEM

In our proposed system we are building a system which can help farmers to get best crops. System give output after analyzing all necessary attribute like rain, soil condition, temperature, cost, market value, etc. proposes the use of data mining techniques to provide result to farmers for recommendation of best crops. We are developing a system that will improve the usability by providing services for crop disease detection as well along with its information, providing crop yield prediction, selecting the best crop for a region. The recommendations here will be based primarily on user location and on multiple factors like humidity, water availability, weather status, soil condition, acidity of soil, etc.



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It also focuses on farmers should be able to identify crop diagnosis by sending image through app. Also the farmer by using our project will get information easily even though he is an amateur at using technology.Thus the farmer gets maximum profit and knowledge which in turn reduces digital divide

VIII. CONCLUSION

Agriculture plays an important role in the economic development of a country. In India, rural population primarily depend on agriculture as their primary source of livelihood. In this paper, we describe our YieldPredict framework which provide farmers with insights that can further help them in decision making and agricultural planning to maximize their crop production. We link an existing smart farm ontology with the pre-processed crop data that consists of soil attributes, area, production and seasonal rainfall of the crop. The reason for choosing these attributes is that the data can be acquired easily when compared to remote sensing data, crop genotype data, or vegetation index which is not very easy to obtain. We populate a knowledge graph from the linked data set. The knowledge graph can further be queried with the help of SPARQL to generate an input data set for the machine learning models. Finally, we have trained ten different machine learning algorithms to predict the crop yield and evaluated them by comparing their predictive accuracy

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