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The Precision Agriculture Using Artificial Intelligence

Dr. C. K. Gomathy[1], Majjari Pedda Chandrasekhar[2], Kalavakuri Mallikarjun[3]
[1]*Assistant Professor,* [2,3]*UG Scholar, Dept. of CSE, SCSVMV (Deemed to be university), Kanchipuram, TamilNadu*

Abstract: ***Agriculture has been the sector of paramount importance as it feeds the country's population along with contributing to the GDP. Crop yield varies with a combination of factors including soil properties, climate, elevation and irrigation technique. Technological developments have fallen short in estimating the yield based on this joint dependence of the said factors. Hence, in this project a data-driven model that learns by historic soil as well as rainfall data to analyse and predict crop yield over seasons in several districts, has been developed. For this study, a particular crop, Rice, is considered. The designed hybrid neural network model identifies optimal combinations of soil parameters and blends it with the rainfall pattern in a selected region to evolve the expected crop yield. The backbone for the predictive analysis model with respect to the rainfall is based on the Time-Series approach in Supervised Learning. The technology used for the final prediction of the crop yield is again a branch of Machine Learning, known as Recurrent Neural Networks. With two inter-communicating data-driven models working at the backend, the final predictions obtained were successful in depicting the interdependence between soil parameters for yield and weather attributes.***

Keywords: Precision agriculture, Artificial intelligence, Crop management, Solutions, Yield, Soil management

I. INTRODUCTION

Agriculture is the backbone of Indian economy. The yield obtained primarily depends on weather conditions as rainfall patterns largely influence cultivation methodologies. With this context, farmers and agriculturalists require spontaneous advice proposition in predicting future reaping instances to maximize crop yield. Due to insufficient involvement of technology, the throughput of agriculture is yet to reach its full glory. Every farmer is interested in knowing the yield he/she could expect at the harvest period and hence, yield prediction is an important aspect for them. Over the years, farmers have an idea about the pattern in yield as per innate human intuition. However, rainfall as a major driver for crop raising can extensively rattle intuitive yield prediction by controlling some of the soil and environmental parameters related to the crop growth.

II. EXISTING STATUS

The yield obtained primarily depends on weather conditions as rainfall patterns largely influence cultivation methodologies. With this context, farmers and agriculturalists require spontaneous advice proposition in predicting future reaping instances to maximize crop yield. Due to insufficient involvement of technology, the throughput of agriculture is yet to reach its full glory. Every farmer is interested in knowing the yield he/she could expect at the harvest period and hence, yield prediction is an important aspect for them. Over the years, farmers have an idea about the pattern in yield as per innate human intuition.

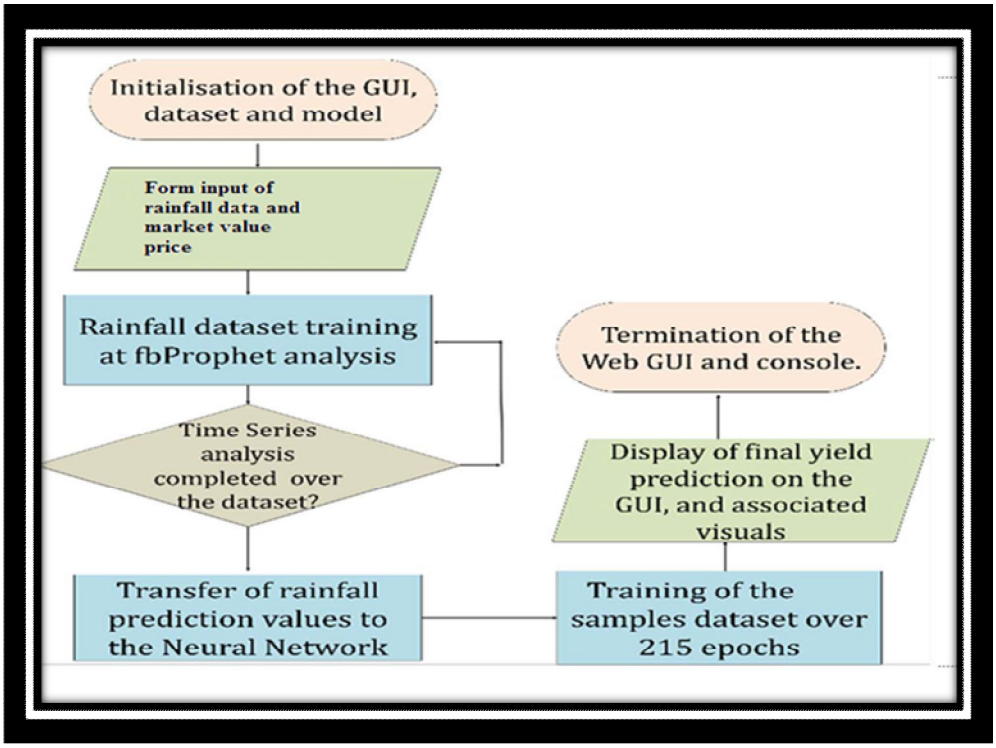
III. PROPOSED SYSTEM

The proposed architecture provides a computational dimension to enhance knowledge about the yield before the crop sowing period. It is made possible through a data driven hybrid model. Since the model performs a joint prediction of both rainfall and soil features on the yield, it is termed as a hybrid model. Around 23 commodities (including all kind of crops) crop value forecasting Crop detailed forecast upto next 12 months Top Gainers and Losers of current time Crop price prediction with 93-95% accuracy Model trained on authenticated datasets provided by data.gov.in

IV. IMPLEMENTATION

First we will get all the required datasets of crops. Next we will train on authenticated datasets from kaggle.com. Now by using Sklearn we will build trained dataset and after that data will be spitted according to the crops. Now to build the model we use Decision Tree – Regression. With help of model we build a web interface using flask from in python and forecast the results like top gainers and top losers of the commodities and showcase the six months forecast. Even for Improve better and complex solution we can further design analysis of each and every commodity. Crop yield prediction is an essential task for the decision-makers at national and regional levels (e.g., the EU level) for rapid decision-making. An accurate crop yield prediction model can help farmers to decide on what to grow and when to grow. There are different approaches to crop yield prediction.

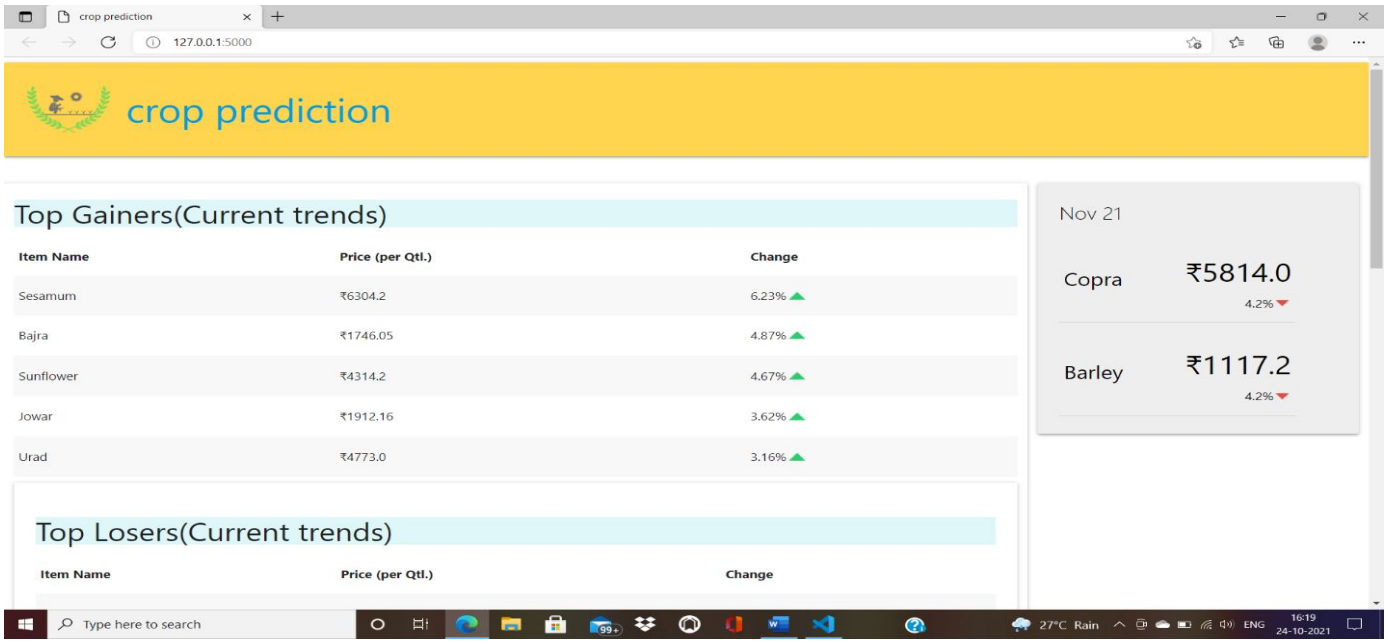
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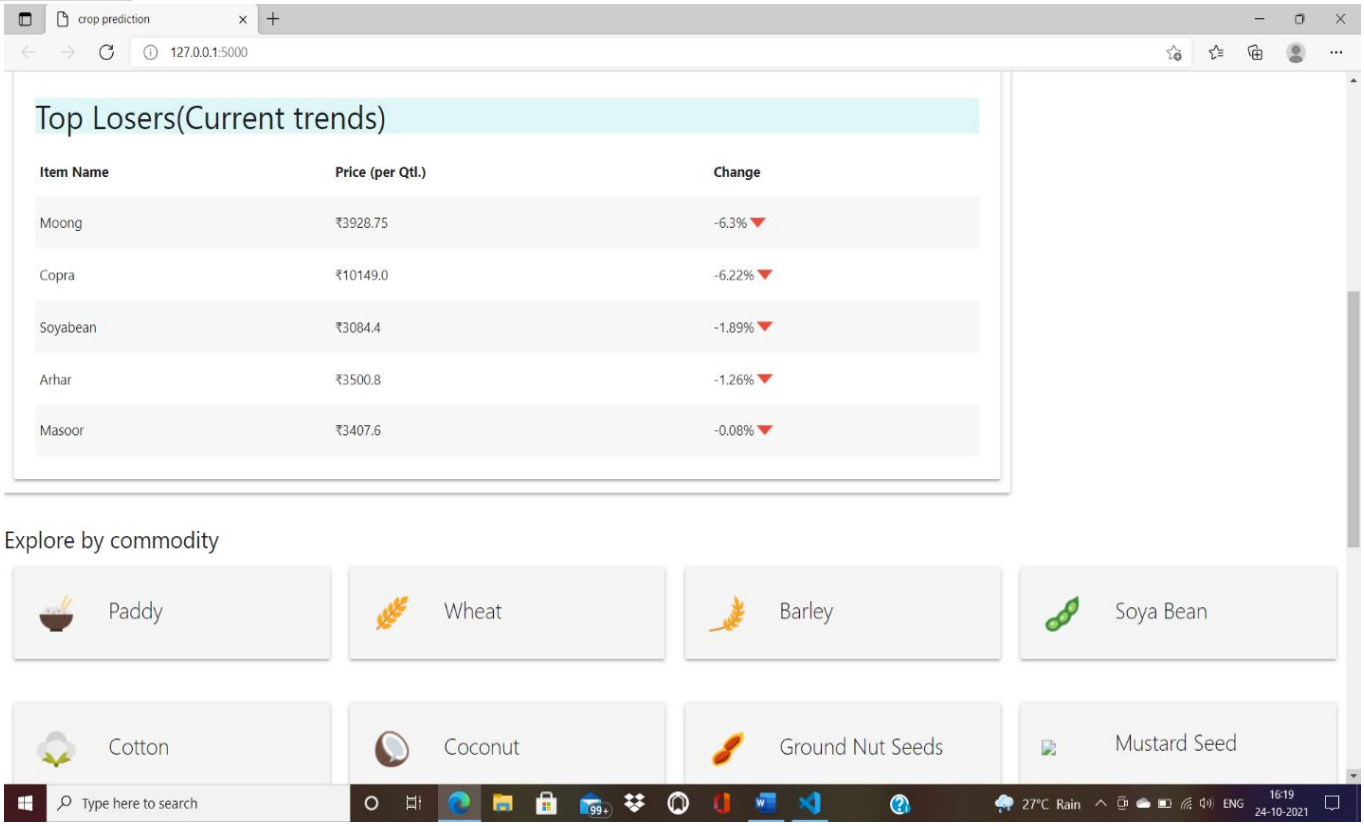
The initialization of GUI and data set and model of crop prediction. In this project with the help of machine learning algorithms with analysis of neural networks we build a artificial application model for farmers which help them to predict the which crop is better and what would be appropriate price for the crop based on the prediction model by using some previous datasets with input fields like rainfall months and whole price index.

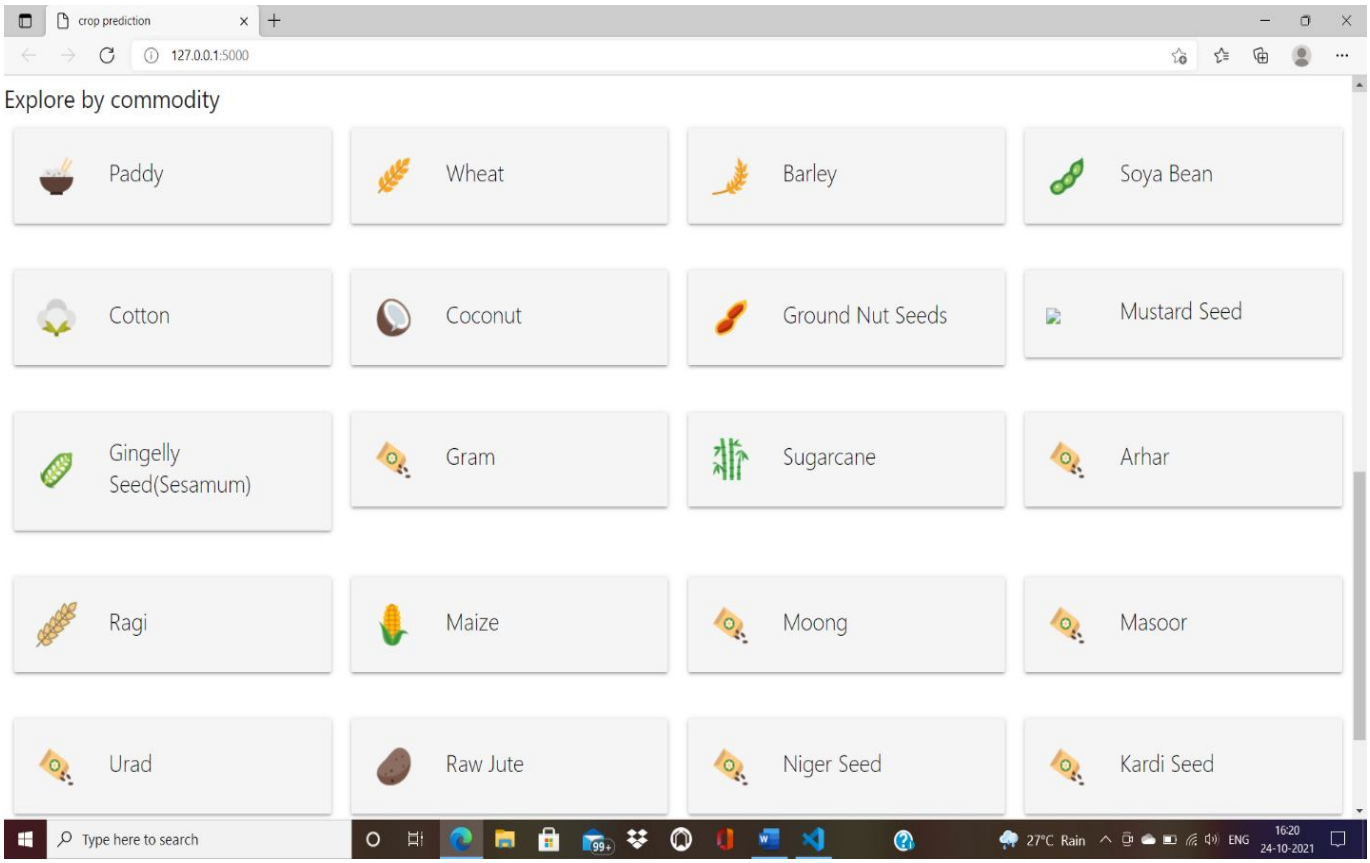
V. RESULTS

A Yield prediction of are the top gainers and top losers of the month/year. In this we can predict up to 12 crops prices from year to year. It shows how the crop prices increase/decrease from last year and to next year.

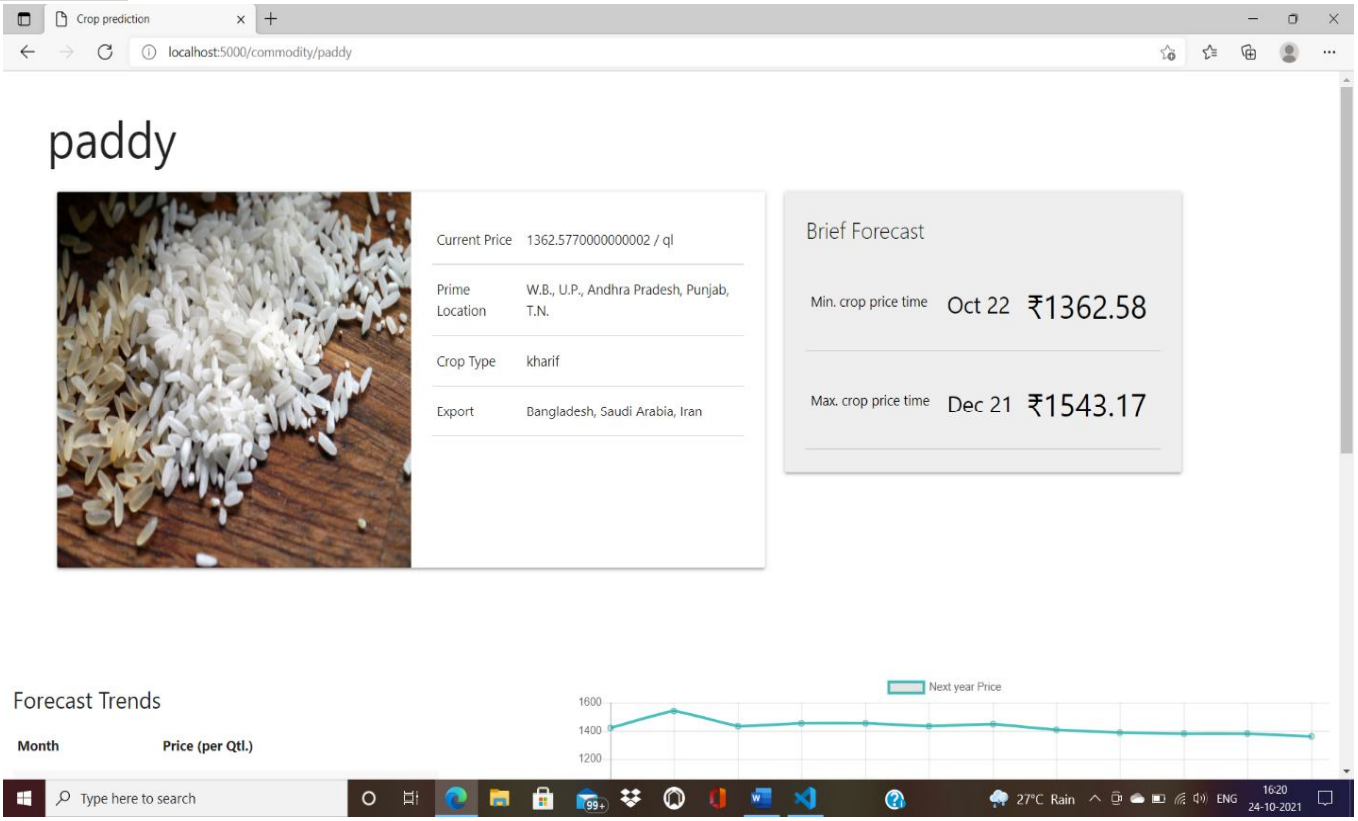


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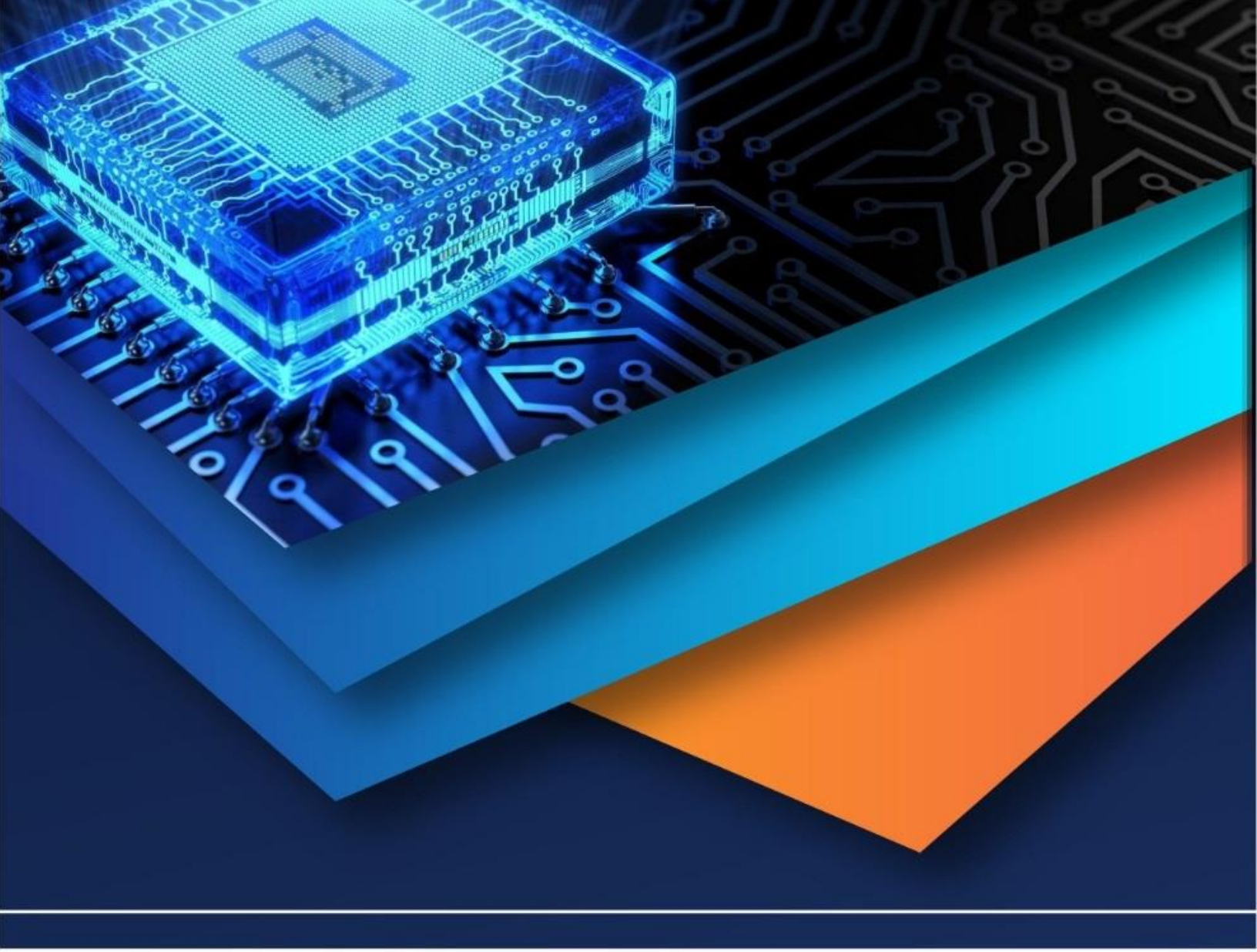
VI. CONCLUSION

The early adopters of AI and other emerging technologies will have a significant advantage in farming. It will help farmers with an increased farm output, better wealth, and most importantly, it will make Precision Agriculture and sustainable farming a reality benefitting the whole mankind.The algorithm developed introduces a data driven model to predict and forecast crop yield using joint dependencies of soil and climate features. Although there are several techniques existing to obtain rainfall predictions .the algorithm discussed in this paper succeeded in emphasising on Rainfall along with the crop yield prediction.

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