

Crop Growth Adviser for Farmers

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Abstract

This project presents a study on crop growth simulation and advisory support using a crop prediction dataset. The dataset used for this work was exported from a public Kaggle dataset. Machine learning models were applied to predict growth patterns. XGBoost was tested first but Random Forest produced more dependable results. A simple interface using Tkinter along with Pathlab and Longin was developed. The study shows that machine learning can help farmers make informed decisions.

Keywords: crop growth, simulation, random forest, agriculture, advisory system

1. Introduction

Agriculture depends on understanding how plants react to soil and weather. Machine learning offers new ways to create predictions for farming decisions. This project uses a Kaggle dataset to build a crop growth adviser. The dataset includes temperature, moisture and nutrient values. The main challenge is selecting a model that gives stable predictions.

2. Literature Review

Previous studies show strong interest in machine learning for agriculture. Decision tree based models like Random Forest often perform well due to their ability to handle varied data. Our study follows this direction using a Kaggle dataset containing structured records.

3. Proposed Methodology

The methodology includes data preparation, model testing and simulation. The Kaggle dataset was cleaned and converted into numerical features. XGBoost was tested first but Random Forest produced more stable behaviour for simulation.

4. Experimental Setup

The experiment used a Kaggle dataset containing environmental attributes. Tools used were Python, Tkinter, Pathlab, Longin and Random Forest. Random Forest performed better in accuracy and consistency compared to XGBoost.

5. Results and Discussion

Random Forest produced reliable output and smoother growth patterns. Extreme conditions affected accuracy which suggests that more diverse data may improve predictions. The adviser interface allows users to test conditions and observe predicted growth behaviour.

6. Conclusion

The project successfully created a crop growth adviser using Random Forest. The Kaggle dataset supported strong prediction results. Machine learning can help farmers understand plant behaviour and improve decision making. Future work includes larger datasets and real time sensor data.