

Semester Project-III

Abstract-I

Project Title: A machine learning based support system for predictive agriculture and resource optimization

Domain / Technology: Machine Learning, Data Analytics, Agriculture Technology

Application: Intelligent crop prediction, fertilizer recommendation, yield and rainfall forecasting for sustainable farming.

Dataset (if applicable): Soil quality data, historical crop yield records, climate and rainfall datasets.

Expected Algorithm / Processing: Random Forest, Decision Tree, Support Vector Machine (SVM) for classification and prediction; data preprocessing and feature engineering for agricultural datasets.

Expected Output from Project:

Recommended crops suitable for a given soil and climate.

Fertilizer suggestions based on crop and soil requirements.

Rainfall and yield predictions to assist in planning.

Abstract:

Agriculture plays a crucial role in food security, and precision A machine learning based support system for predictive agriculture and resource optimization is vital for enhancing productivity while ensuring sustainability. A machine learning based support system for predictive agriculture and resource optimization is a machine-learning-based decision support platform designed to help farmers make data-driven decisions. The system analyzes soil quality, climate conditions, and historical agricultural data to recommend the most suitable crops, optimal fertilizers, and yield. It employs algorithms such as Random Forest, Decision Tree, and Support Vector Machine (SVM) for accurate predictions. By integrating advanced analytics enabling farmers to optimize resources, reduce costs, and mitigate climate-related risks. This approach empowers rural and commercial farmers alike, improving efficiency and profitability while promoting environmentally responsible farming practices. The system's data-driven methodology makes it a valuable tool in modern agronomy, aligning with global efforts toward sustainable agriculture.

Keywords: Crop Prediction, Machine Learning, Random Forest, Decision Tree, Support Vector Machine, Yield Forecasting, Fertilizer Recommendation, Precision Agriculture, Data-Driven Farming, Rainfall Prediction, Sustainable Farming, Smart Agriculture.

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