

(54) Title of the invention : Predicting Agriculture Yields Based on Machine Learning Using Regression and Deep Learning

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(57) Abstract :

ABSTRACT [0012] Agriculture plays a pivotal role in the livelihood of a majority of the population, especially in developing countries. With increasing demand for food and unpredictable climatic changes, accurate crop yield prediction has become essential for sustainable agricultural development and planning. Traditional prediction methods, often statistical, fall short in terms of accuracy and scalability when compared to modern computational approaches. This project introduces a novel approach to predicting agricultural crop yield using a stacked ensemble model. The base models include Random Forest, Gradient Boosting, and Bagging Regressor, which are combined to generate predictions that are then passed to a Recurrent Neural Network (RNN) serving as the meta-learner. This ensemble structure leverages the strengths of each model while minimizing their individual weaknesses, resulting in a highly accurate prediction system. [0013] The data used in this system is sourced from reliable global organizations such as the Food and Agriculture Organization (FAO) and the World Data Bank. It includes various agricultural features such as rainfall, temperature, pesticide use, crop types, and yield data across multiple years and countries. The comprehensive preprocessing phase ensures data consistency and optimal model input. To make the solution practically usable, a Flask-based web application is integrated with the model. This web app allows end-users like farmers, agronomists, or policy planners to input agricultural parameters and instantly receive predictions on expected crop yields. This real-time interface bridges the gap between complex ML models and user-friendly agricultural tools. This research not only enhances the predictive accuracy of agricultural systems but also contributes toward intelligent and data-driven decision-making in the field. It opens avenues for integrating AI into farming practices, enabling sustainable and profitable agriculture.

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