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Agricultural Recommendation System for Crops Using Different Machine Learning Regression Methods

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ABSTRACT

Agriculture is a foremost field within the world, and it's the backbone in the Republic of India. Agriculture has been in poor condition. The impact of temperature variations and its uncertainty has engendered the bulk of the agricultural crops to be overripe in terms of their manufacturing. A correct forecast of crop expansion is a vital character in crop forecast management. Such forecasts will hold up the federated industries for accomplishing the provision of their occupation. ML is the method of finding new models from giant information sets. Numerous regressive ways like random forest, linear regression, decision tree regression, polynomial regression, and support vector regression will be used for the aim. Area and production are among the meteorological information that's made by necessary data. This paper figures out the yield recommendation of the crop by the accurate comparison of numerous machine learning ML regressions where the overall percentage improvement over several existing methods is 3.6%.

KEYWORDS

Crop Yield, Decision Tree (DT) Regression, Linear Regression (LR) Prediction, Machine Learning, Polynomial Regression (PR), Random Forest (RF) Regression, Support Vector Regression (SVR)

INTRODUCTION

Agriculture is the leading hold up and the paramount territory of the Indian wealth. The manufacturing of farming is very little. As the ultimatum for daily bread is heighten epidemically, the farmers, investigators, analysts, scientists, and government attempt to site further attempts and schemes to heighten the agricultural manufacturing to lodge the needs (Shastry et al., 2017). India is generally stubby despite being a huge sector and yields of crops per hectare. Correct productivity of crops hangs on numerous parameters such as properties of soil, irrigation, terrain, and climate.

Owing to several components such as change of climate, tumble levels of water, accidental rainfall, imprudent utilize of bio-pesticides, etc., the intensity of agricultural manufacturing is diminishing in India. The majority of farmers do not attain awaited crop yield for a variety of grounds (Kumar et al., 2018) To acknowledge manufacturing intensity, yield manufacturing is carried out which

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requires forecasting the yield of the crop relied on the existing information. Formerly, crop production estimations were based on farmer's certain crops and experience of cultivation.

There are numerous methods to amplify and upgrade crop production and standards. Varieties of researches have been conducted to grow a well-organized technique for yield forecasting but focal points have been consistently on analytical techniques and not much has been carried out in machine learning (ML) approaches. The crop manufacturing hangs on different components (Renuka & Terdal 2019) which varies with every square meter and hangs on:

1. Geographical region;
2. Climate (Temperature, moistness, precipitation);
3. Types of loam (saline, alkaline, and non-alkaline, etc.);
4. Composition of loam (ph, N, P, OC, Zn, F, K, and EC, etc.).

Varieties of subsets of the above specifications are applied in several forecasting models for different crops. Forecasting models are generally of 2 types.

1. Analytical models that employ a solitary forecast function that considers every single space of samples.
2. Technologies of machine learning, a recent technology for knowledge explore that associates input and output.

Learning the machine without elucidated computer programming is one of the capabilities of machine learning techniques, so it enhances machine production by discovering and distinguishing the stability and design of operating information. Machine learning can be categorized into 3 broad categories according to the methods of learning –Supervised, unsupervised, and Reinforcement learning (Singh et al., 2017). In our paper, we are building the work with supervised algorithms to forecast crop production. These categories of algorithms assist to construct the most precise and effectual model as here, the learning information occurs with labels or required outputs and the objective is to discover a common rule of depicting input to output. It presumes to construct a machine learning model that is relied on labeled samples.

This paper predicts the accuracy of the future production of five different crops such as rice, ragi, gram, potato, and onion crops using various supervised machine learning approaches in of Andhra Pradesh region and recommends the crop to yield. The dataset is collected from the statistical and agricultural department of Andhra Pradesh, it consists of precipitation, yield, cloud cover, vapor pressure, season, production, and area dataset. The Linear, Decision trees, Random Forest, Polynomial, and Support Vector Regressions have been utilized for crop production forecasting.

An Agricultural farmer is always interested to know whether how much yield he/she is about to produce. In the past times, Predictions on crop yield on different crops was performed by considering farmer's experience on specific field and crop. The crop production is effected by variegated seasonal, biological and economical constituents but unforeseeable changes in these constituents lead to a huge loss to farmers. In Most of the Cases, Farmers even commit suicide because of not able to pay the bank loans taken for farming due to production loss. These risks can be minimized when significant mathematical or statistical methodologies are applied on data related to soil, weather as well as past yield and using these Methods, We can recommend the Best Crop to farmer for his Agricultural land so that it helps to get maximum profit.

The paper is collocated as: Segment 2 presents the associated work or literature review, whereas the proposed approach is discussed in Segment 3. Then, the experimental results and performance analysis on agricultural information are discussed in Segment 4. In the end, the conclusion is given in Segment 5.