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Effective Crop Ration Period Estimation for Different Production And Seasonal Crops

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ABSTRACT:

Agriculture is one of the major and the least paid occupation in India. Machine learning can bring a boom in the agriculture field by changing the income scenario through growing the optimum crop. This paper focuses on predicting the yield of the crop by applying various machine learning techniques. The outcome of these techniques is compared on the basis of mean absolute error. The prediction made by machine learning algorithms will help the farmers to decide which crop to grow to get the maximum yield by considering factors like temperature, rainfall, area, etc.

Keywords:Crop field, crop analysis, Temperature.

1. INTRODUCTION:

Agriculture, since its invention and inception, be the prime and pre-eminent activity of every culture and civilization throughout the history of mankind. It is not only an enormous aspect of the growing economy, but it's essential for us to survive. It's also a crucial sector for Indian economy and also human future. It also contributes an outsized portion of employment. Because the time passes the requirement for production has been increased exponentially. So as to produce in mass quantity people are using technology in an exceedingly wrong way. New sorts of hybrid varieties are produced day by day. However, these varieties don't provide the essential contents as naturally produced crop. These unnatural techniques spoil the soil. It all ends up in further environmental harm. Most of these unnatural techniques are wont to avoid losses. But when the producers of the crops know the accurate information on the crop yield it minimizes the loss. Machine learning, a fast-growing approach that's spreading out and helping every sector in making viable decisions to create the foremost of its applications. Most

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devices nowadays are facilitated by models being analyzed before deployment. The main concept is to increase the throughput of the agriculture sector with the Machine Learning models. Another factor that also affects the prediction is the amount of knowledge that's being given within the training period, as the number of parameters was higher comparatively. The core emphasis would be on precision agriculture, where quality is ensured over undesirable environmental factors. So as to perform accurate prediction and stand on the inconsistent trends intemperature and rainfall various machine learning classifiers like Logistic Regression, Naïve Bayes, Random Forest etc. are applied to urge a pattern. By applying the above machine learning classifiers, we came into a conclusion that Random Forest algorithm provides the foremost accurate value. System predicts crop prediction from the gathering of past data. Using past information on weather, temperature and a number of other factors the information is given. The Application which we developed, runs the algorithm and shows the list of crops suitable for entered data with predicted yield value.

2. LITERATURE SURVEY:

Aruvansh Nigam, SakshamGarg, ArchitAgrawal[1] conducted experiments on Indian government dataset and it's been established that Random Forest machine learning algorithm gives the best yield prediction accuracy. Sequential model that's Simple Recurrent Neural Network performs better on rainfall prediction while LSTM is good for temperature prediction. The paper puts factors like rainfall, temperature, season, area etc. together for yield prediction. Results reveals that Random Forest is the best classifier when all parameters are combined.

Leo Brieman [2] , is specializing in the accuracy and strength & correlation of random forest algorithm. Random forest algorithm creates decision trees on different data samples and then predict the data from each subset and then by voting gives better the answer for the system. Random Forest used the bagging method to trained the data. To boost the accuracy, the randomness injected has to minimize the correlation ρ while maintaining strength.

Balamurugan [3], have implemented crop yield prediction by using only the random forest classifier. Various features like rainfall, temperature and season were taken into account to predict the crop yield. Other machine learning algorithms were not applied to the datasets. With the absence of other algorithms, comparison and

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quantification were missing thus unable to provide the apt algorithm.

Mishra [4], has theoretically described various machine learning techniques that can be applied in various forecasting areas. However, their work fails to implement any algorithms and thus cannot provide a clear insight into the practicality of the proposed work.

Dr. Y. JeevanNagendra Kumar [5], have concluded Machine Learning algorithms can predict a target/outcome by using Supervised Learning. This paper focuses on supervised learning techniques for crop yield prediction. To get thespecified outputs it needs to generate an appropriate function by set of some variables which can map the input variable to the aim output. The paper conveys that the predictions can be done by Random Forest ML algorithm which attain the crop prediction with best accurate value by considering least number of models.

3. METHODOLOGY

EXISTING SYSTEM:

Due to the revolution in industrialization, the economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth. The problem that the Indian Agriculture sector is facing is the integration of technology to bring the desired outputs. With the advent of new technologies and overuse of non-renewable energy resources patterns of rainfall and temperature are disturbed. The inconsistent trends developed from the side effects of global warming make it cumbersome for the farmers to clearly predict the temperature and rainfall patterns thus affecting their crop yield productivity. In order to perform accurate prediction and handle inconsistent trends in temperature and rainfall various machine learning algorithms like RNN, LSTM, etc can be applied to get a pattern. It will complement the agricultural growth in India and all together augment the ease of living for farmers. In past, many researchers have applied machine learning techniques to enhance agricultural growth of the country.

PROPOSED SYSTEM:

This paper focuses on the practical application of machine learning algorithms and its quantification. The work presented here also takes into account the inconsistent data from rainfall and temperature datasets to get a consistent trend. Crop yield prediction is determined by considering all the features in

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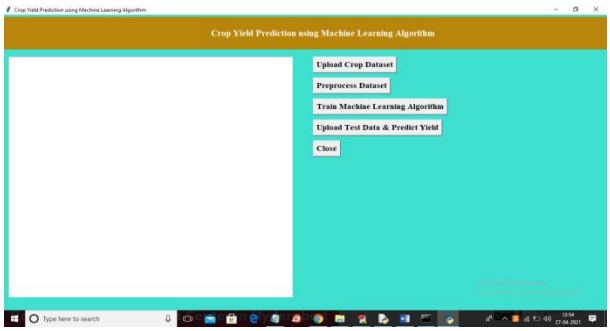
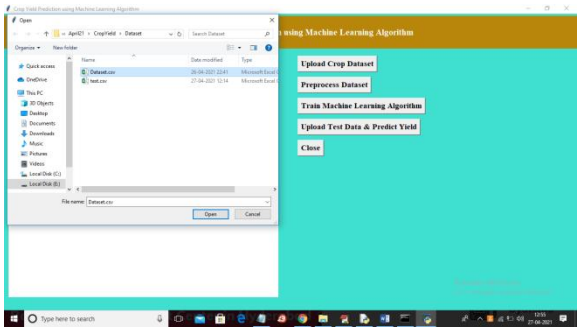
contrast with the usual trend of determining the prediction considering one feature at a time.

To run project double click on 'run.bat' file to get below screen

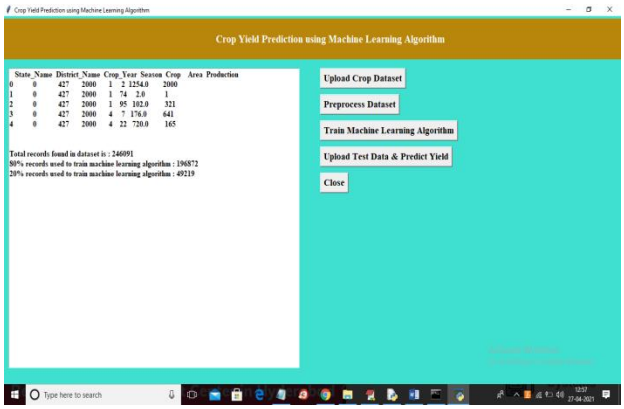


In above screen click on 'Upload Crop Dataset' button to upload dataset



In above screen selecting and uploading 'Dataset.csv' file and then click on 'Open' button to load dataset and to get below screen

In above screen dataset loaded and we can see dataset contains some non-numeric values and ML will not take non-numeric values so we need to preprocess dataset to convert non-numeric values to numeric values by assigning ID to each non-numeric value. So click on 'Preprocess Dataset' button to process dataset



In above screen all non-numeric values converted to numeric format and in below lines we can see dataset contains total 246091 records and application using (80%) 196872 records to train ML and using (20%) 49219 records to test ML prediction error rate (RMSE (root mean square error)). Now click on 'Train Machine Learning Algorithm' button to train Decision Tree Machine learning algorithm on above dataset and then calculate prediction error rate

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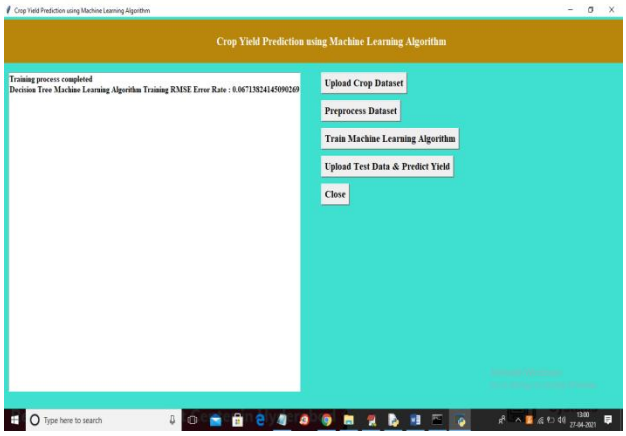
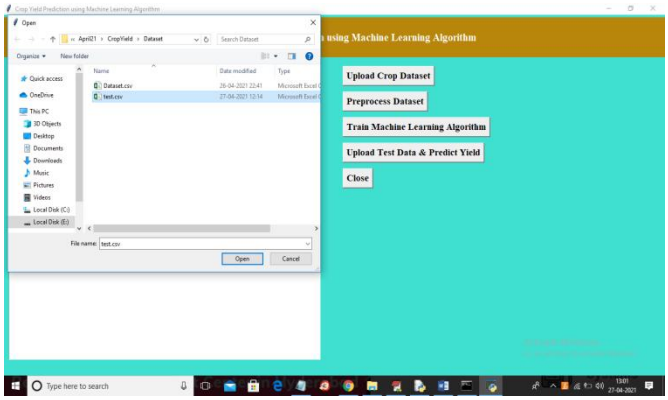
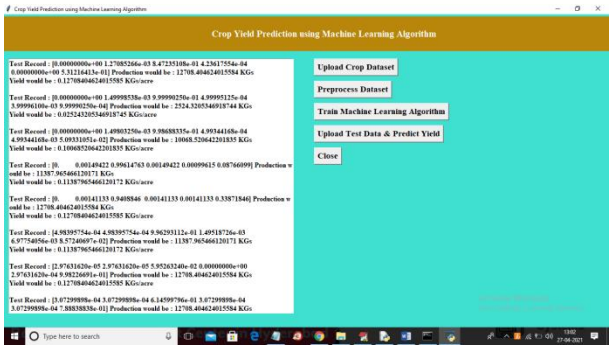


In above screen ML is trained and we got prediction error rate as 0.067% and now Decision Tree model is ready and now click on 'Upload Test Data & Predict Yield' button to upload test data and then application will predict production



In above screen selecting and uploading 'test.csv' file and then click on 'Open' button to load test data and then application will give below prediction result



In above screen each test record is separated with newline and in above screen in square bracket we can see test data values and after square bracket we can see predicted production and after that we can see predicted YIELD per acre. So each test record and its prediction are separated with newline.

CONCLUSION

The paper presented the various machine learning algorithms for predicting the yield of the crop on the basis of temperature, rainfall, season and area. Experiments were conducted on Indian government dataset and it has been established that Random Forest Regressor gives the highest yield prediction accuracy. Sequential model that is Simple Recurrent Neural Network performs better on rainfall prediction while LSTM is good for temperature prediction. By combining rainfall, temperature along with other parameters like season and area, yield prediction for a certain district can be made. Results reveals that Random Forest is the best classifier when all parameters

are combined. This will not only help farmers in choosing the right crop to grow in the next season but also bridge the gap between technology and the agriculture sector.

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