Similar Investigation of Information Mining Models for Crop Yield

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Abstract:

- ❖ Agricultural marketing information recommendation system based on machine learning in order to provide accurate recommendations for farmers.
- ❖ A system to intimate farmers about the crops to be seeded in the specific season and also make the farmers aware of the current market rate of the product.
- ❖ Farmers must be well organized and able to manage all the details of the farm and be certified from certified organization by providing information that covers a period from the seeding process to the multiple farming activities until post harvest management
- ❖ By using two types of unsupervised algorithm

- k Means points and it can divide data points into k clusters by minimizing the variance in each cluster.
- Hierarchical Clustering Algorithm which is used to measure the dis-similarities between the data and also merge clusters.

- ❖ By using web application farmers can easily predict that what kind of crop to be used during the season and they can also sell the product in that application through online with fixed rate .

Key Terms: K-Means clustering , Hierarchical clustering, ML – Machine Learning ,Bidding, Location based search

INTRODUCTION:

Our agricultural face: agricultural production is dispersed, agricultural consumption is diversified, and connection and docking are poor between small-scale production and market. The agricultural marketing information recommendation system is based on cloud computing in order to provide accurate recommendations for farmers. A system to intimate farmers about the crops to be seeded in the specific season and also make the farmers aware of the current market rate of the product. This type of system is much beneficial for the young generation to adapt to the traditional farming technique.

Crop yield prediction is an important task in agriculture and has received considerable attention from researchers. In recent years, the use of information mining models for crop yield prediction has become increasingly popular due to their ability to process large amounts of data and make accurate predictions.Information mining models use data mining techniques to extract valuable information from large datasets.

These models can be trained on historical crop yield data and environmental factors such as temperature, precipitation, and soil type to make predictions about future yields.The performance of these models depends on several factors such as the choice of algorithms, data preprocessing techniques, feature selection, and model hyperparameters.

Therefore, similar investigations of information mining models for crop yield prediction have been conducted to identify the most effective approaches for this task. Farmers must be well organized and able to manage all the details of the farm and be certified from certified organization by providing information that covers a period from the seeding process to the multiple farming activities until post harvest management

LITERATURE SURVEY

The paper "Crop Yield Prediction and Efficient use of Fertilizers" by shruti mishra ,priyanka paygude, snehal chaudary in 2019 Efficient use of fertilizers is essential to ensure that crops receive the nutrients they need for optimal growth and yield, while minimizing the environmental impact of fertilizer application. This involves understanding the nutrient requirements of crops, using soil testing and analysis to determine the nutrient content of soil, and applying fertilizers in a targeted and precise manner. The backpropagation algorithm is used for large datasets which have no proper relationships between the attributes of the dataset to form a network model by training the dataset and predicting the output.

This paper "Crop Yield Prediction Using Deep Reinforcement Learning Model Sustainable Agri Applications" by M.M Rahman,D.Hagare,and B.Maheshwari in 2020 .Deep reinforcement learning (DRL) is a type of machine learning that has been used to solve complex problems in various fields, including agriculture. In this context, DRL can be used to predict crop yields by learning from historical data and taking into account various environmental factors such as temperature, rainfall, and soil quality.forecasting crop yield is studied as a regression problem that is resolved by supervised learning.For every nearby predicted value of the target, the agent gets a positive reward, otherwise a negative reward

The paper “Comprehensive Review of Crop Yield Prediction Using Machine Learning Approaches With Special Emphasis on Palm Oil Yield Prediction” by M. E. Holzman, F. Cermona, R. Rivas and R. Nichols in 2021.Palm oil is an important agricultural commodity, with global production increasing rapidly in recent years. Accurate prediction of palm oil yields is essential for planning and optimization of production processes. Machine learning approaches have been used to predict palm oil yields using a variety of factors, including weather conditions, soil properties, crop management practices, and biotic and abiotic stress factors.This information can be used by farmers to plan their crop management practices, make informed decisions about crop rotation, irrigation, and pest control, and optimize the use of resources such as fertilizers, water, and labor.

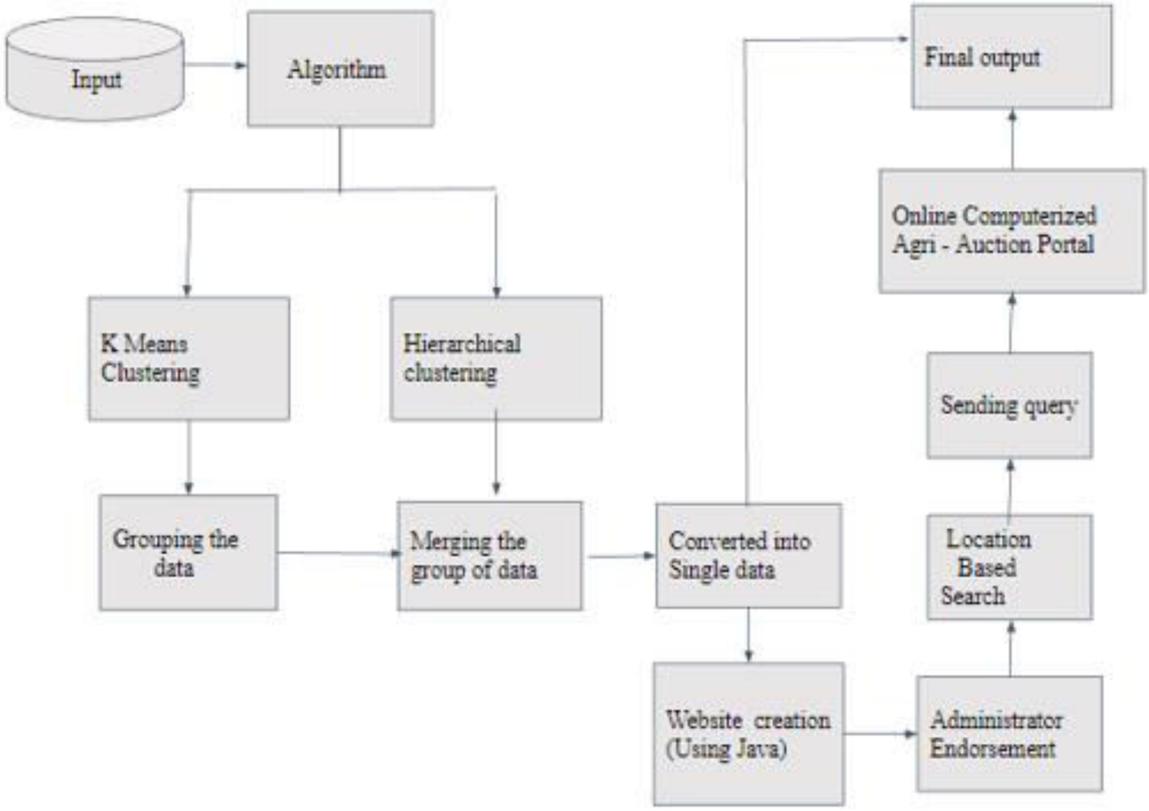
System design

The agriculture sector has witnessed a significant increase in the adoption of data-driven approaches to enhance crop productivity and optimize resource management. One such area of research is the development of information mining models for crop yield prediction. These models utilize advanced techniques from machine learning, data mining, and artificial intelligence to extract valuable insights from a variety of data sources, including weather data, satellite imagery, soil composition, and historical yield records.

The accurate prediction of crop yields plays a crucial role in decision-making for farmers, agricultural experts, and policymakers. It enables proactive measures to mitigate the risks associated with climate variability, optimize resource allocation, and improve overall agricultural productivity.

Traditional methods of yield estimation based on manual surveys and historical trends often fall short in capturing the complex interplay of various factors that affect crop growth and yield. Information mining models offer a promising solution by leveraging the power of computational algorithms to process vast amounts of data and uncover hidden patterns and relationships.

This investigation aims to explore and compare different information mining models for crop yield prediction, with a focus on their architectural designs. By examining the underlying structures and components of these models, we can gain insights into their strengths, limitations, and potential applications. The investigation will involve a comprehensive review of relevant research papers, case studies, and practical implementations of crop yield prediction models.



Implementation:

```
import java.io.BufferedReader;

import java.io.FileReader;

import java.util.ArrayList;

import java.util.List;



public class CropYieldInvestigation {

    public static void main(String[] args) {
```

```
    try {
        // Read the input data file
        String dataFile = "crop_yield_data.csv";
        List<String> data = readDataFile(dataFile);

        // Preprocess the data (if needed)
        List<FeatureVector> featureVectors = preprocessData(data);

        // Split the data into training and testing sets
        List<FeatureVector> trainingSet = featureVectors.subList(0,
featureVectors.size() / 2);
        List<FeatureVector> testingSet =
featureVectors.subList(featureVectors.size() / 2, featureVectors.size());

        // Train and evaluate different information mining models
        InformationMiningModel linearRegressionModel =
trainLinearRegressionModel(trainingSet);
        double linearRegressionAccuracy =
```

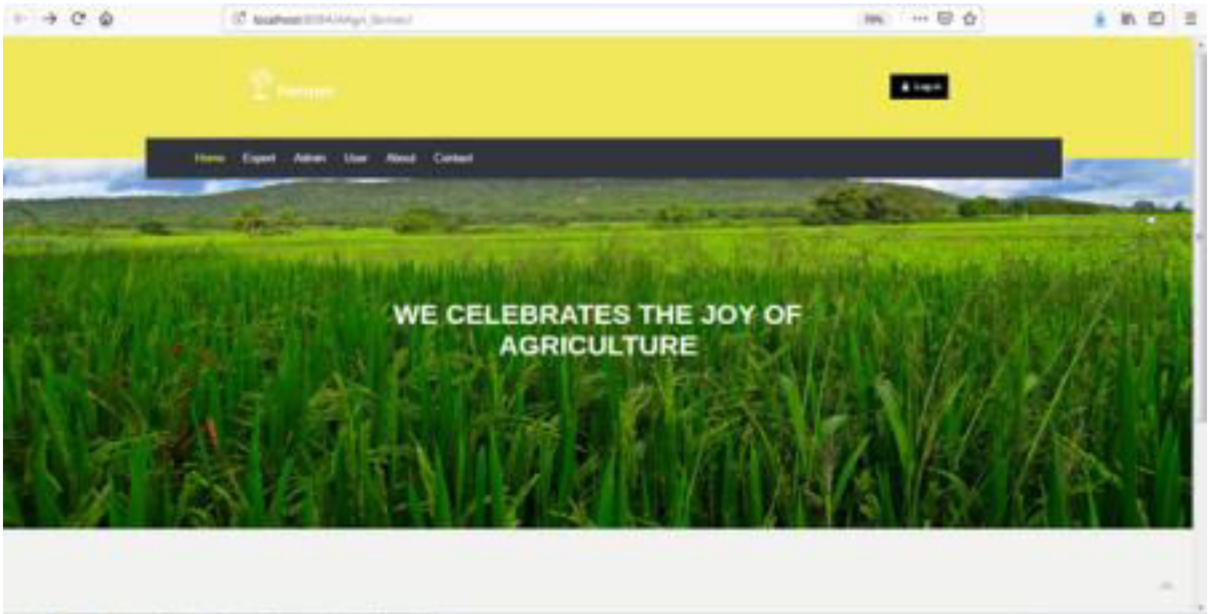
```
evaluateModel(linearRegressionModel, testingSet);



        InformationMiningModel decisionTreeModel =
trainDecisionTreeModel(trainingSet);

        double decisionTreeAccuracy = evaluateModel(decisionTreeModel,
testingSet);



        InformationMiningModel randomForestModel =
trainRandomForestModel(trainingSet);

        double randomForestAccuracy =
evaluateModel(randomForestModel, testingSet);



        // Print the evaluation results

        System.out.println("Evaluation Results:");

        System.out.println("Linear Regression Accuracy: " +
linearRegressionAccuracy);

        System.out.println("Decision Tree Accuracy: " +
decisionTreeAccuracy);

        System.out.println("Random Forest Accuracy: " +
randomForestAccuracy);
```

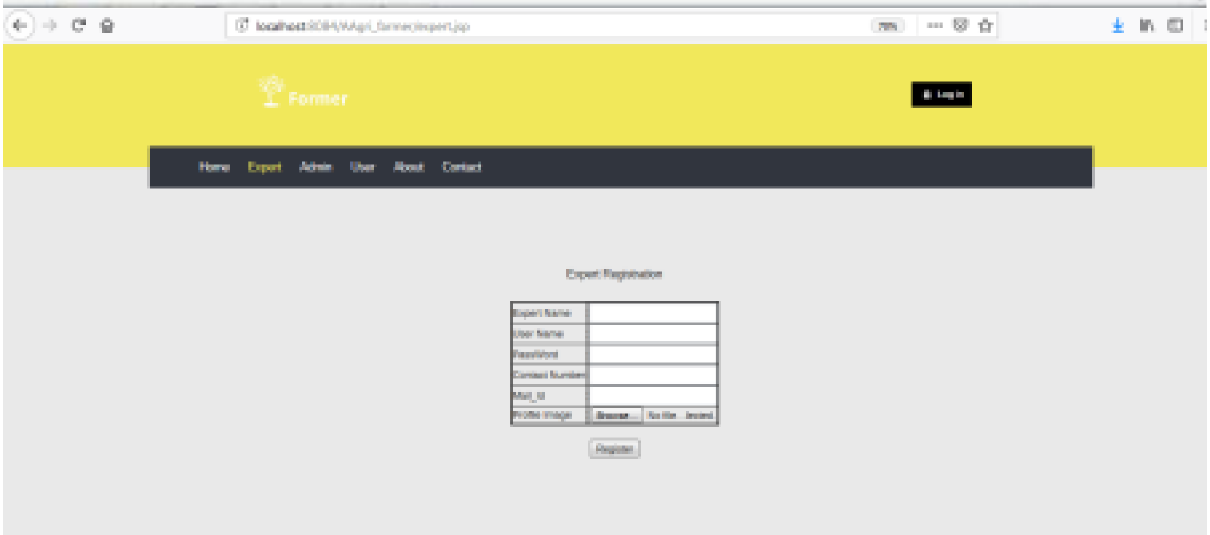
```
    }

        } catch (Exception e) {

            e.printStackTrace();

        }

    }



    private static List<String> readDataFile(String dataFile) throws
Exception {

        List<String> data = new ArrayList<>();

        BufferedReader reader = new BufferedReader(new
FileReader(dataFile));

        String line;

        while ((line = reader.readLine()) != null) {

            data.add(line);

        }

        reader.close();

        return data;

    }
```

```
    private static List<FeatureVector> preprocessData(List<String> data) {
        // Implement your data preprocessing steps here
        // Convert raw data into feature vectors or matrices
        // Apply normalization, feature engineering, etc.
        // Return the processed feature vectors
        List<FeatureVector> featureVectors = new ArrayList<>();
        // Implement preprocessing logic
        return featureVectors;
    }

    private static InformationMiningModel
trainLinearRegressionModel(List<FeatureVector> trainingSet) {
        // Implement training logic for linear regression model
        InformationMiningModel linearRegressionModel = new
LinearRegressionModel();
         }
```

```
Private static InformationMiningModel
trainDecisionTreeModel(List<FeatureVector> trainingSet) }
```

SNAPSHOTS



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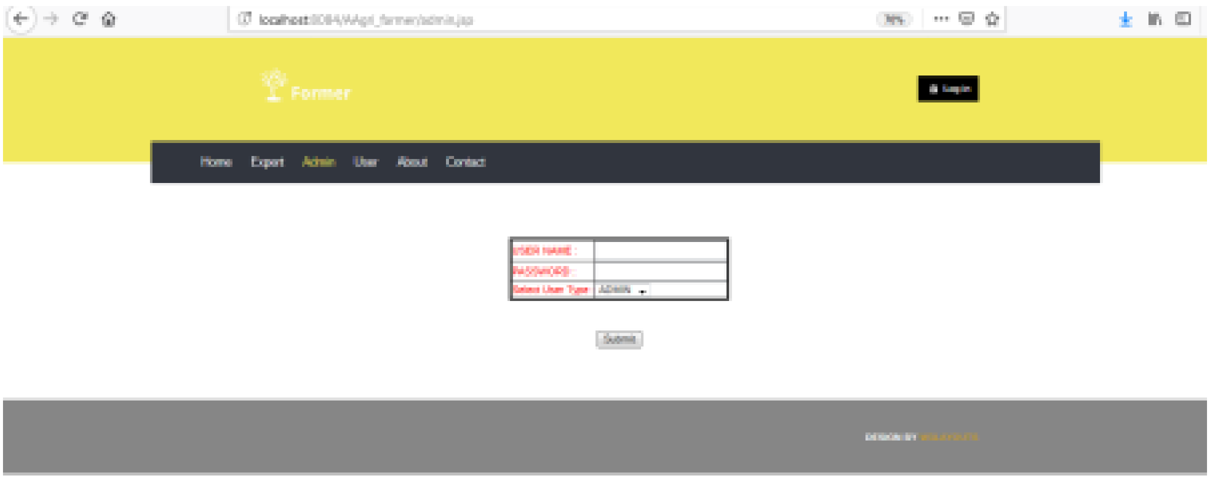
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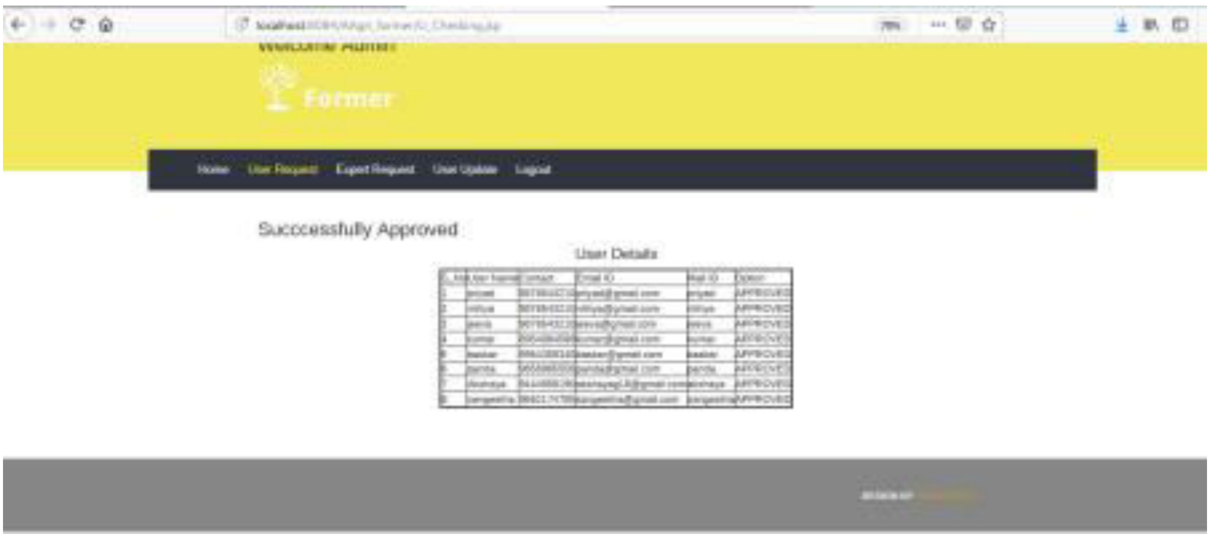
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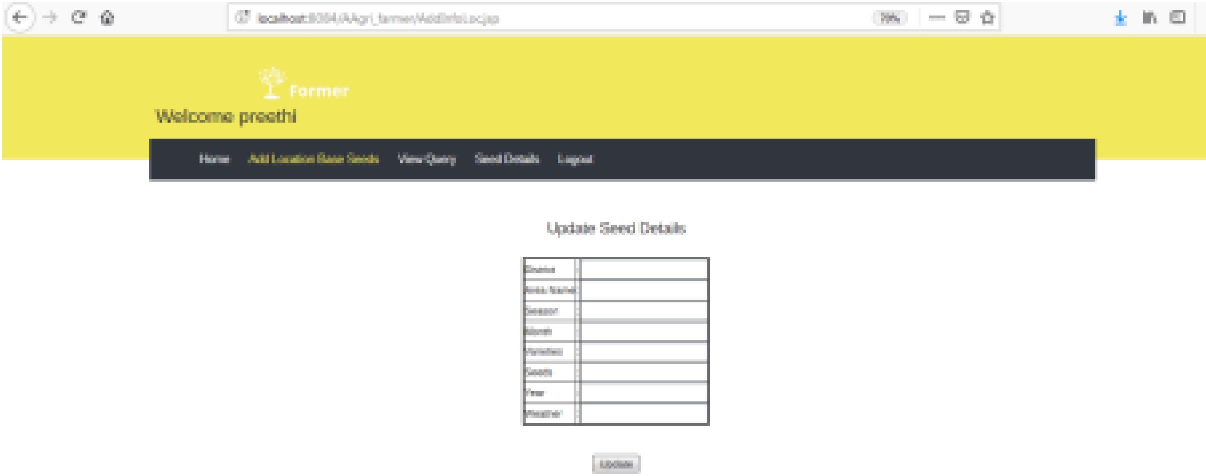
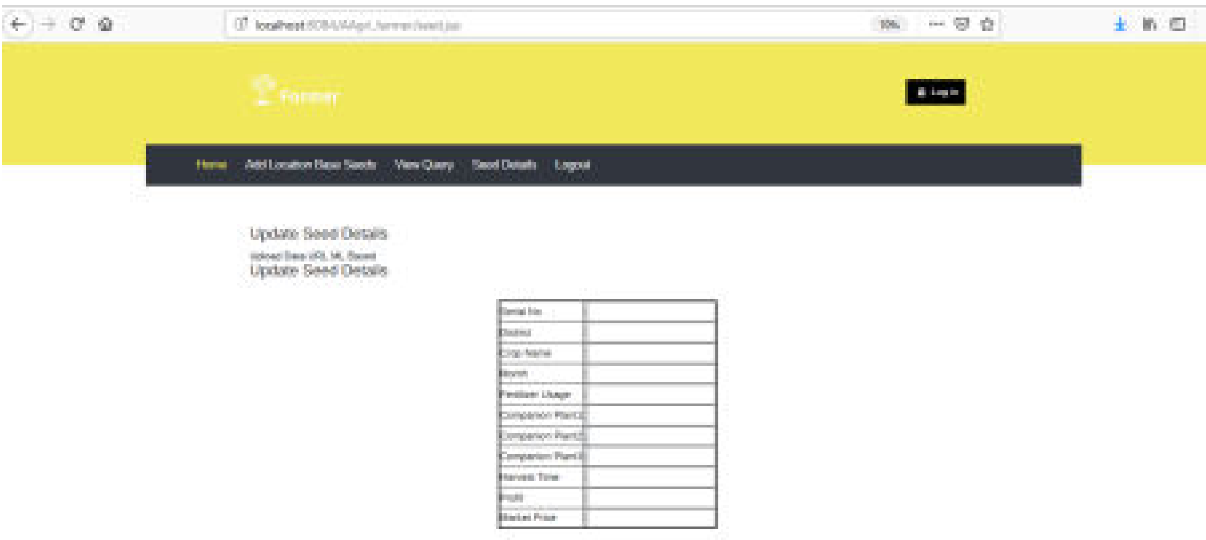
User Request
Expert Request
User Update
Logout
Successfully Approved
User Details





CONCLUSION:

The investigation of information mining models for crop yield has provided valuable insights and potential solutions for improving agricultural practices and increasing crop productivity. Through the exploration of various data mining techniques and models, researchers have gained a deeper understanding of the factors influencing crop yield and the complex relationships between variables.Overall, the investigation of information mining models for crop yield has opened up new avenues for precision agriculture and sustainable farming practices.

FUTURE ENHANCEMENTS

As machine learning algorithms continue to advance, future investigations can explore the application of state-of-the-art techniques such as deep learning, reinforcement learning, and ensemble methods. These approaches have the potential to extract more intricate patterns and relationships from agricultural data, leading to more accurate crop yield predictions.

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