Fertilizer Prediction

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Problem Statement

- Brief Overview:
- Data Preparation :Loaded the fertilizer dataset using pandas, checked for nulls, explored features with .head(), .info(), and .describe().
- Model Training & EvaluationSplit the data using train_test_split(), then trained models like Logistic Regression, Decision Tree, and KNN using .fit
- Prediction on New DataUsed the trained KNN model to predict fertilizer type for a new set of input features.
- Key Objectives:
- Label encoded categorical columns like Fertilizer Name, Soil Type, and Crop Type to make them numeric for ML models.
- Evaluated models using accuracy_score and classification_report.
- Optionally used label_encoder.inverse_transform() to convert the prediction back into the actual fertilizer name.

Source : www.freepik.com/

Dataset Overview(Optional)

- Dataset Description:
- https://www.kaggle.com/datasets/irakozekelly/fertilizer-prediction/data
- Key Features:
- Environmental Conditions: Includes Temperature, Humidity, and Moisture, which affect how crops grow and absorb nutrients.
- Soil and Crop Type: Categorical features like Soil Type and Crop Type help determine specific fertilizer needs based on the crop and land.
- Soil Nutrients (NPK): Levels of Nitrogen, Phosphorus, and Potassium (N, P, K) indicate how nutrient-rich the soil is — crucial for fertilizer recommendations.

Methodology

- Approach:
- Preprocess the data by handling missing values and label encoding categorical columns.
- Split the data and train ML models like Decision Tree or KNN on the training set.
- Predict and evaluate using the test set with metrics like accuracy and classification report.

- Algorithms Used:
- Logistic Regression for a simple, interpretable baseline, Decision Tree for capturing rule-based patterns in the data, and K-Nearest Neighbors (KNN) to predict based on similar past records.
- These models were chosen to handle classification and compare performance on predicting the best fertilizer.

Source : www.freepik.com/

Conclusion

- Summary:
- The case study used machine learning models like Logistic Regression, Decision Tree, and KNN to predict the best fertilizer based on environmental and crop features.
- After data preprocessing and training, the models showed good accuracy, with Decision Tree and KNN performing effectively. This solution helps in making smart, data-driven agricultural decisions
- Future Work:
- Future improvements could include using ensemble models like Random Forest or XGBoost for higher accuracy and adding more real-time data like rainfall or soil pH for better predictions

Source : www.freepik.com/

GitHub Repository Link of a project

https://github.com/Ikyara/Fertilizer_Prediction.git

References

- Paste your reference link here

Thank You