Crop Recommendation and Revenue Estimates in Agriculture in Kenya

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Introduction

Agriculture is heavily influenced by environmental factors and soil composition, making it critical to recommend the most suitable crops for specific conditions.

This project leverages machine learning to recommend crops based on data related to soil nutrients and environmental factors.

Additionally, it provides an estimation of potential revenue based on market trends, offering a holistic solution to farmers aiming to maximize both yield and profitability.

Objectives

1

Crop Recommendation: Utilize data on soil nutrients (Nitrogen, Phosphorus, Potassium) and environmental factors (Temperature, Humidity, pH, Rainfall) to recommend crops that are likely to perform well in a given set of conditions.

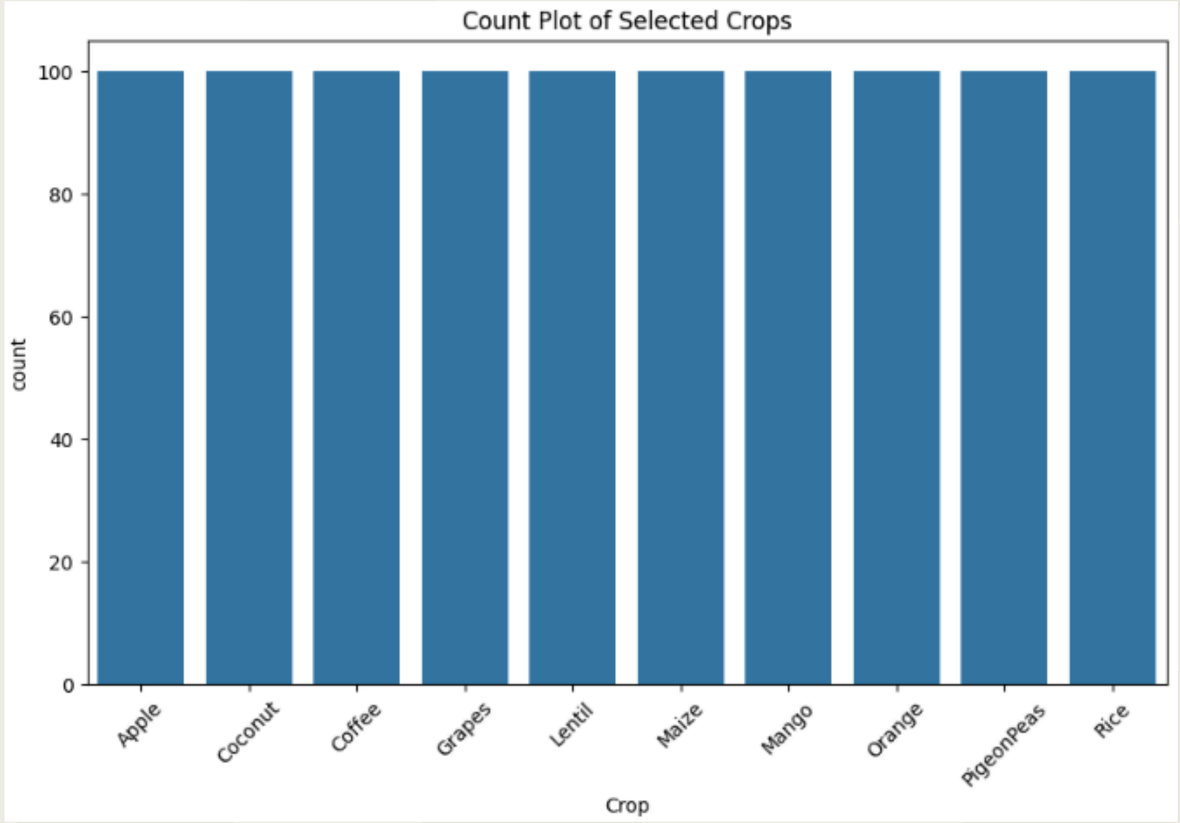
2

Revenue Estimates: Based on market price analysis, predict potential earnings for each recommended crop, helping farmers make informed decisions that balance both yield and revenue.

Dataset Overview

This project uses a dataset rich in agricultural features, which include:

- **Soil Composition:** Nitrogen, Phosphorus, Potassium
- **Environmental Conditions:** Temperature, Humidity, pH levels, Rainfall
- **Market Price Data:** Historical price trends for various crops
- **Crops:** A wide variety of crops including maize, rice, mango, coconut, and others, with yield predictions based on the above features.



Methodology

The machine learning process involved several steps:

- **Data Preprocessing:** Data was cleaned and prepared by handling missing values, normalizing the numerical features, and encoding categorical variables where necessary.
- **Model Selection:** Two models were evaluated for crop recommendation, i.e. Logistic Regression and Random Forest. The best-performing model was selected based on accuracy and precision metrics.
- **Revenue Estimation:** Once the crops were recommended, market data was used to estimate potential revenue by considering current price trends. This involved analyzing historical pricing for different crops and predicting potential earnings based on expected yields.

Key Insights

1. Crop Recommendations

2. Revenue Estimates

Source: output.txt

1. The model effectively recommended crops based on nutrient and environmental conditions. For instance, crops with higher Nitrogen requirements were suggested for soils rich in Nitrogen, while other environmental factors were matched to crop tolerance thresholds.
2. Revenue predictions provided clear estimates of how much a farmer could potentially earn based on current market conditions. This allowed for better decision-making, especially in regions where price volatility affects farming strategies.

Conclusion

The application of machine learning to crop recommendations shows immense promise in improving agricultural productivity. By aligning crop suitability with both environmental data and economic factors, farmers can optimize their operations to ensure better yield and profitability. This project lays the foundation for further advancements in precision agriculture, where data-driven decisions can transform farming practices globally.






Thank You

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Github Portfolio