Crop Production Analysis and Prediction Dashboard

Project Title: Crop Production Analysis and Prediction Dashboard

Tools Used:

- Python
- Streamlit
- Pandas
- Matplotlib
- Scikit-learn
- XGBoost
- Openpyxl

Project Description:

This project analyzes historical crop production data and provides visual insights and predictions using machine learning. It includes data cleaning, exploratory data analysis (EDA), visualization, and predictive modeling.

Data Source:

FAOSTAT_data.xlsx (converted to FAOSTAT_data.csv for efficient handling in Streamlit)

Project Steps:

1. Data Cleaning & Preprocessing:
   - Removed null values and unnecessary columns
   - Converted data types where necessary
   - Ensured the data is suitable for analysis and modeling

2. Exploratory Data Analysis (EDA):

- Visualized production trends by country and year
- Analyzed crop patterns and year-wise production data

3. Data Visualization:

- Line plots showing production trends
- Bar charts for comparing crops or countries

4. Machine Learning (Regression):

- Used Random Forest and XGBoost Regressors
- Trained on historical production data to predict future crop production
- Evaluated using metrics such as MAE and RMSE

5. Streamlit App:

- Built an interactive dashboard to:
  - Upload CSV data
  - Visualize data dynamically
  - Select area and view production trends
  - Predict crop production using trained models

How to Run the Project:

1. Open Command Prompt or Anaconda Prompt
2. Navigate to the project folder:

   cd C:\Users\hp
3. (Optional) Activate virtual environment:

   conda activate streamlit_env

4. Run the Streamlit app:

   streamlit run Crop_Production.py

Folder Structure:

C:\Users\hp\

|-- Crop_Production.py

|-- FAOSTAT_data.csv

Note: Ensure all required packages are installed:

pip install streamlit pandas matplotlib scikit-learn xgboost openpyxl

Next Steps / Future Enhancements:

- Add filtering by crop type or season

- Integrate user-uploaded datasets dynamically

- Include forecast visualizations for future years

- Deploy the Streamlit app to the cloud (Streamlit Community Cloud, Heroku, etc.)