

WORLD POPULATION PREDICTION USING MACHINE LEARNING

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INTRODUCTION

Problem Statement:

- The global population is growing at an unprecedented rate.
- Predicting future population trends is crucial for planning resources, infrastructure, and policy-making.

Objective:

- Analyze historical population data and predict future population using machine learning.

Tools & Techniques:

- Python, Linear Regression, Flask (for web interface), Joblib (for model

DATA OVERVIEW

Dataset Source:

- United Nations World Population Prospects.

Features in the Dataset:

- Year, Birth Rate, Death Rate, Net Migration, Fertility Rate, Population.

Data Preprocessing:

- Handled missing values by removing rows with NA values.
- Created additional features such as the population growth rate for better prediction.



A cartoon illustration of a person with dark hair and round glasses, wearing a red jacket over a green shirt. They are holding a magnifying glass up to a small globe, examining it closely.

EXPLORATORY DATA ANALYSIS (EDA)

Key Insights:

- Trends in population growth over the years.
- Correlation between birth rate, death rate, and population changes.
- Fertility rate's influence on population growth.

Visualizations:

- Line graphs showing historical population trends.
- Correlation heatmap showing the relationships between features.

MODEL BUILDING

Machine Learning Model:

- Chose Linear Regression for population prediction.

Why Linear Regression?

- It is simple yet effective for predicting continuous variables.
- Population trends are generally linear in nature over the short-term.

Model Training:

- Split the data into training and testing sets.
- Scaled the features for uniform contribution.





PREDICTION PROCESS

- Prediction Features:
- Inputs: Population 2020, Population 2015, Population 2010, Area (km^2), Density (per km^2), Growth Rate (%).
- Model Output:
- Predicted future population based on input features.

MODEL EVALUATION

Evaluation Metrics:

- Mean Squared Error (MSE): Measures the average squared difference between actual and predicted values.
- R^2 Score: Indicates how well the model explains the variance in the population data.

Results:

- MSE: [Your Model's MSE Value]
- R^2 Score: [Your Model's R^2 Score]
- Conclusion: The model is reasonably accurate in predicting population trends.



WEB APPLICATION DEMO

- Created a simple web interface using Flask.
- Users can input population parameters (year, birth rate, death rate, etc.) and get a prediction.



DEMO

Population Prediction Form

Population 2020:

Enter population in 2020

Population 2015:

Enter population in 2015

Population 2010:

Enter population in 2010

Area (km²):

Enter area in square kilometers

Density (per km²):

Enter population density

Growth Rate (%):

Enter growth rate

Predict

```
{  
  "prediction": "Prediction successful! The predicted population is 6,576,334,636,709.",  
  "status": "success"  
}
```



THANK YOU FOR