Exploratory Data Analysis (EDA) Report

# UAE Population Analysis and Forecasting

Prepared by: POOJA ANILKUMAR

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# 1. Introduction

This report presents an Exploratory Data Analysis (EDA) of the UAE population dataset. The purpose of the analysis is to understand historical population trends across gender and age groups, gain insights into demographic changes over time, and lay the foundation for forecasting future population trends. This analysis will support data-driven decisions in policy planning and resource allocation.

# 2. Data Description

The dataset used for this analysis contains population estimates for the United Arab Emirates from 1950 to 2022, categorized by age group and gender. The key columns include:  
- Year: The year of the population count.  
- Sex: The gender of the population (Male/Female).  
- Age Group Name: The age group the population belongs to.  
- Value: The population count for the specified year, gender, and age group.  
  
Source: Federal Competitiveness and Statistics Center - UAE Population Estimates.

# 3. Data Cleaning and Preprocessing

Data cleaning involved checking for missing values, verifying data types, and ensuring consistency across records. Categorical variables such as gender and age group were encoded using one-hot encoding to allow for proper analysis. Additionally, the 'year' column was converted to numerical form to enable time series analysis.

# 4. Exploratory Data Analysis (EDA)

## 4.1 Population Growth Over Time by Gender

The UAE population has shown consistent growth over the years. The male population has grown faster than the female population, which is likely due to labor migration, as many male workers come to the UAE for employment in key sectors such as construction and services.

## 4.2 Population Distribution by Age Group and Gender (Latest Year)

The working-age population (ages 20–50) makes up the largest portion of the UAE’s population in 2022. This suggests that the UAE workforce is predominantly composed of adults in their prime working years. Younger and older age groups are less represented, reflecting the country’s reliance on a foreign labor force.

## 4.3 Population Trends by Age Group Over Time

The analysis shows that the 20–50 age group has grown significantly, while the elderly population (60+) remains small. There is a steady increase in the younger population (below 20), although at a slower rate compared to the working-age group.

## 4.4 Overall Gender Distribution

The overall population is skewed towards males, with men comprising a larger proportion of the population. This imbalance is attributed to the influx of male workers from abroad. Female representation is higher in the younger age groups, suggesting a more balanced gender ratio among children.

# 5. Findings and Insights

Key insights from the EDA include:  
1. The male working-age population (20–50) dominates the UAE’s demographic profile, largely driven by labor migration.  
2. The UAE’s population has been growing steadily, with the male population outpacing the female population.  
3. The elderly population remains a small segment, although it has shown slow growth in recent years.  
4. The gender ratio is more balanced among children, indicating natural population growth among residents.

# 6. Conclusion

The EDA has provided valuable insights into the demographic trends of the UAE population. The analysis shows that the population is heavily skewed towards males in the working-age group, with a steadily growing population overall. These insights will inform future predictive models that forecast population growth and guide policy decisions in workforce planning, resource allocation, and urban development.