DATA EXPLORATION AND SYSTEM MANAGEMENT (COURSE CODE: 13906)

Analyzing Demographic Trends and Scenario Simulations in Pakistan

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Use Python-based analysis to explore population trends and simulate growth scenarios

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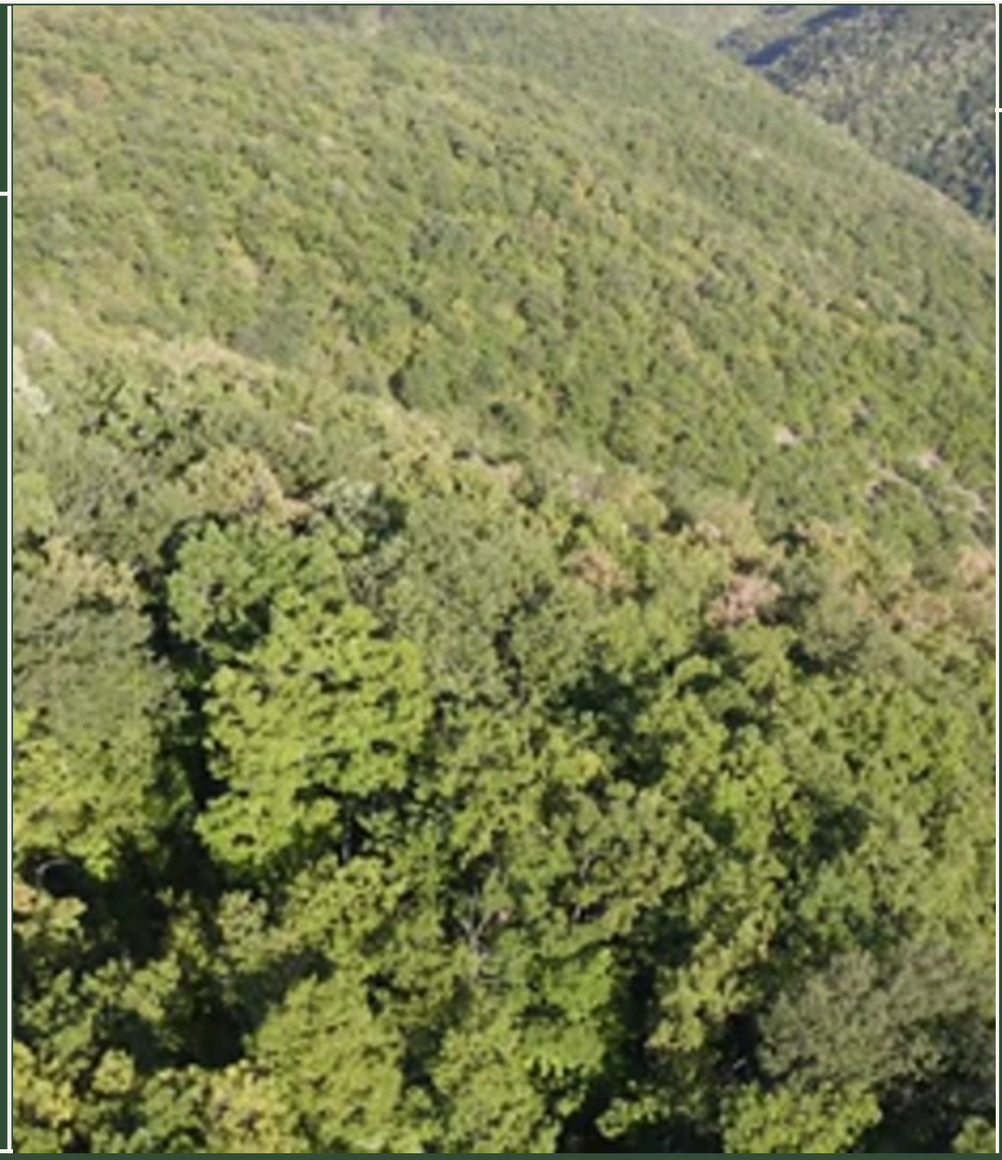
Abstract

Project Focus

- What: Investigating Pakistan’s demographic trends
- How: Data visualization and scenario simulations
- Why: Provide insights to policymakers and stakeholders

Scenarios Analyzed

- Growth rate variations
- GDP-driven growth
- Uniform growth



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Introduction

Importance of Demographic Analysis

- Critical for resource allocation, development planning, and policy-making
- Highlights regional disparities and population trends

Why Pakistan?

- Diverse demographics with rapid population growth
- Unique challenges such as high fertility rates and religious diversity

Goal

- Identify key trends and explore potential outcomes through simulations

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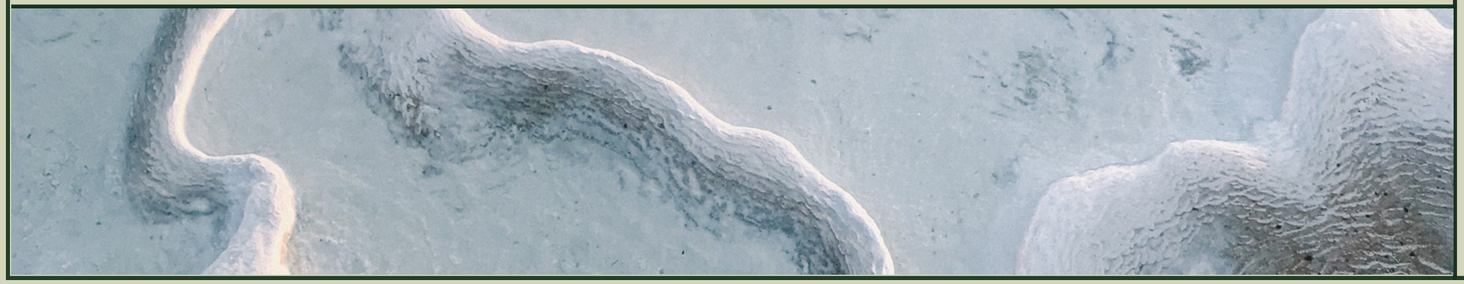
Methods

Data Collection

- Datasets focused on religion-based population distribution, age demographics, and geographic trends

Tools and Libraries

- Pandas: Data cleaning and manipulation.
- Matplotlib/Seaborn: Creating detailed visualizations
- Scipy: Dynamic calculations for GDP-driven growth modeling



Techniques

- Static and dynamic growth models for different scenarios
- Forecasting population changes over 10 years

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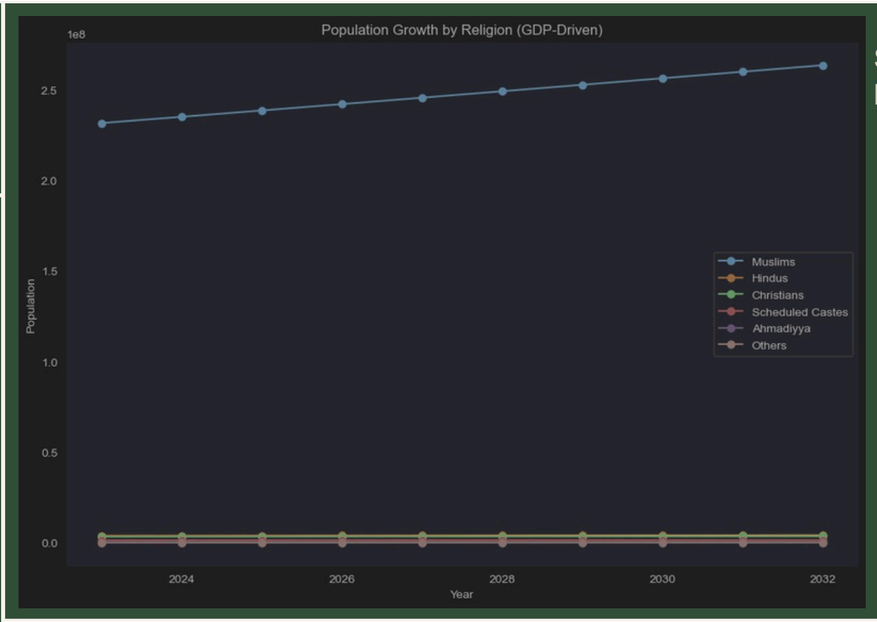
Results

Scenario 1: Growth Rate Variations

- Applied growth rates for each religion (e.g., Muslims: +5%, Hindus: -2%)
- Outcome: Muslims increased significantly, maintaining their dominance. Hindus and Scheduled Castes experienced declines

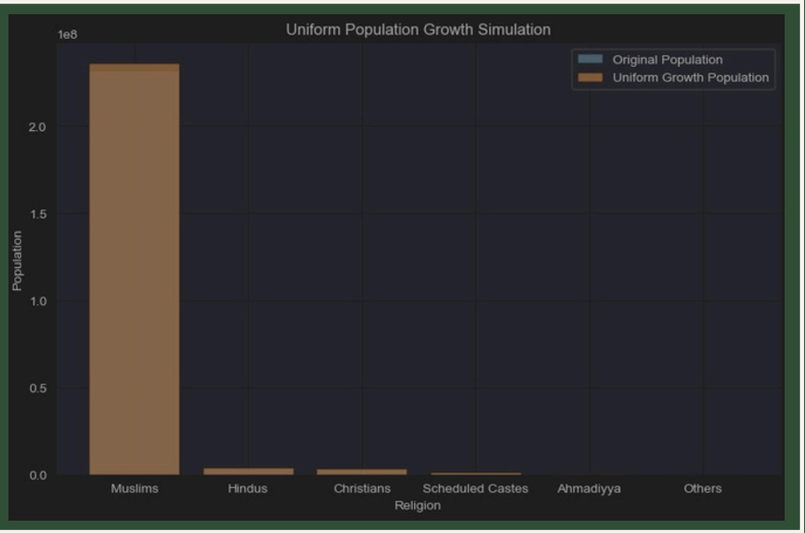


Scenario 2: GDP-Driven Growth

- Growth rates adjusted dynamically with GDP improvements
- Outcome: Overall growth reduced, reflecting better living standards, but Muslims remained the majority

Scenario 3: Uniform Growth

- A 2% growth rate applied equally to all religions
- Outcome: Proportional distribution of populations was preserved



Implications of Findings

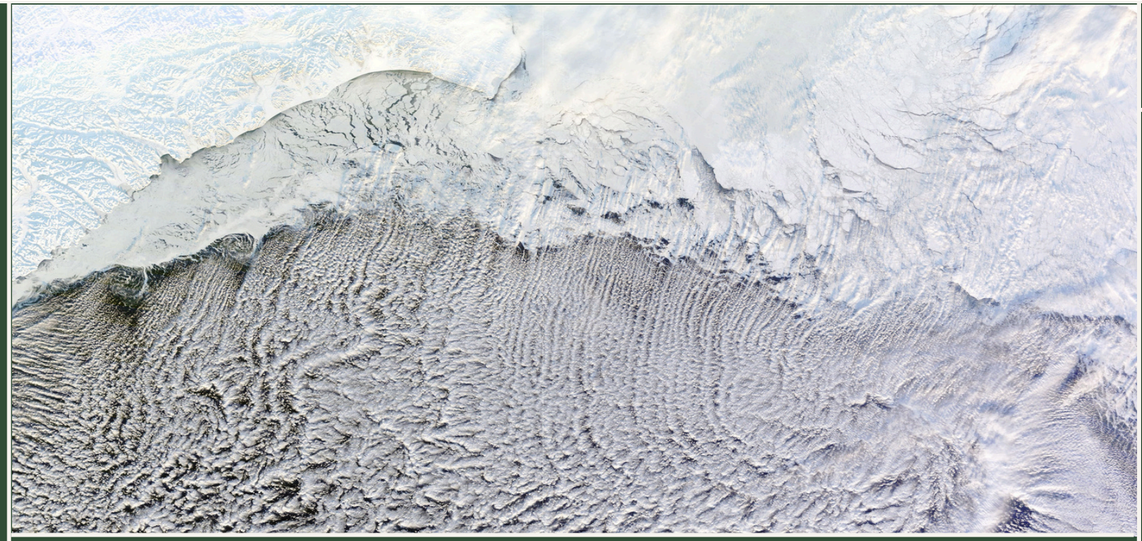
- Religion-specific growth rates highlight potential social disparities
- Economic improvements stabilize growth trends, supporting sustainable development
- Uniform growth showcases stability but lacks real-world variability

Strengths

- Python’s computational tools provided efficient, high-quality analysis

Limitations

- Static growth assumptions may not capture real-world complexities
- Lacked district-level data granularity for deeper insights



DIscussion

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Conclusion

Key Takeaways

- Scenario simulations are powerful tools for understand demographic dynamics.
- Insights emphasize the interplay between population trends and socioeconomic factors.

Future Directions

- Expand analysis to include migration, fertility rates, and district-level granularity.
- Incorporate real-time economic data for more dynamic forecasting.

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Thank you!

Check out these sources:

- Python Libraries: Pandas, Matplotlib, Seaborn, NumPy, Scipy. URL: Popular Python Libraries - NumPy, Pandas, Seaborn, Sklearn
- Data Sources: National demographic surveys, public databases. Data Sources for Demographic Research | Pew Research Center
- Kaggle URL: https://www.kaggle.com/datasets/kirahhayatdata/pakistan-demographic-and population-data

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