CLIMATE CHANGE ANALYSIS

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S3-18

Introduction

Climate change represents one of the most significant challenges facing our planet today. This project leverages big data technologies and advanced analytics to examine global temperature changes from 1961 to 2022. Using PySpark for distributed computing and machine learning techniques, we've analyzed data from multiple countries to identify patterns, trends, and regional variations.

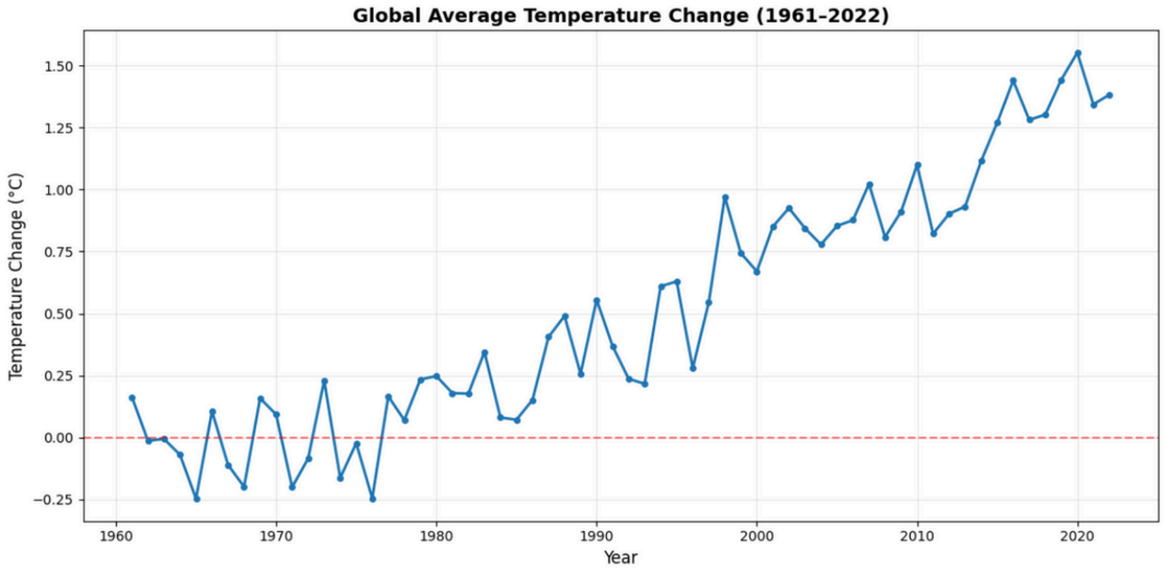
Objectives

- Analyze global temperature change patterns (1961–2022)
- Identify regions with significant temperature variations
- Provide statistical insights into climate change
- Visualize climate trends effectively
- Build a scalable big data analytics framework

Dataset Overview

- Time Period: 1961–2022 (62 years)
- Geographic Coverage: Global (multiple countries)
- Data Points: Annual temperature change records
- Key Variables: Country, Yearly temperature data, Continental classification, Temperature change metrics

Data Analysis Performed



Description:

The graph shows yearly global temperature changes from 1961 to 2022 compared to the baseline average. The red dashed line (0°C) marks the reference point.

Analysis:

Global temperatures stayed near average until the late 1970s, then began rising steadily. After 2000, the increase accelerated, crossing 1°C above the baseline — clear evidence of ongoing global warming.

Screenshots

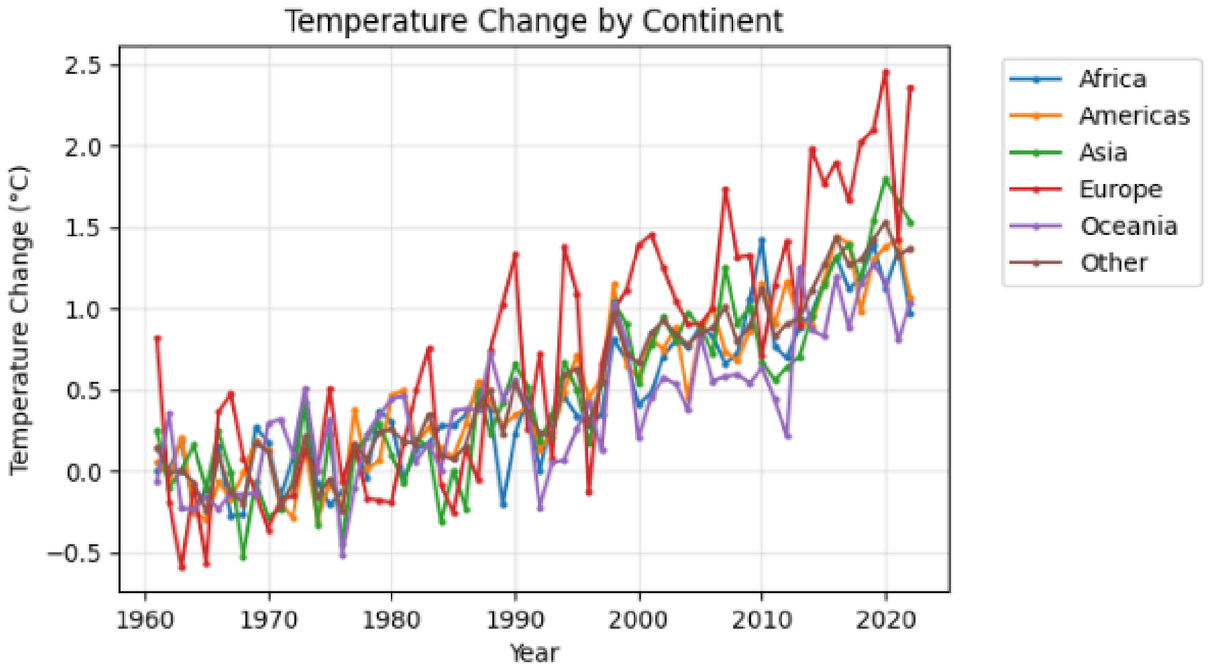


Image 1

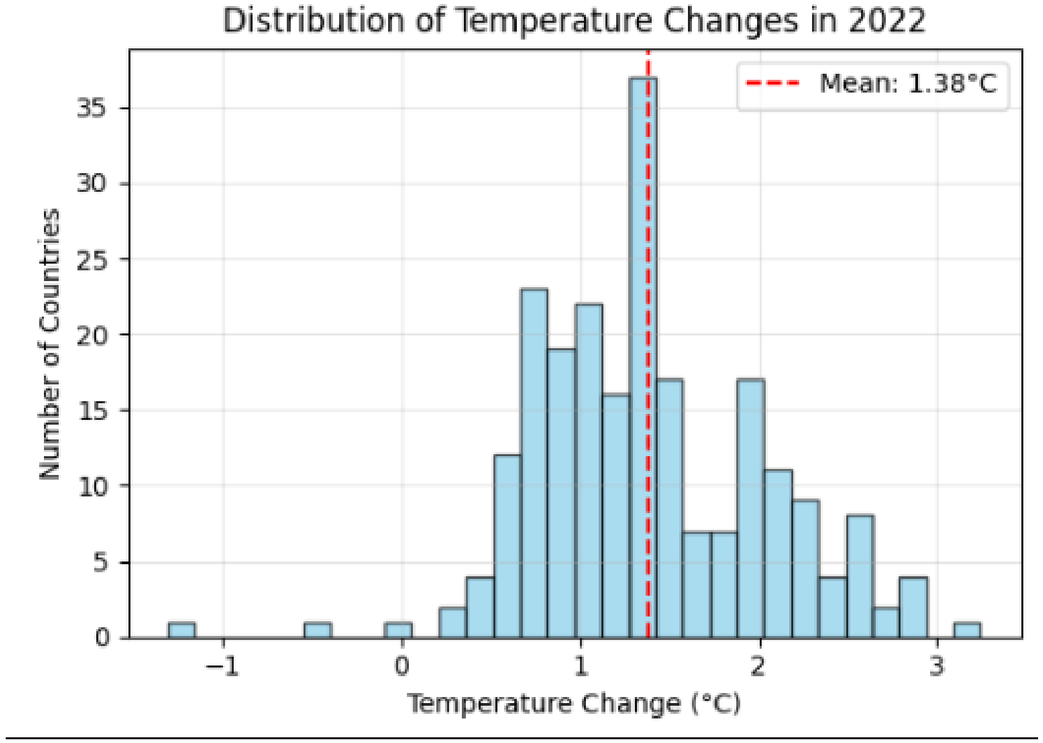


Image 2

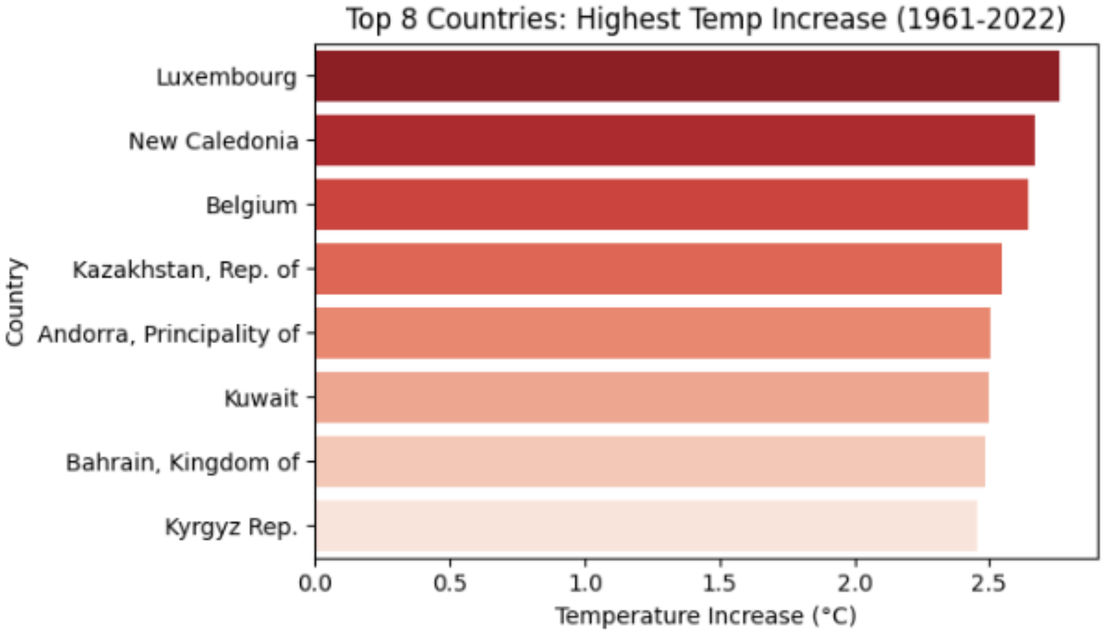
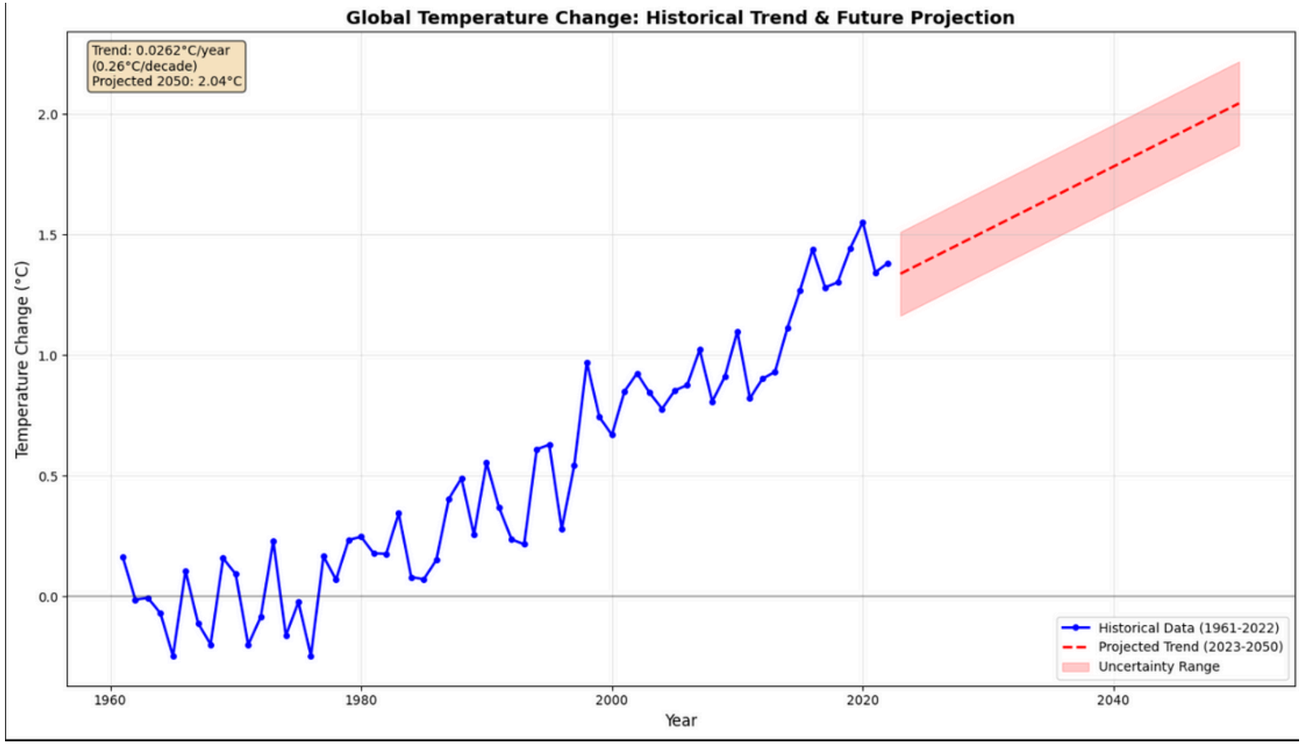


Image 3

Image 4



Key Observations

- Global warming trend has accelerated since 1961
- Consistent upward temperature movement across all continents
- Some regions show higher rates of warming
- Increased temperature variability over time
- Strong correlations between recent years, indicating persistent warming

Conclusion

This analysis provides clear evidence of sustained global temperature rise and regional disparities. It reinforces the scientific consensus on climate change and the importance of data-driven insights for effective climate policy and mitigation planning.