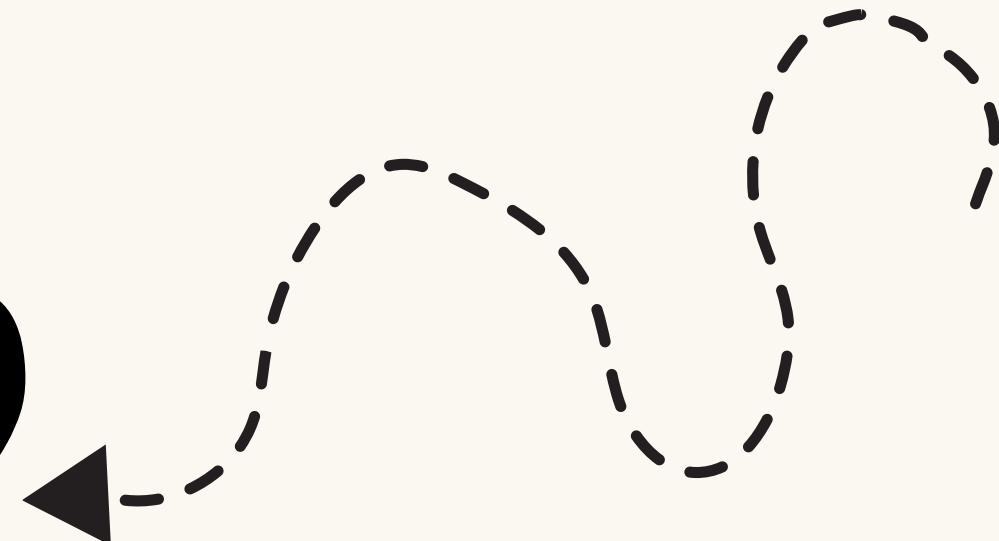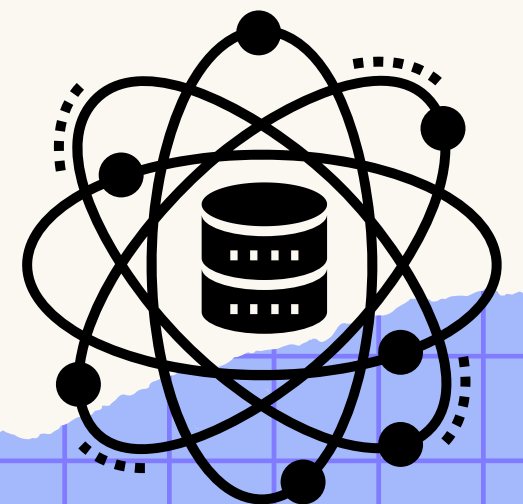By Dennis Maxwell

# 3MTT C2

# CAPSTONE PROJECT

<u>Title</u>: Analyzing Global COVID-19 Trends

<u>Subtitle</u>: Forecasting, Classification, and Interactive Visualization

<u>Author</u>: Dennis Maxwell - FE/23/29787163

<u>Track</u>: Data Science

<u>Date</u>: November 2024

# Abstract

The COVID-19 pandemic has profoundly impacted public health and global economies.

# Goals and Objectives:

- Analyze COVID-19 trends globally.

- Predict future case trajectories using time-series modeling.

- Identify high-mortality countries through classification models.

- Develop an interactive dashboard for stakeholder engagement.

# Methodology

- Data Collection:

- Preprocessing
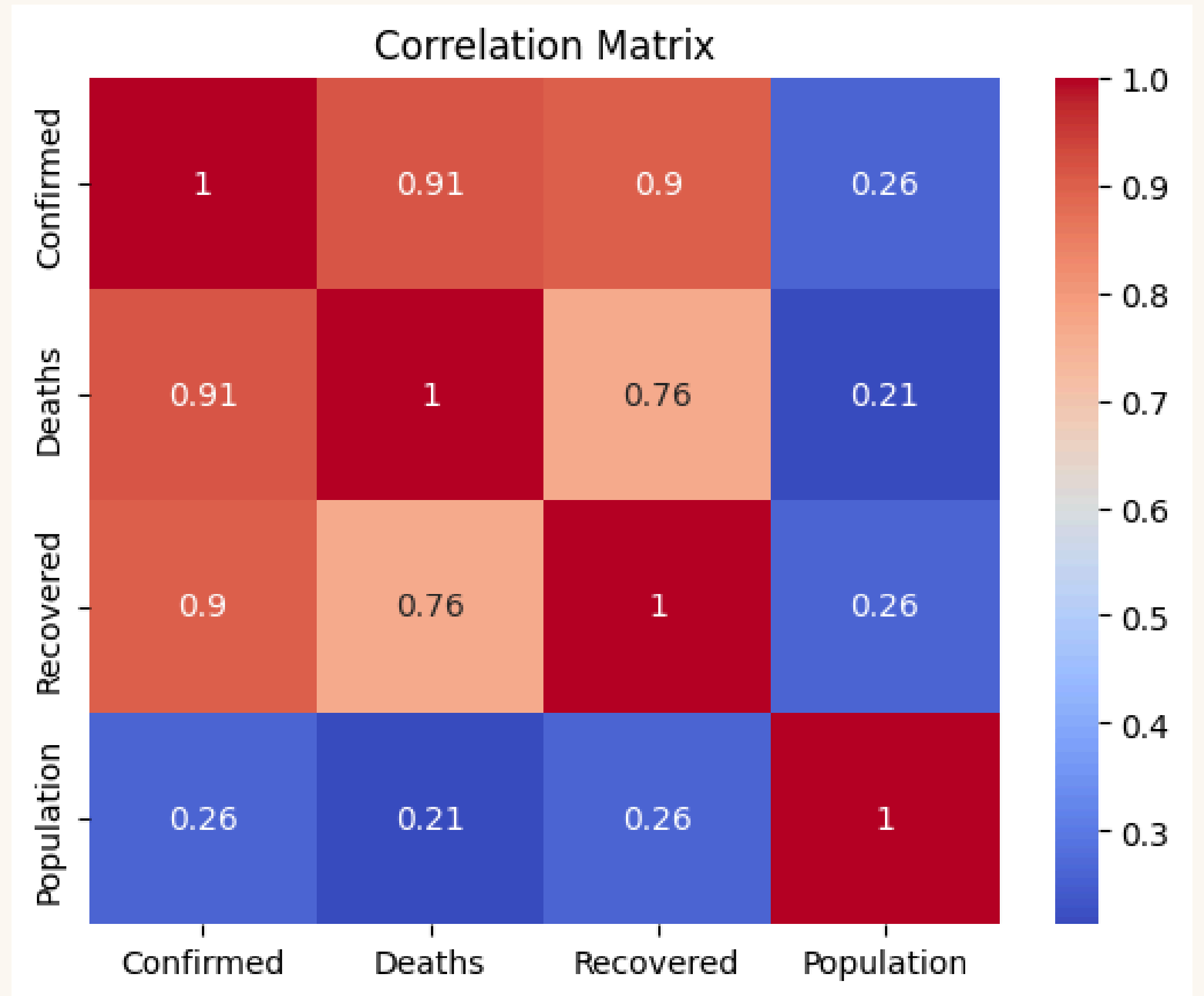
- Exploratory Analysis
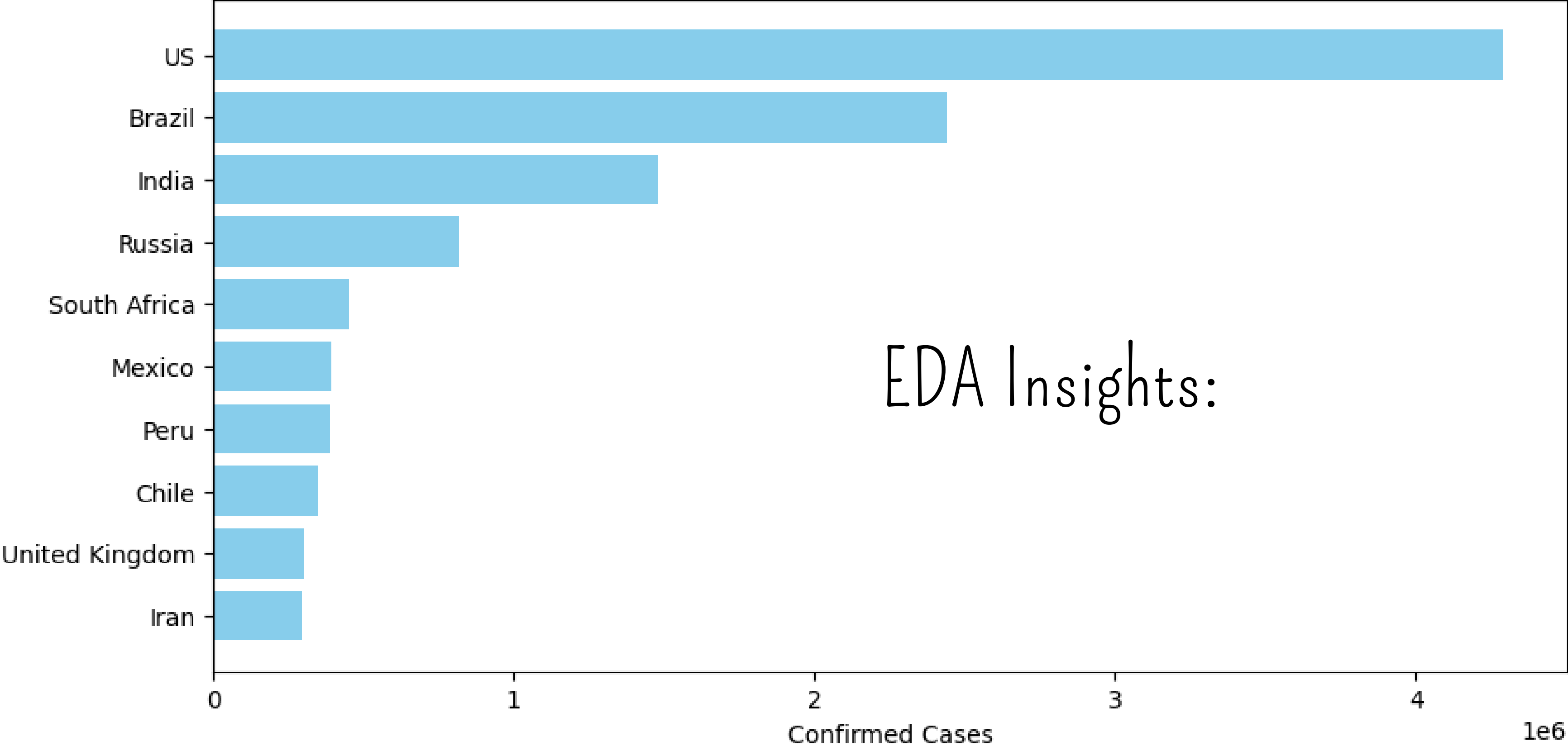
- Modeling:

# Results
# EDA Insights:



Global COVID-19 Trends
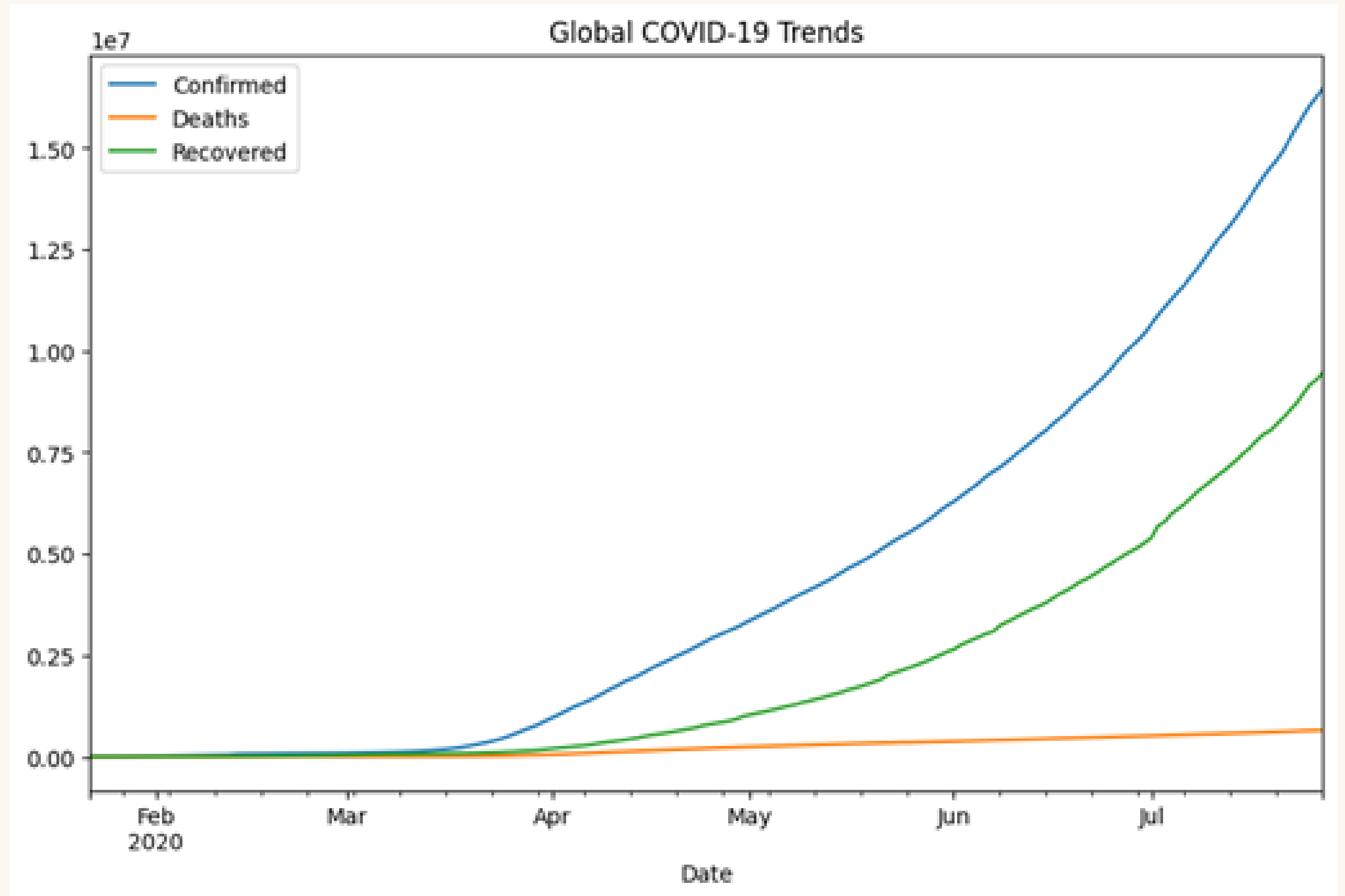
# Results
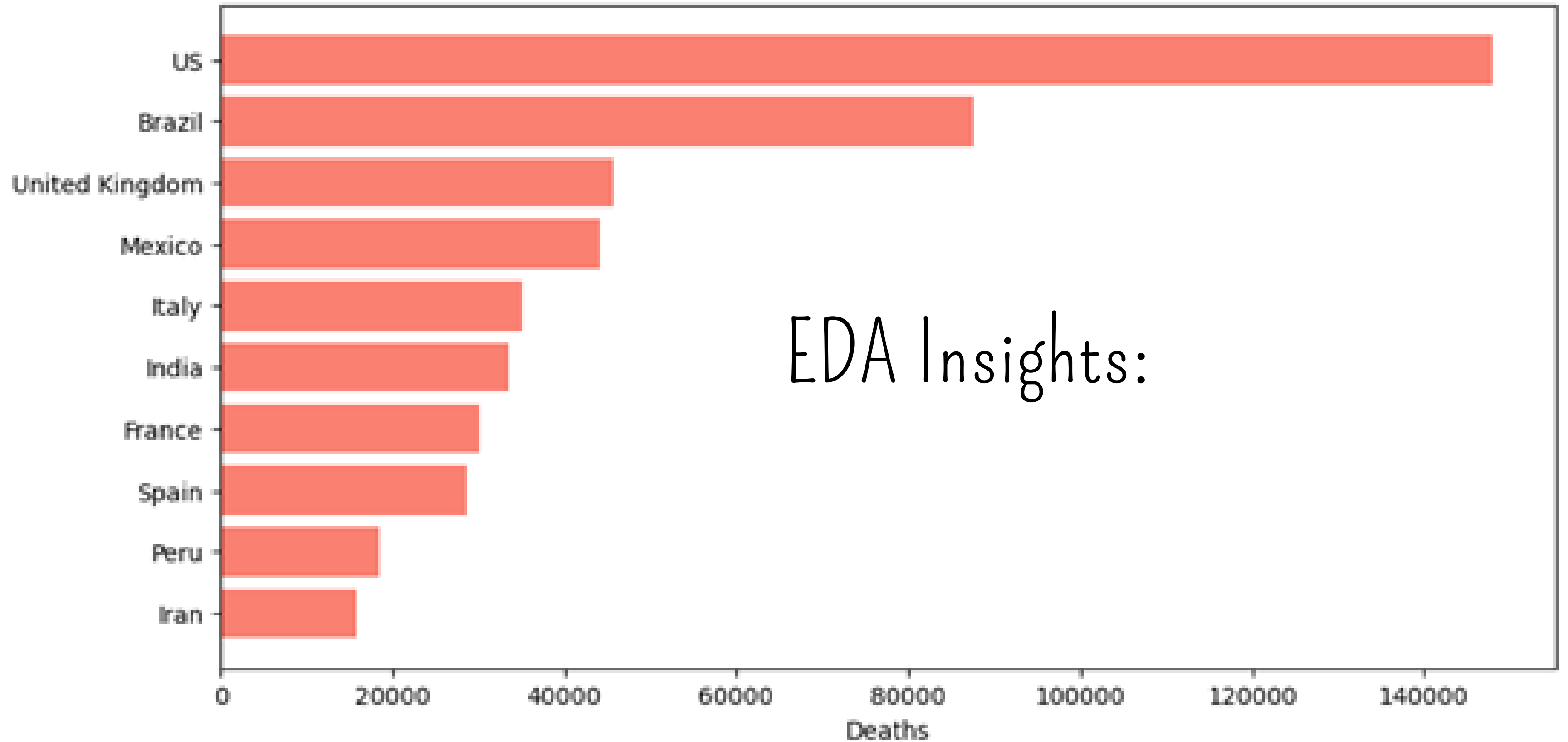## Correlation Analysis:



Correlation Matrix
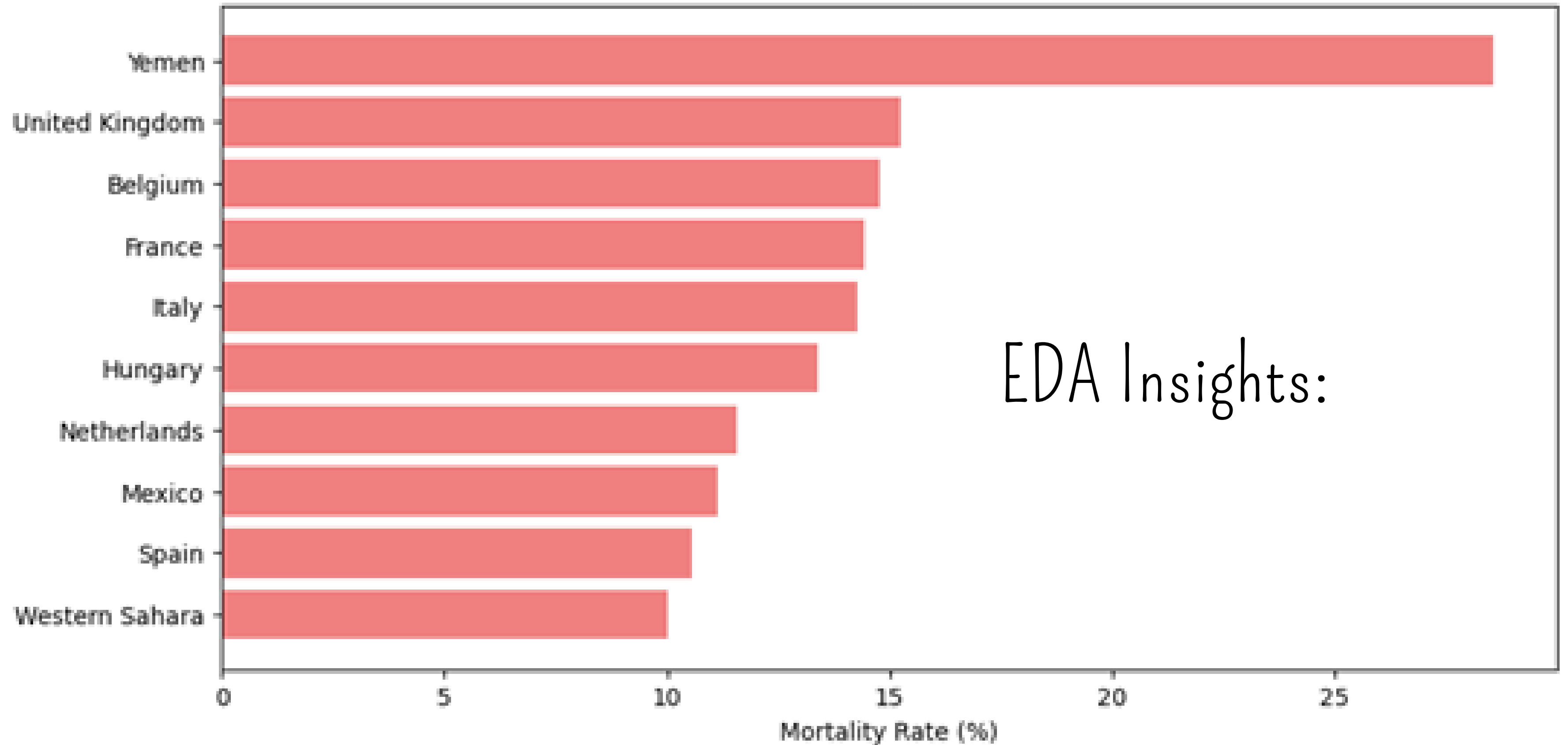
Top 10 Countries by Confirmed Cases

EDA Insights:

Top 10 Countries by Deaths

EDA Insights:

Top 10 Countries by Mortality Rate

EDA Insights:

# Time-Series Forecasting:

## ARIMA model results:

- MAE: 214,000 cases.

- RMSE: 305,000 cases.

# Classification Outcomes:

- Logistic Regression: 82% accuracy.

- Random Forest: 87% accuracy.

- XGBoost: 89% accuracy (Best performer).

# Interactive Dashboard

Features:

- Time-series plots and global maps.

- Dropdown for country selection.

# Discussion

Key Insights:

- Higher healthcare burdens correlate with increased mortality.

- XGBoost effectively identifies high-risk regions.

- Advanced models needed for better forecasting.

# Limitations:

- Limited real-time data integration.

- Economic and vaccination data excluded.

# Conclusion

This study demonstrates the utility of integrating statistical, machine learning, and visualization techniques to analyze COVID-19.

# THANK YOU