

Global Suicide Analysis

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Introduction

Once overlooked, mental health is now widely acknowledged as a critical issue, with suicide serving as a stark indicator of its severity. Our project explores the link between societal freedoms, measured by the Human Freedom Index (HFI) and the Economic Freedom Index (EFW), and global suicide rates. By identifying key factors and building predictive models, we aim to inform policymakers and mental health advocates.

Discovering & Cleaning Data



Data sources:

- 1. Suicide rates (1986–2016) by age, sex, and country (Kaggle).
- 1. Economic Freedom metrics (Fraser Institute).
- 2. Human Freedom Index (2010–2016) measuring civil, personal, and economic freedoms (Cato Institute).

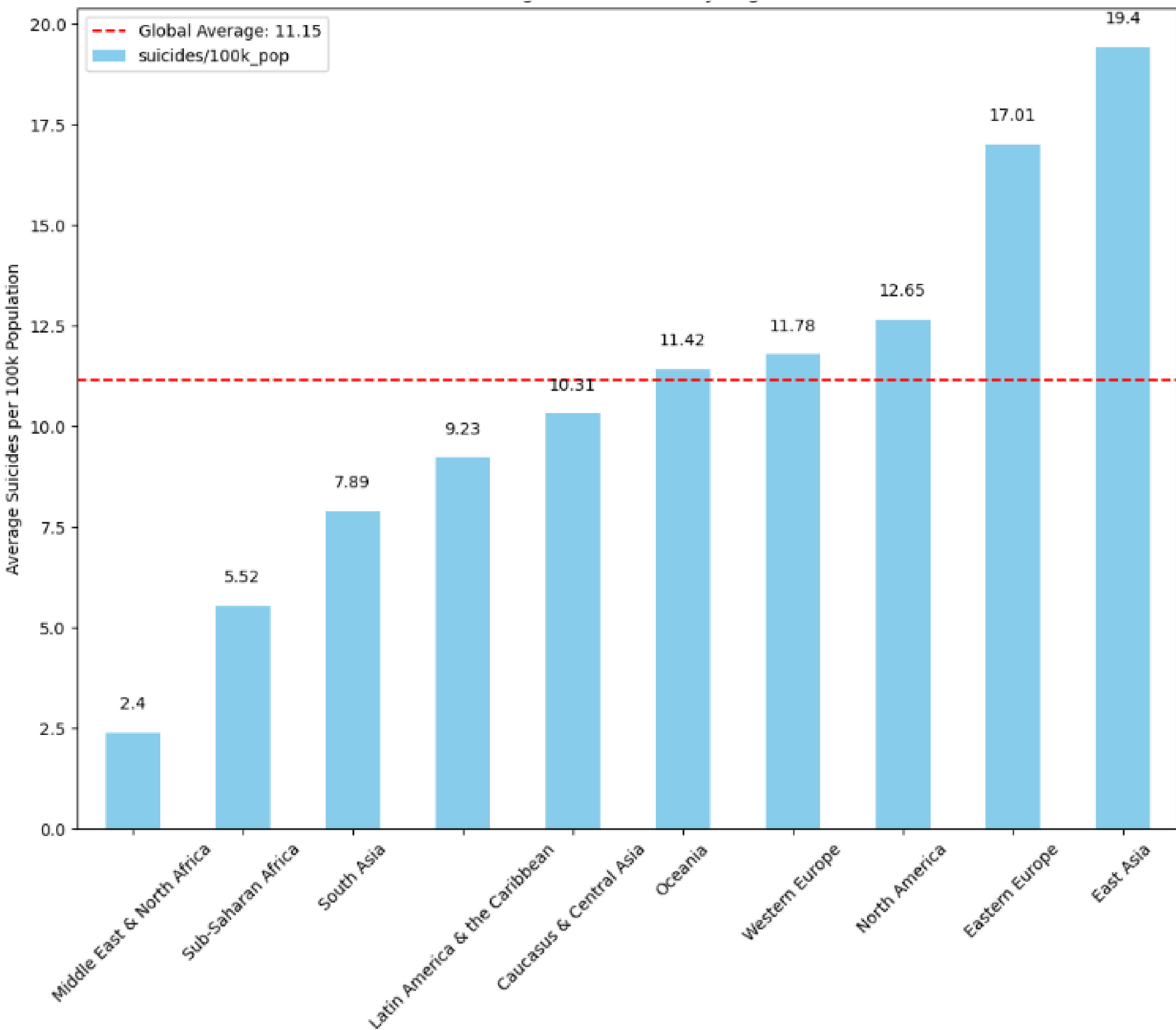


Cleaning:

- 1. Removed rows for countries with ongoing wars to avoid confounding effects.
- 2. Selected overlapping years and common features across datasets.
- 3. Addressed missing data by removing rows with excessive gaps.
- 4. Standardized and aligned data formats for consistency.

Goal

To grasp societal and economic factors linked to suicide rates and develop a predictive model that achieves a minimum accuracy of 70%.



Method & Models

Replaced missing numerical values with regional medians to preserve regional patterns. Dropped features with excessive missing data. Applied one-hot encoding to transform non-numerical data into a format suitable for modeling. Goal for model: Predict suicide rates per 100k population aiming to achieve a high R^2 score and a low RMSE. Models Tested: Linear Regression, Lasso, and Ridge Regression. Random Forest and XGBoost Regressors.

Results

We achieved the goals we set for ourselves. Created interesting graphs and found statistical results that illustrate global suicide trends. Found that GDP, homicide, regulation, expression control and dissappearances have the highest correlation with suicide rates. XGBoost model achieved the best performance at predicting, reducing RMSE to 2.95 and an R^2 score of 0.846, there seems to be a few red flags we will continue investigating.

