Conflict/Terrorism Forecasting Report

1. Project Overview

Objective: Forecast monthly conflict/terrorism intensity per country using historical multi-source data (GTD, UCDP, GDELT).

Approach: Data integration preprocessing XGBoost modeling dashboard visualization.

Time Frame: Predicting for January to December 2024.

2. Data Sources & Preprocessing

Datasets Used:

- GTD (Global Terrorism Database)
- UCDP (Uppsala Conflict Data Program)
- GDELT (Global Database of Events, Language, and Tone)

Steps:

- Cleaned and filtered each dataset.
- Concatenated all three into one master dataset.
- Pivoted by country and aggregated monthly.
- Removed sparse/all-zero columns.
- Selected features from 20132023 for modeling.

3. Modeling with XGBoost

Target Variable: Monthly conflict/terror activity per country.

Features: Aggregated indicators (event counts, protest activity, etc.) from the combined dataset.

Model: XGBoost Regressor (reg:squarederror)

Conflict/Terrorism Forecasting Report

Hyperparameters:

```
{
    'objective': 'reg:squarederror',
    'eval_metric': 'rmse',
    'max_depth': 6,
    'eta': 0.1
}
```

Performance:

- RMSE (Test set, sample country "AF"): ~5.2 million
- Feature Importance: Top features included historical violence, protest frequencies, and neighbor country indicators.

4. Forecast Generation

Predicted values for each country from Jan 2024 to Dec 2024.

Used last available historical feature snapshot as proxy.

Stored predictions in a standardized format:

date	country	prediction
2024-01-01	AF	120.5
...	...	...

5. Interactive Dashboard

Conflict/Terrorism Forecasting Report

Framework: Dash (Plotly + Flask)

Features:

- Choropleth Map: Displays prediction intensity per country.

- Timeline Slider: Choose a month to see global predictions.

- Time-Series Panel: Click any country to view prediction trend over the year.

Tech Stack:

pip install dash pandas plotly xgboost

User Interaction:

- Hover or click countries to explore.

- Switch months using the slider.

- Export visuals for reports.

6. Findings & Insights

- High predicted intensity in countries with ongoing or recent conflicts.

- Some countries show increasing trends even if historically low in activity.

- Feature importance shows interdependence across countries.

7. Next Steps

- Improve forecasting with lag features (e.g., previous months counts).

- Integrate real-time data for nowcasting.

- Train separate models per region for better granularity.

- Validate predictions against actual 2024 events (when available).