# Analyzing Climate's Role in Urban Accidents in the U.S.

**MVP 1**: Initial Progress Presentation

## **Project Scope and Objectives**

**Objective:** Quantify Weather-Accident

Relationships

**Approach:** Time-Series Analysis

- Explore Seasonal Trends
- Pattern Recognition
- Forecasting

#### **Data Sources**

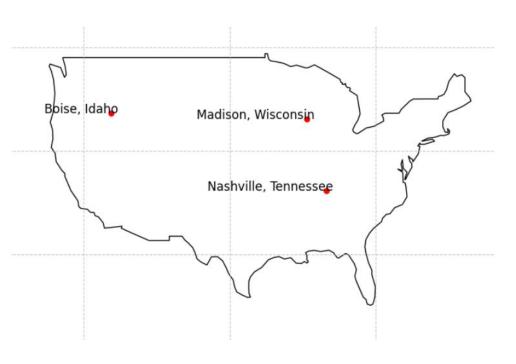
#### **Traffic Data:**

- U.S. Accidents (2016 2023) Kaggle
- Crash Report Sampling System from NHTSA

The Weather Dataset: Meteostat from Kaggle

#### Cities:

- Madison, Wisconsin.
- Nashville, Tennessee.
- Boise, Idaho.



## **Preliminary Data Exploration & Preprocessing Strategy**

- Initial Findings:
  Summary Statistics & Distributions
  - Accidents Across Cities
  - Accidents Across Seasons

Tentative Insights: Correlations

- Challenges:
  Merging & Missing Data.
  - Time-Series Alignment
  - Missing Data Handling

Solutions: Imputation & Alignment

## **Feature Engineering Approach**

 Features: Temporal features, Lag Variables & Seasonality, Normalization.

• Goals: Capture Time-Dependent Patterns

Short-term Trends, Long-term Trends

#### **Initial Model Selection**

 Models: ARIMA, SARIMA, (potentially) Prophet, and Recurrent Neural Network (RNN) like LSTM/GRU.

- **Criteria:** Accuracy & Interpretability.
- ARIMA (Autoregressive integrated moving average)/SARIMA (Seasonal AutoRegressive Integrated Moving Average) for Baseline.

 Prophet & LSTM (Long -short-term memory) and GRU (Gated Recurrent Unit) for Advanced Analysis.

# **Methodology Overview**

- Methodology Phases:
  - Data Collection
  - Preprocessing
  - Exploratory Analysis
  - Feature Engineering
  - Model Building
  - Evaluation

- Evaluation Metrics:
  - MAE
  - o RMSE
  - MAPE

# **Next Steps**

MVP 2 Goals:

Feature Engineering & Initial Modeling

• Final Goals:

Model Evaluation & Academic Paper

#### **Questions & Feedback**



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