NOAA Temperature Analysis

Overview

This project analyzes temperature trends using NOAA historical climate data. It focuses on identifying record high and low temperatures from 2005-2014, comparing them with 2015 data to detect any record-breaking events.

Dataset

- **temperature.csv**: Contains daily temperature records with attributes such as date, station ID, temperature values, and element type (TMAX/TMIN).
- **BinSize.csv**: Additional metadata, included but not directly analyzed in this version.

Analysis Performed

1. **Data Cleaning & Preprocessing**
    - Converted date values into proper datetime format.
    - Removed leap day (Feb 29th) for consistency across years.
    - Extracted temperature records for 2005-2014 and 2015 separately.
2. **Historical Temperature Trends (2005-2014)**
    - Identified record high and low temperatures for each day of the year.
    - Created a line graph showing historical record highs and lows.
    - Shaded the area between highs and lows to represent the historical range.
3. **2015 Temperature Anomalies**
    - Compared 2015 temperature data against historical records.
    - Marked days where 2015 broke record highs (red dots) or lows (blue dots).
4. **2015 Temperature Summary**
    - Created a seaborn line plot showing max and min temperatures for 2015.
    - Helps visualize seasonal temperature variations in Ann Arbor.
5. **Data Normalization**
    - Used StandardScaler to normalize temperature values for better comparison.

Results & Insights

- 2015 had some record-breaking temperatures, suggesting extreme weather conditions.
- The overall temperature pattern followed expected seasonal variations.
- The shaded area in the graph represents normal temperature fluctuations over the years.