

Weather vs. Crime

Team: Let's Git

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Intro and Questions

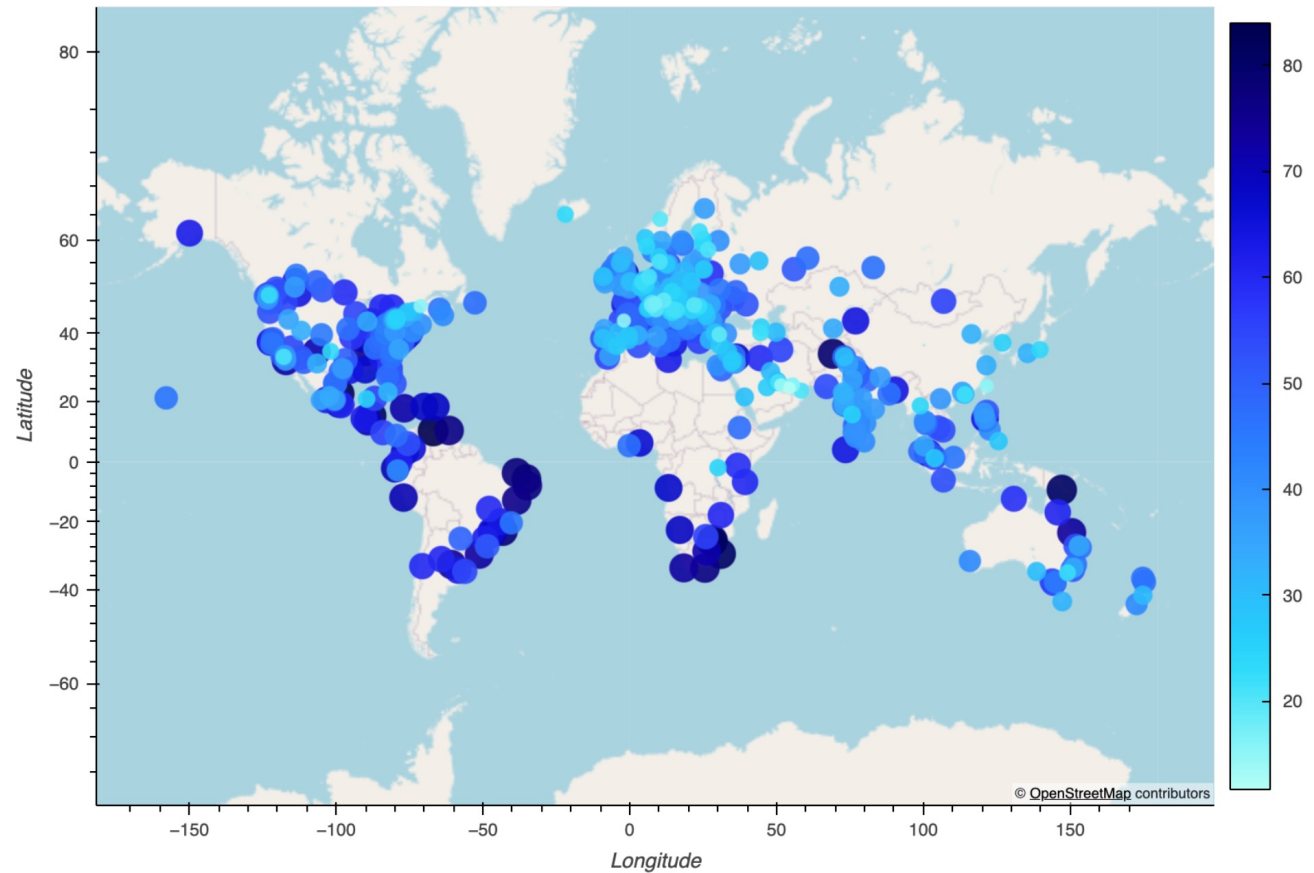
- The following analysis investigates the impact of weather on crime and suicide rates worldwide to determine the correlation. Datasets were retrieved via API, crime index data is from 2022 for over 450 cities worldwide and suicide data is as of 2019 by country.
- Questions
 - 1) Does climate affect crime?
 - 2) Does climate influence suicide rates?
 - 3) Does climate impact crime in the United States by region?

Hypothesis, Assumptions & Sources

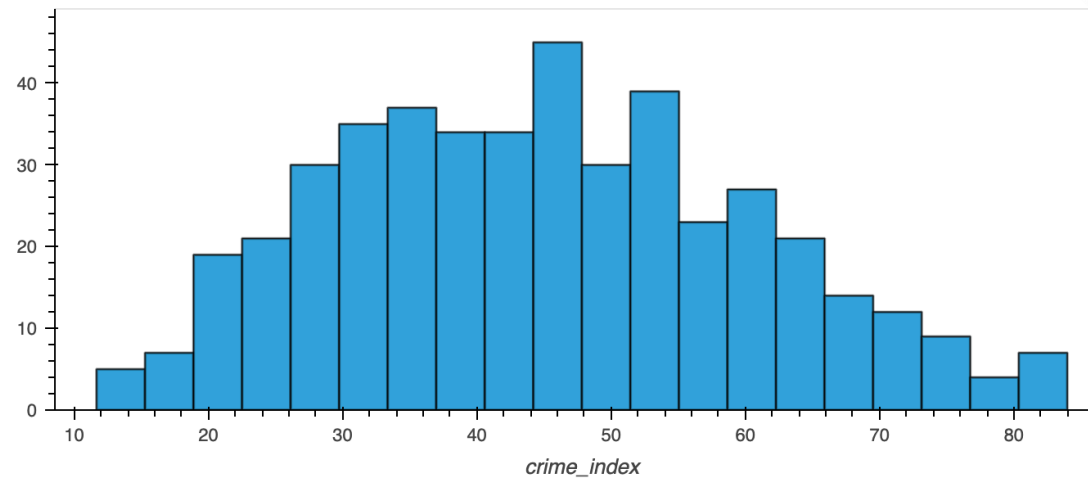
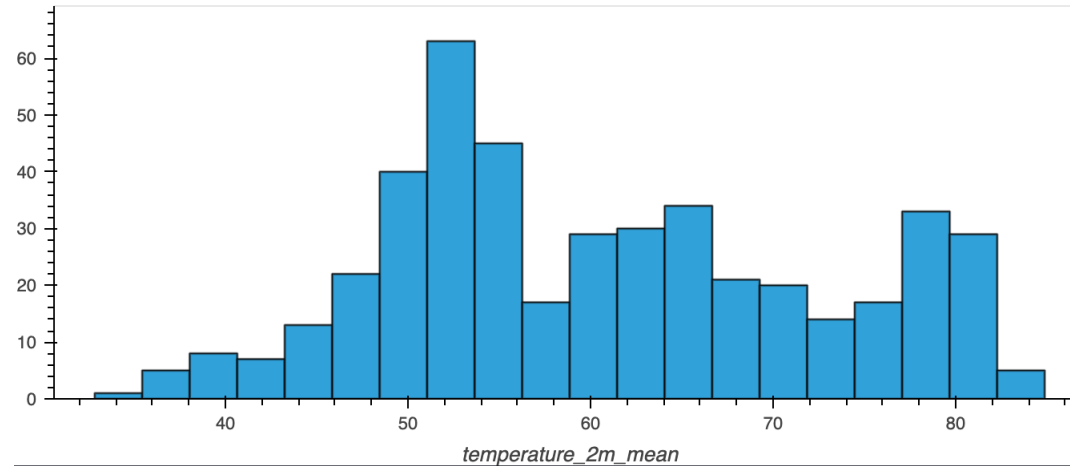
- Determine the correlation of weather vs. crime and weather vs. suicide rates
- Hypothesis for crime by region in the United States
 - **Null:** There is a statistical difference in crime in cities within the northern vs. southern regions of the United States in 2022
 - **Alternative:** There is no statistical difference in crime in cities within the northern vs. southern regions of the United States in 2022
- Assumptions
 - Datasets utilized in the analysis are normalized
 - Analysis examines data from 2022 based on availability of world crime index data
 - Suicide rates are as of 2019, however, we assume the same rates carry forward to 2022, no distinction made by gender
 - The average temperature by city was calculated from daily data from 2022
- Data Sources
 - World Crime Index: <https://www.kaggle.com/datasets/ahmadjalalmasood123/world-crime-index>
 - Weather Data: <https://open-meteo.com/en/docs/historical-weather-api>
 - Suicide Rates : <https://www.who.int/data/gho/data/themes/mental-health/suicide-rates>

Analysis: Worldwide Crime Index

- Crime Index as of 2022 sourced for over 450 cities across the world

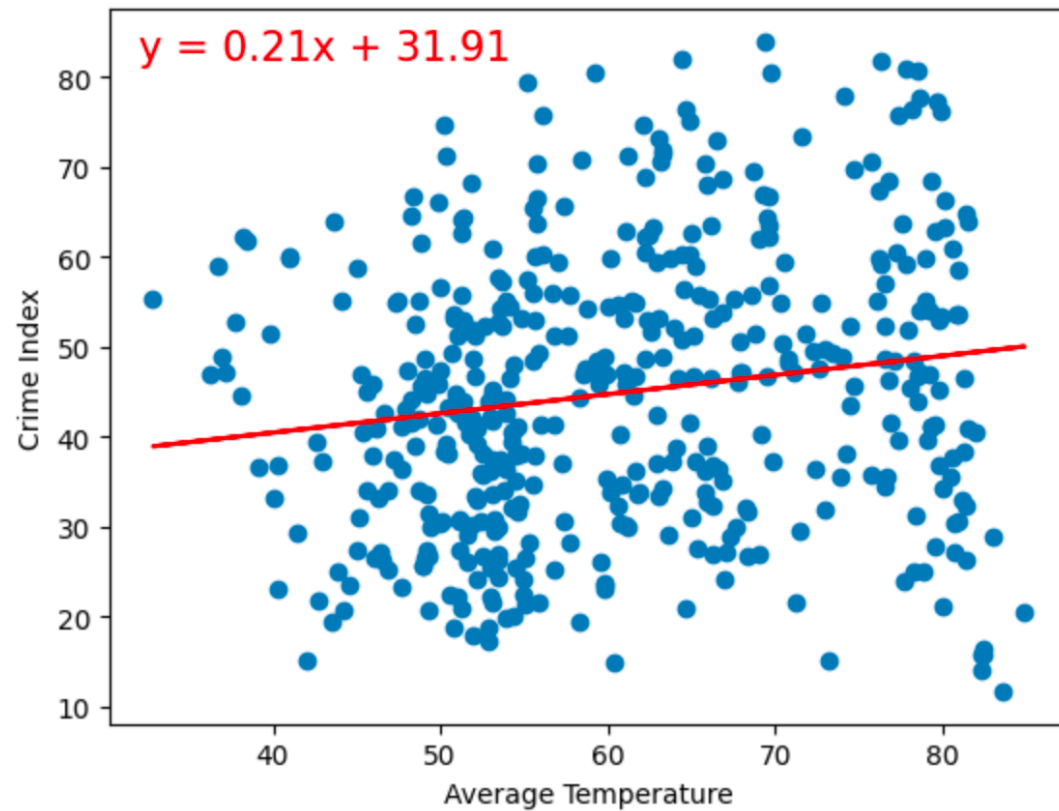


Distribution of Crime Index and Temperature (count by city)



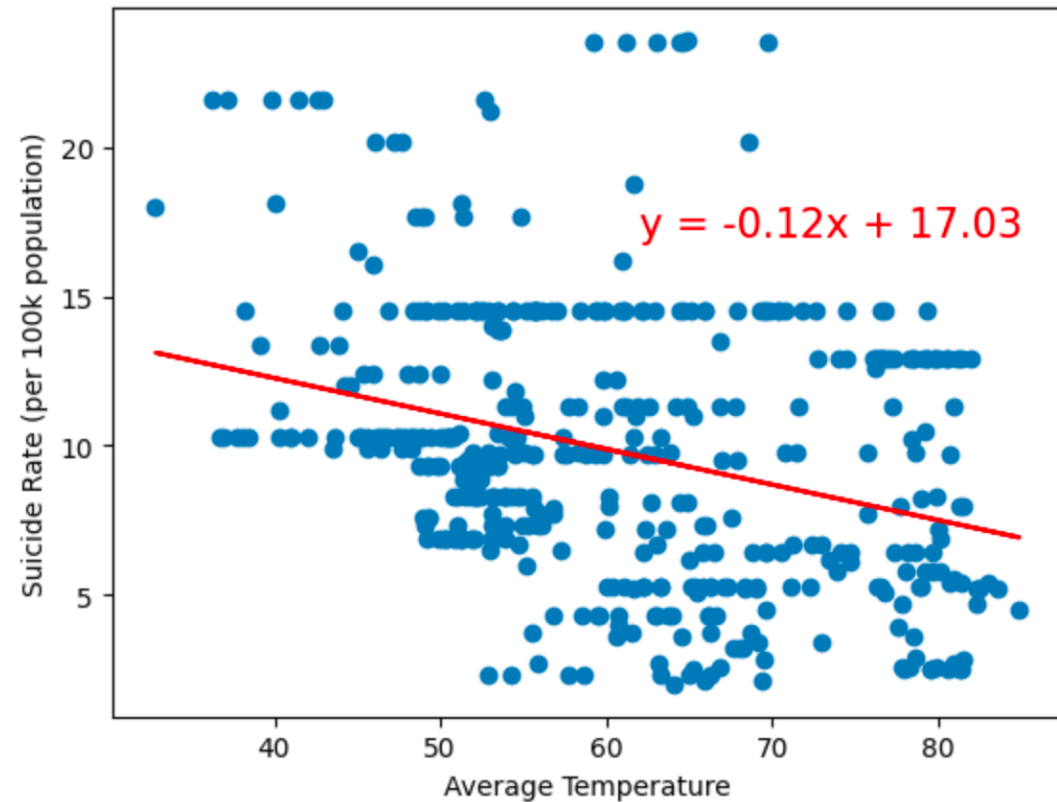
Analysis: Average Temperature vs. Crime Index Worldwide

- The R^2 between crime and average temperature is **0.0265**
- The correlation coefficient is **0.163**, indicating a positive, however, insignificant relationship between the two factors



Analysis: Average Temperature vs. Suicide Rates Worldwide

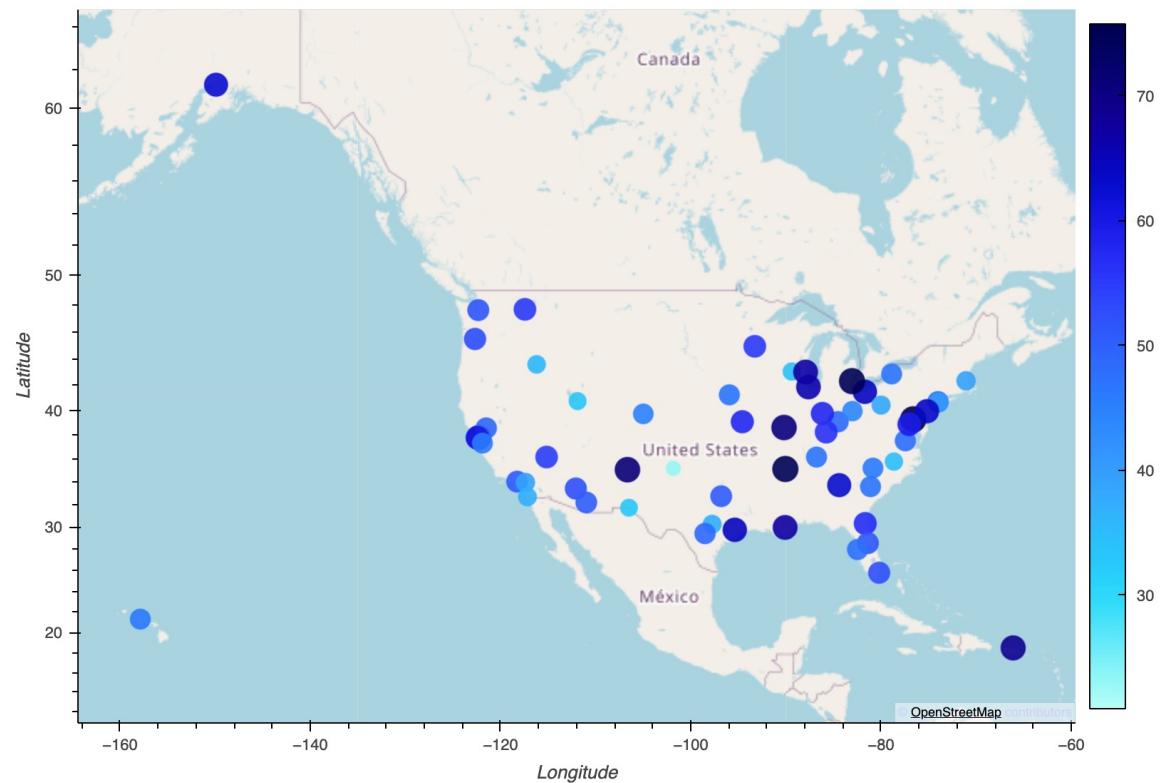
- The R^2 between average temperature and suicide rates is **0.0946**
- The correlation coefficient is **-0.308**, indicating a low negative relationship between the two factors



*Suicide rates are as per 100k population as of 2019 by country

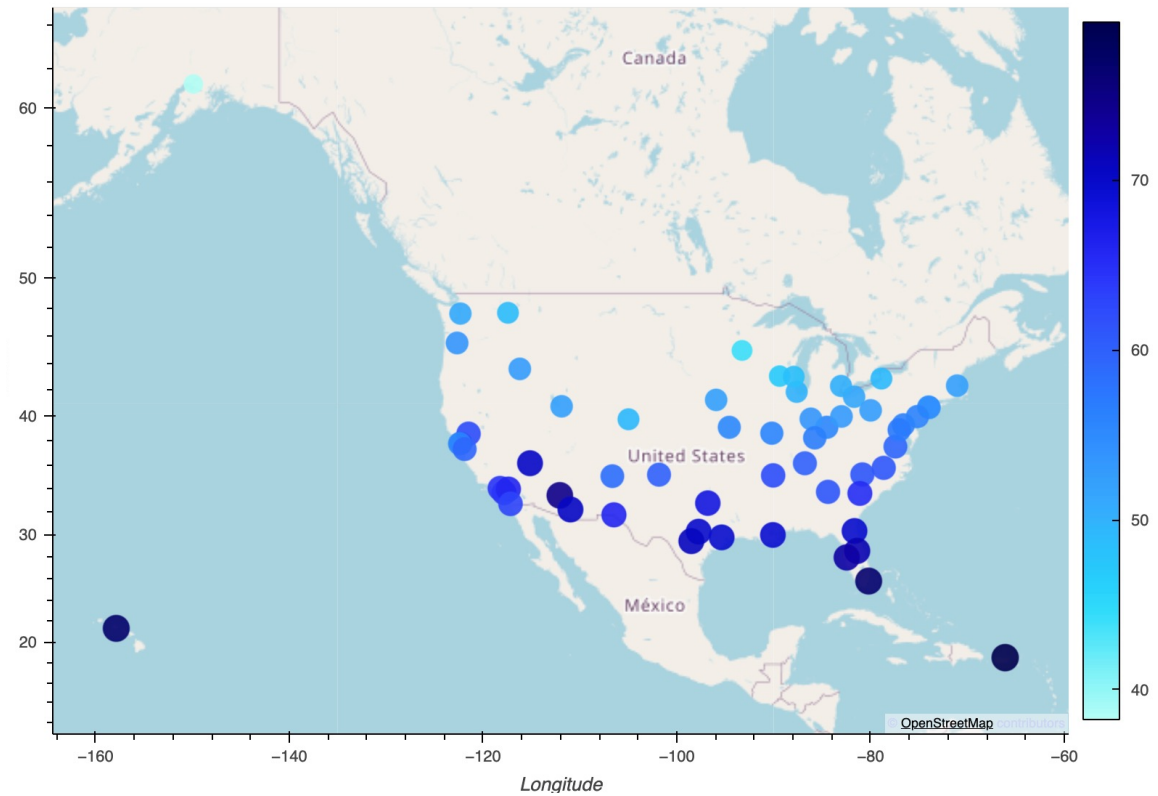
Analysis: Crime in the United States by region

- 60 cities in the US, 18 from Northern and 42 from Southern regions based on the crime index dataset
- Northern US Lat: measured by latitude 40 degrees north and above
- Southern US Lat: measured by latitude 40 degrees north and below



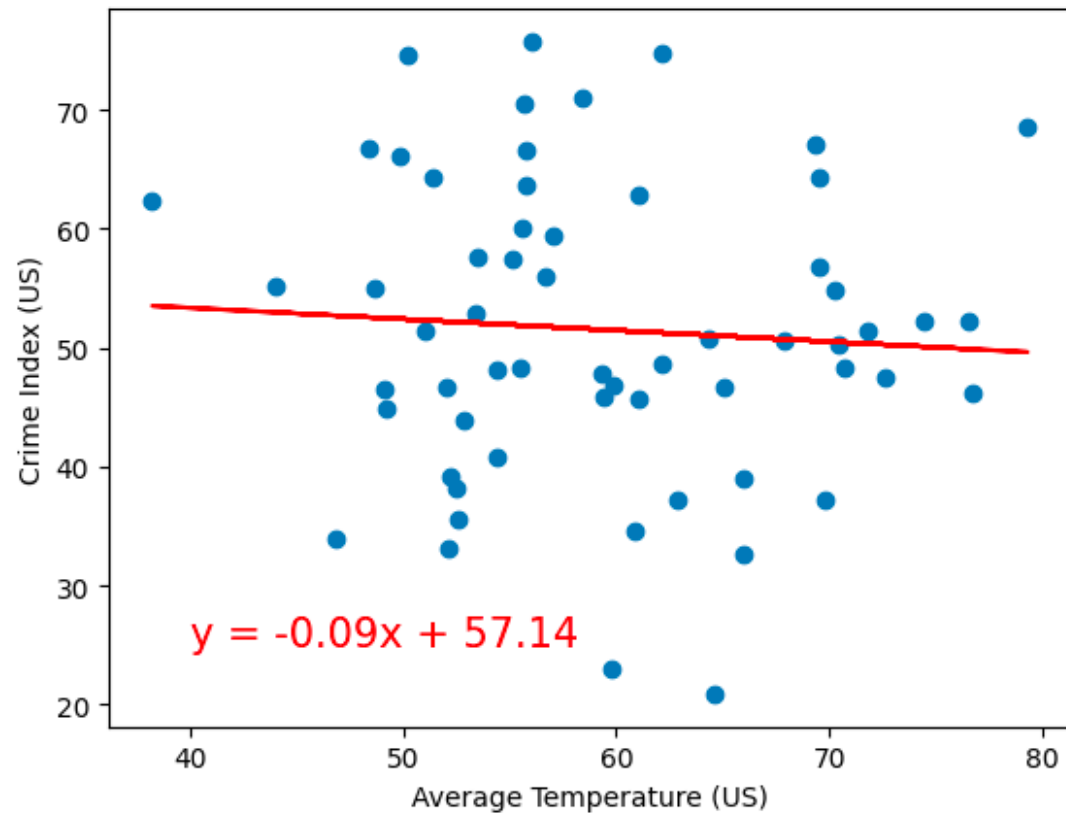
Analysis: Average Temperature in the United States by region

- Total of 60 cities in the US, 18 from Northern and 42 from Southern



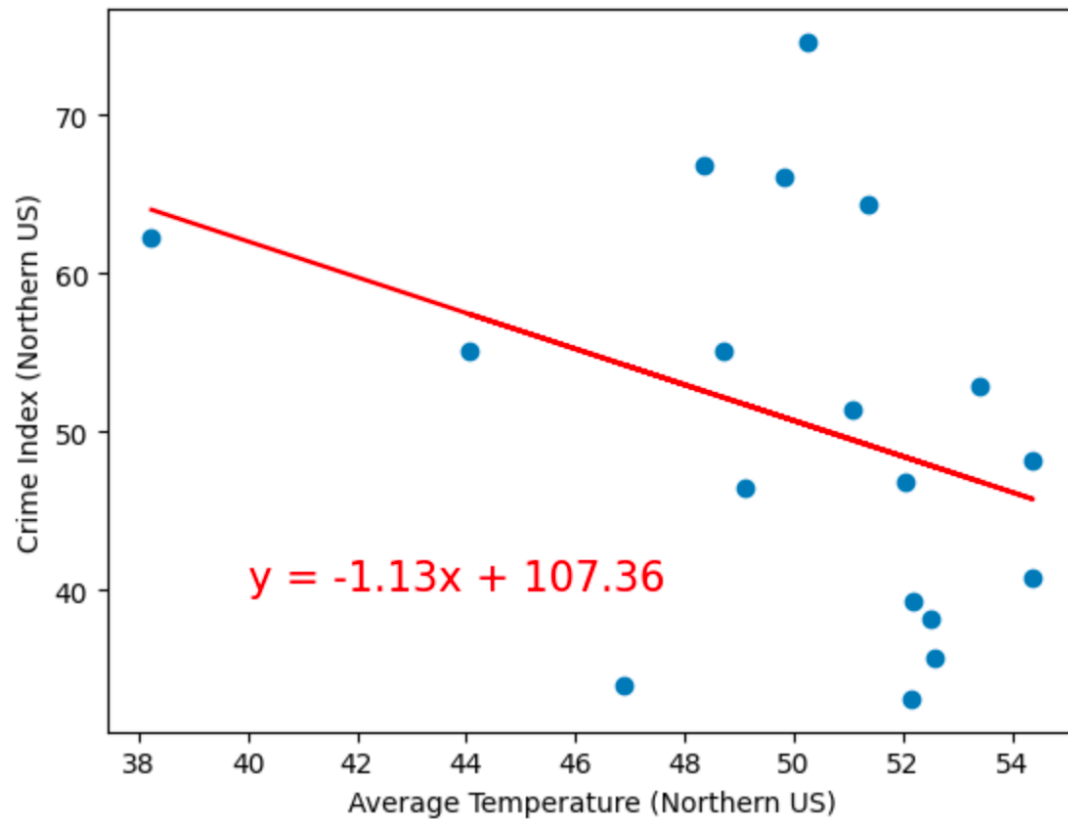
Analysis: Average Temperature vs. Crime Index– US

- The R^2 between average temperature and crime for the US is **0.0045**
- The correlation coefficient is **-0.068**, indicating an insignificant relationship between the two factors



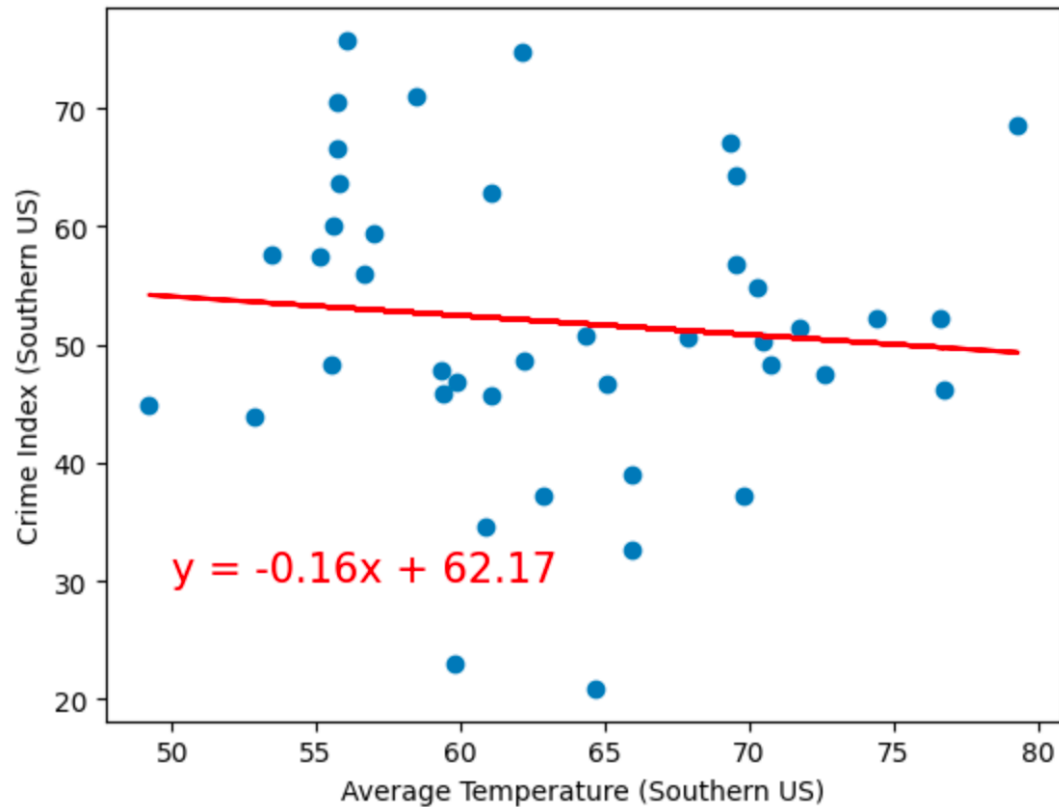
Analysis: Average Temperature vs. Crime Index – Northern US

- The R^2 between average temperature and crime for the Northern US is **0.129**
- The correlation coefficient is **-0.359**, indicating a low negative relationship between the two factors

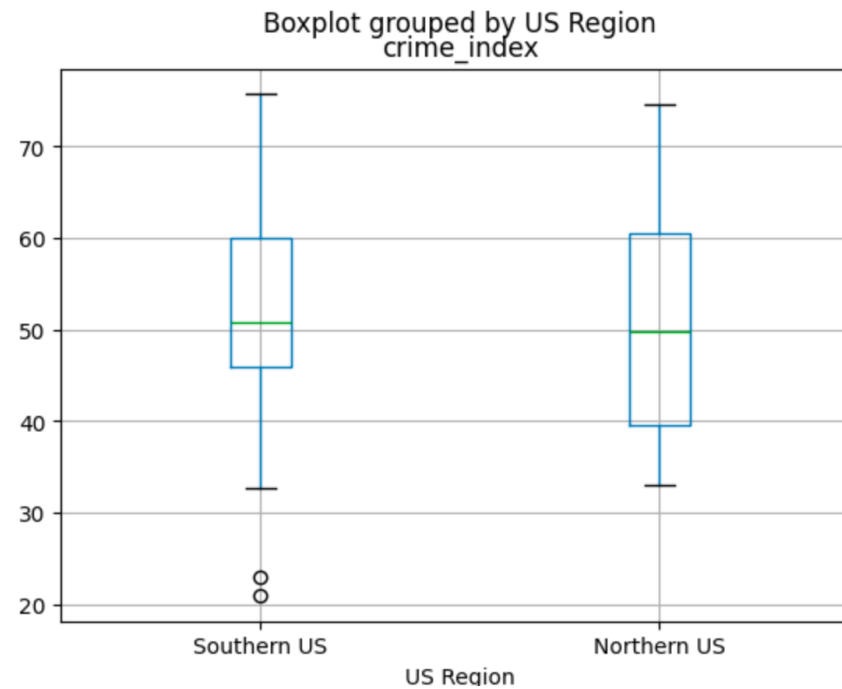


Analysis: Average Temperature vs. Crime Index— Southern US

- The R^2 between average temperature and crime for the Southern US is **0.009**
- The correlation coefficient is **-0.095**, indicating a low negative relationship between the two factors and weaker compared to Northern US



Analysis: Crime compared by region- T- Test



| T- Statistic | P-Value |
|--------------|---------|
| 0.369 | 0.714 |

- **T- Test Conclusion:** Reject null hypothesis; accepted the alternative hypothesis that there is no statistical difference in crime in cities within the northern vs. southern regions of the United States in 2022

Conclusion

- Examined the crime index for over 450 cities worldwide to determine if weather impacts the magnitude of crime
 - Worldwide, there is a positive relationship between average temperature and crime (corr = 0.163), which allows us to conclude that cities with higher temperature often have more crime
 - However, in comparison, the US had an insignificant relationship between the two factors (corr = -0.068)
 - Northern US (corr = -0.359) had a stronger relationship compared to Southern US (corr = -0.095)
 - Performing a t-test for the US regions, a conclusion was made that there is no significant difference in crime between Northern and Southern regions
- The relationship between average temperature and suicide rates was found to be inverse (corr = -0.308), where suicide rates declined as the average temperature rose

Questions

