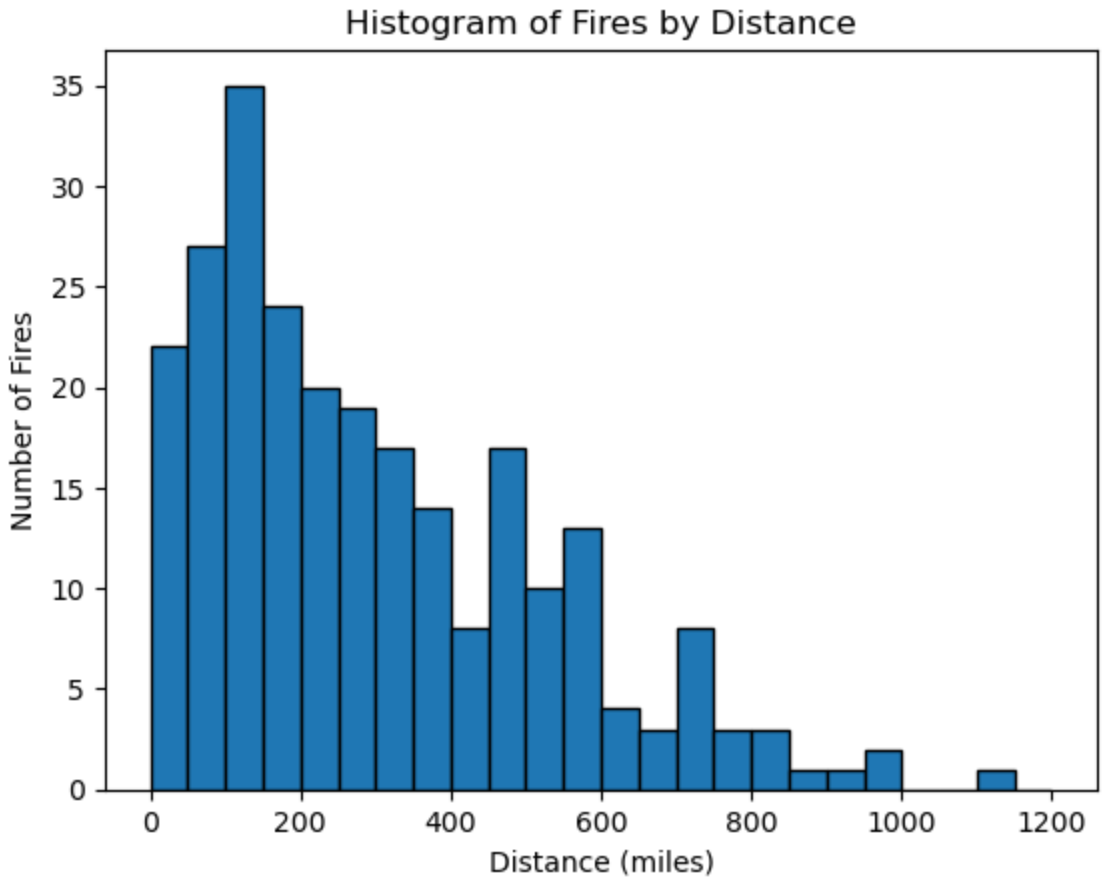
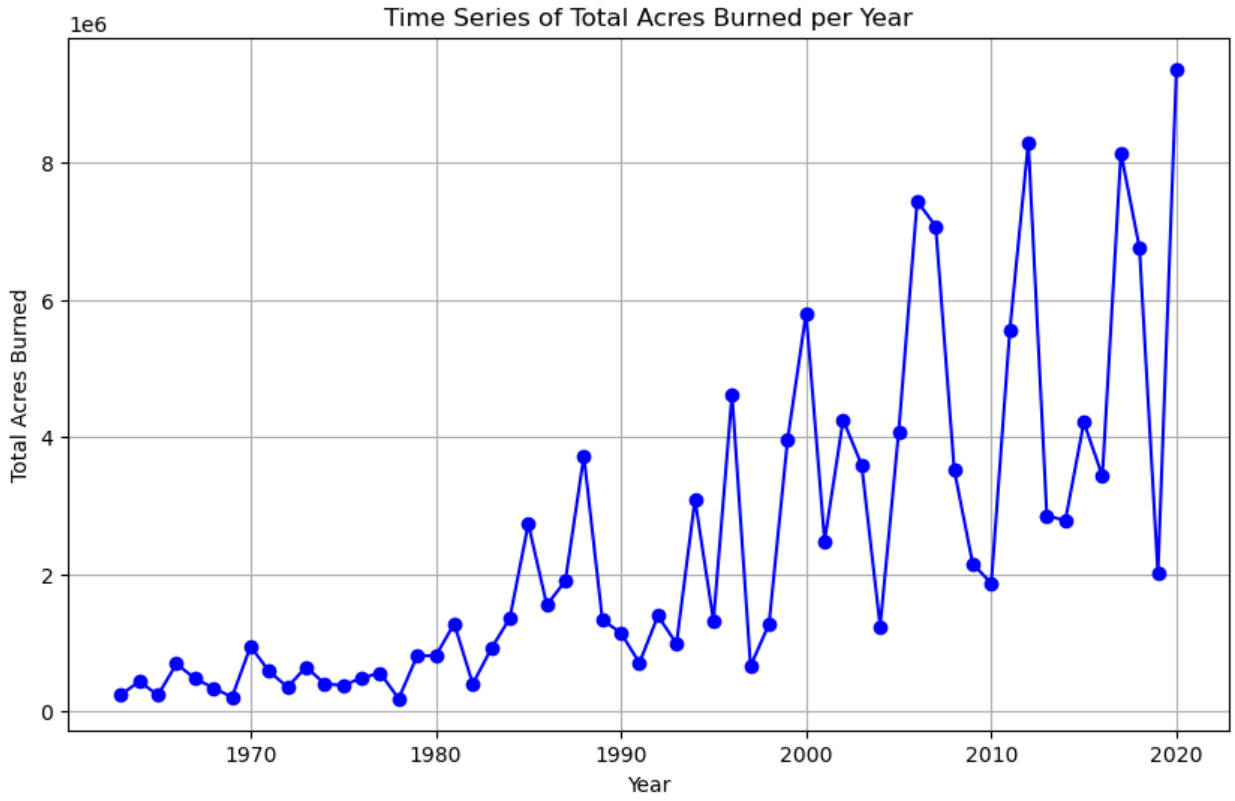
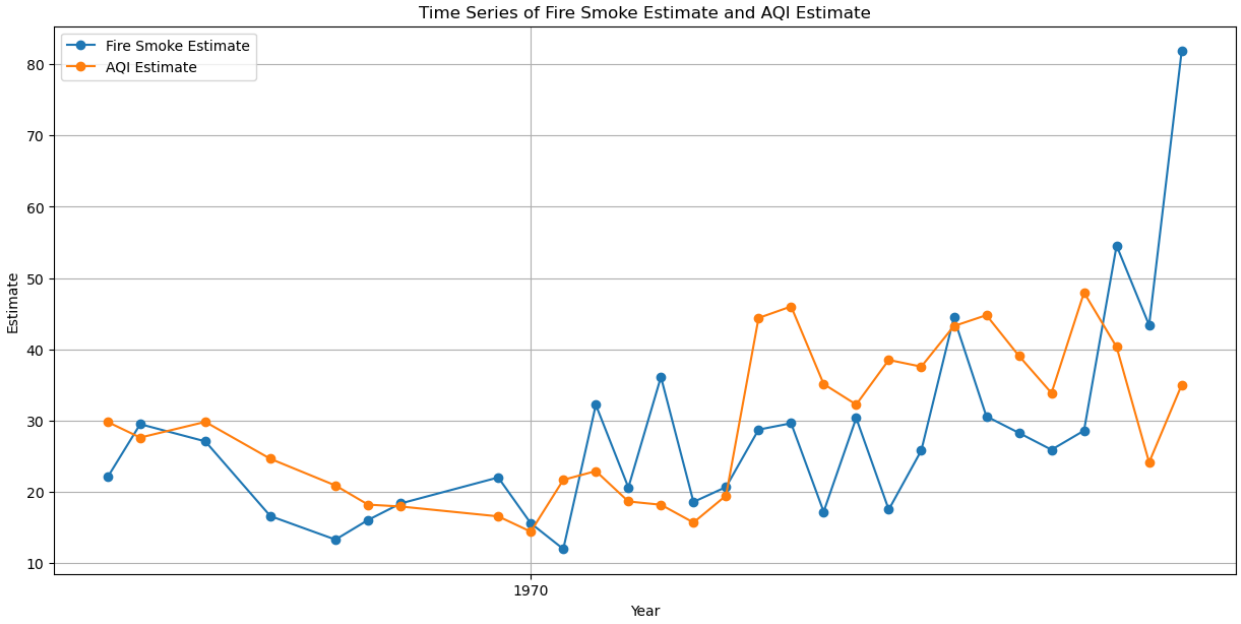


This graph is a histogram showing the number of fires occurring every 50 mile distance from Benicia, California up to the max specified distance. The x-axis represents the distance in miles from the assigned city. The distances are divided into 50-mile intervals. Each interval is represented by a bar on the histogram. The y-axis represents the count or frequency of fires that occurred within each 50-mile distance interval. It shows how many fires were recorded in each specific range. Each bar in the histogram represents one of the 50-mile distance intervals. The height of each bar corresponds to the number of fires that occurred in that distance range. The taller the bar, the more fires occurred within that interval. The viewer can look to the Y-axis for a more specific number of wildfires. Viewers can also look for trends or patterns in the data. One such observation is that the highest number of wildfires took place within 200 miles of the city. Further investigation will have to be conducted in order to find the specific reason. The Combined wildland fire datasets for the United States and certain territories, 1800s-Present (combined wildland fire polygons) dataset was used in order to create this graph. This dataset was collected and aggregated by the US Geological Survey. Fire polygons are available in ArcGIS and GeoJSON formats. The data was explored using a GeoJSON reader provided by Professor David McDonald after which all the fires within 1250 miles of Benicia,

California, which was the assigned city, were identified. The data for a few years was missing and hence, has not been included in the graph.



This graph is a time series graph of total acres burned per year for the fires occurring in the specified distance from Benicia, California. The x-axis represents the years during which the fires occurred. Each year is marked along the x-axis, allowing viewers to follow the progression of time. The y-axis represents the total acres burned by fires each year. The units on the y-axis indicate the scale of the total acres burned, which is the variable being measured. The data was gathered using the procedure outlined above. This graph allows viewers to observe how the number of acres burned in wildfires within 1250 miles of the city changes over the years up to present day. Again, there were a few missing values which had to be left out.



This graph is a time series graph containing your fire smoke estimate and the AQI estimate for Benicia, CA. The x-axis represents the years during which the fires occurred. The Y-axis represents the estimated smoke impact on the city of Benicia. The orange graph represents the AQI. The Air Quality Index is EPA's index for reporting air quality. It is a standardized way of reporting and quantifying air quality levels to the general public. It is used by environmental agencies, including the U.S. Environmental Protection Agency (EPA), to communicate how clean or polluted the air currently is and what associated health effects might be of concern. This index was extracted using EPA's air quality API. The blue graph represents the smoke estimate that I calculated by dividing the area across which the wildfire had spread by the distance from the fire. Comparing the two graphs together allows the viewer to understand how the estimate compares to the AQI which is a widely used indicator of smoke impact due to wildfires. Here, the viewer can observe that the two graphs seem to spike and drop approximately at the same time but have different values. This allows them to make a judgment on the effectiveness of the smoke estimator.

REFLECTION

The assignment involved exploring data about wildfires in the USA and how it impacted air quality in the city assigned to us. Having to understand the concepts of geodetic distance computation techniques and coordinate systems was a huge learning for me as I had never worked with geospatial data before. Grasping the notation of attributes and geometry in a GeoJSON file proved to be intriguing, and delving into various projections and determining the suitable one for distance calculations added substantial value to this assignment, offering me a valuable learning opportunity. While it took some time to understand the data, the experience has been immensely beneficial. I now feel confident working with this type of data and believe that the skills acquired could be applicable to similar datasets in future endeavors.

Coming up with an estimate to measure smoke impact of the wildfires was also a learning experience for me. Having to understand each of the attributes available in the dataset and explore how they may or may not be related to the impact of the smoke in cities allowed me to understand the workings and environmental impact of wildfires. It also allowed me to reason out which attributes would be relevant and which ones wouldn't. Lastly, comparing my estimates to the AQI allowed me to understand the effectiveness of my estimate.

Collaborating with peers on an individual project was a unique experience for me. It felt somewhat like working as a team as I used this opportunity to brainstorm ideas for estimates and models as well as get clear on the problem statements and fill the gaps in my understanding of it. I enjoyed learning about their thought processes on how to generate an effective estimate for the smoke impact and which models could most effectively forecast the future data. It pushed me to question my ideas and come up with better solutions, incorporating their input as necessary.

Being able to use the example notebooks provided to us was also extremely helpful. It was important to learn how to integrate new code into existing code seamlessly.