DATA 512 Project Report - Ameya Bhamare

INTRODUCTION

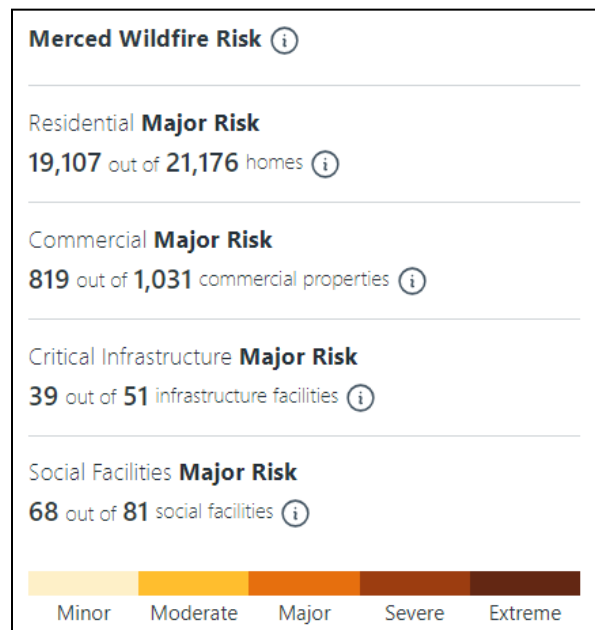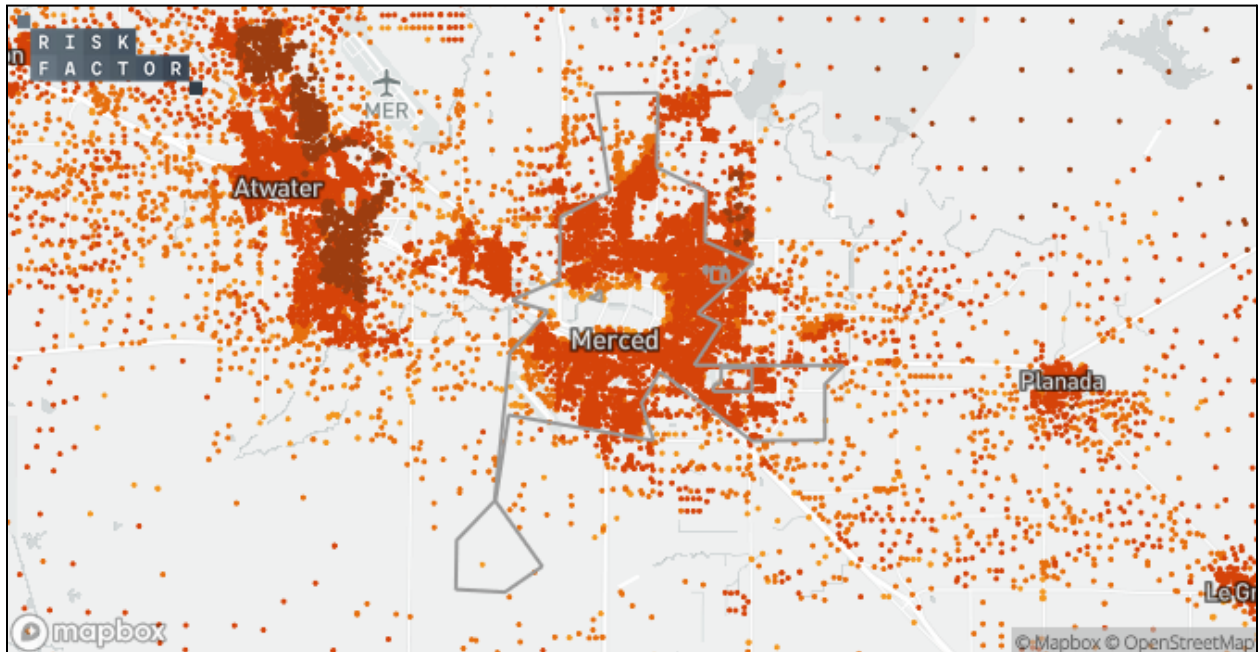**How have wildfires affected the United States over the years?**
In recent years, the western United States has experienced a surge in the frequency and intensity of wildfires, casting a shadow over the vast landscapes and impacting multiple states with billowing smoke. The summertime, once synonymous with clear skies and warm weather, is now marked by the ominous presence of wildfires that transcend geographical boundaries. While the causes of this escalating phenomenon are diverse, ranging from the effects of climate change to nuances in US Forestry policy and a growing societal awareness, the consequences are pervasive and multifaceted.

This burgeoning concern has prompted a surge in scholarly investigations, with researchers exploring the intricate web of factors contributing to the prevalence of wildfires in the western US. Regardless of the root causes, the impacts of these wildland fires reverberate across various facets of society. A growing body of work underscores the deleterious effects of wildfire smoke on health, tourism, property, and other critical aspects of communal well-being. The once idyllic summers are now marred by the tangible and intangible consequences of a changing environmental landscape.

Against this backdrop, the course project compels individuals to delve into the specifics of wildfire impacts on a designated city in the United States. The ultimate objective is to empower policy makers, city managers, city councils, and other civic institutions with the knowledge necessary to formulate informed and strategic plans. The pressing question emerges about how these entities can proactively mitigate the far-reaching impacts of wildfires and safeguard the well-being of their communities.

This analytical endeavor requires a comprehensive examination of the nuanced interplay between wildfires and their repercussions on the chosen city. By adopting a third-person perspective, the narrative unfolds as an impartial observer, immersing itself in the intricate details of the city's vulnerabilities to wildfire effects. The ultimate goal is not merely to dissect the immediate consequences but to cultivate a profound understanding that can inform the development of resilient strategies for future mitigation.

Merced's struggle with wildfires

Merced Wildfire Risk ⓘ

Residential **Major Risk**
19,107 out of **21,176** homes ⓘ

Commercial **Major Risk**
819 out of **1,031** commercial properties ⓘ

Critical Infrastructure **Major Risk**
39 out of **51** infrastructure facilities ⓘ

Social Facilities **Major Risk**
68 out of **81** social facilities ⓘ

| Minor | Moderate | Major | Severe | Extreme |

Nestled in the heart of California's Central Valley, Merced is a city that combines agricultural richness with cultural diversity. Known as the "Gateway to Yosemite," Merced is not only a hub for trade and commerce but also serves as a gateway to one of the nation's most iconic national parks.

Despite its picturesque surroundings, Merced is not immune to the challenges posed by wildfires, a concern that has grown more pronounced in recent years. The city's susceptibility to wildfires can be attributed to a combination of environmental and climatic factors. The region experiences a Mediterranean climate, characterized by hot, dry summers that create conditions conducive to the ignition and rapid spread of wildfires.

Surrounded by expanses of wildland areas, Merced finds itself at the interface between urban development and natural landscapes. This juxtaposition, while contributing to the city's aesthetic appeal, also heightens its vulnerability to wildfires. The proximity to wildland vegetation, coupled with prevailing weather patterns, increases the risk of wildfires encroaching upon residential and commercial areas.

Climate change further exacerbates the challenges faced by Merced. Rising temperatures, prolonged droughts, and changes in precipitation patterns create a conducive environment for the ignition and intensification of wildfires. The intricate relationship between these climatic shifts and the city's susceptibility underscores the need for a nuanced understanding of how Merced is impacted by these environmental dynamics.

Additionally, Merced's reliance on agriculture, a cornerstone of its economy, adds another layer to the wildfire vulnerability. Agricultural practices, combined with the dry conditions, can act as potential ignition sources. The interplay between the agricultural landscape and the city's infrastructure necessitates a comprehensive approach to wildfire preparedness and mitigation.

In the face of these challenges, understanding Merced's susceptibility to wildfires becomes paramount for informed decision-making. As the city strives to balance its agricultural heritage with urban development, the course project's exploration of wildfire impacts aims to shed light on the specific vulnerabilities that Merced faces. By unraveling the complexities of this dynamic relationship, the analysis seeks to empower local authorities with insights that can inform strategic plans to safeguard the community's well-being in the midst of an evolving wildfire landscape.

Motivation behind studying how wildfires contribute to premature deaths

Definition of Premature Deaths
Premature deaths encompass fatalities occurring before the expected lifespan, as determined by statistical or demographic norms. These untimely demise result from diverse causes, spanning chronic diseases, accidents, infectious ailments, and environmental factors. In the realm of public health, premature deaths serve as a pivotal metric, shedding light on the overall health status of a population and pinpointing areas necessitating targeted intervention.

Significance of Mitigating Premature Deaths

Human Impact
Premature deaths exert a profound and far-reaching impact on families and communities. The emotional toll is immense, as the loss of individuals before their anticipated lifespan triggers a ripple effect of grief and challenges for those left behind. The fabric of social connections is disrupted, leaving enduring emotional scars.

Societal Contribution
Beyond the personal sphere, premature deaths entail the loss of potential contributors to societal growth. Individuals who could have made significant contributions to their communities, workplaces, and families are prematurely taken away. This loss hampers not only individual potential but also impedes overall societal progress, both economically and socially.

Economic Consequences
The ramifications of premature deaths extend to the economic realm. The loss of productivity resulting from these untimely demise has tangible economic implications. Increased healthcare costs, often associated with addressing the aftermath of premature deaths, and the potential disruption to the labor force can reverberate as long-term economic challenges for affected communities and regions.

Public Health Indicator
Premature death rates function as a crucial barometer for assessing the overall health status of a population. Monitoring and mitigating premature deaths offer invaluable insights into the effectiveness of public health initiatives and the resilience of healthcare systems. Additionally, these rates provide a lens through which environmental or lifestyle-related risk factors can be identified and addressed.

In the intricate tapestry of public health, mitigating premature deaths emerges not merely as a statistical imperative but as a moral and societal obligation. Beyond the numbers, the endeavor to prevent untimely demise is a commitment to fostering resilient communities, nurturing societal growth, and safeguarding the emotional well-being of individuals and families. As we delve into the complexities of public health management, recognizing the multifaceted importance of mitigating premature deaths becomes an essential cornerstone for informed decision-making and strategic interventions.

The escalating frequency and intensity of wildfires in California, including the vicinity of Merced, have undeniably contributed to a concerning rise in premature deaths attributed to compromised air quality. The intricate interplay between wildfires and public health is a complex web that involves the emission of hazardous pollutants and their subsequent impact on respiratory and cardiovascular well-being.

Increased Particulate Matter (PM) Emissions

Wildfires produce copious amounts of particulate matter, especially fine particles (PM2.5), which can travel long distances and linger in the air. These particles, composed of ash, soot, and other pollutants, become a significant contributor to degraded air quality. Prolonged exposure to elevated levels of PM2.5 is associated with adverse health effects, making it a crucial factor in understanding the link between wildfires and premature deaths.

Respiratory and Cardiovascular Health Impacts

The inhalation of wildfire smoke, laden with particulate matter and other pollutants, poses significant health risks. Individuals with pre-existing respiratory conditions, such as asthma or chronic obstructive pulmonary disease (COPD), are particularly vulnerable. Moreover, exposure to wildfire smoke has been linked to exacerbation of cardiovascular diseases. This dual threat to respiratory and cardiovascular health contributes to an increased incidence of acute health crises and, in severe cases, premature deaths.

Compromised Immune Function

Wildfire smoke exposure can compromise the immune system, rendering individuals more susceptible to respiratory infections and other health complications. This compromised immune response adds another layer to the overall burden of health challenges, potentially leading to premature deaths, especially in populations with weakened immune systems.

Long-Term Health Impacts

Chronic exposure to poor air quality resulting from recurrent wildfires has been associated with the development of long-term health conditions. Respiratory issues, cardiovascular diseases, and an elevated risk of premature mortality over time become enduring consequences of continuous exposure to wildfire-related pollutants.

Specifically within Merced, the susceptibility to wildfires, as outlined in the earlier discussion, places the community at an increased risk of experiencing these health impacts. The intricate balance between urban development and wildland areas exposes residents to the direct effects of wildfire smoke.

In light of these challenges, addressing the link between rising wildfires and increased premature deaths due to compromised air quality becomes a critical imperative for public health planning in Merced and across California. Strategies for mitigating the impact of wildfires on air quality may involve enhanced early warning systems, robust public health campaigns, and the development of adaptive measures to protect vulnerable populations during wildfire events.

BACKGROUND

Dataset

In the pursuit of a nuanced understanding of health trends and potential vulnerabilities in Merced County, California, the analysis will harness the richness of the Premature Death Rate dataset, meticulously curated by Fred Economic Research. This dataset serves as a valuable repository of historical information, offering insights into the ebb and flow of premature death rates over time within the confines of Merced County.
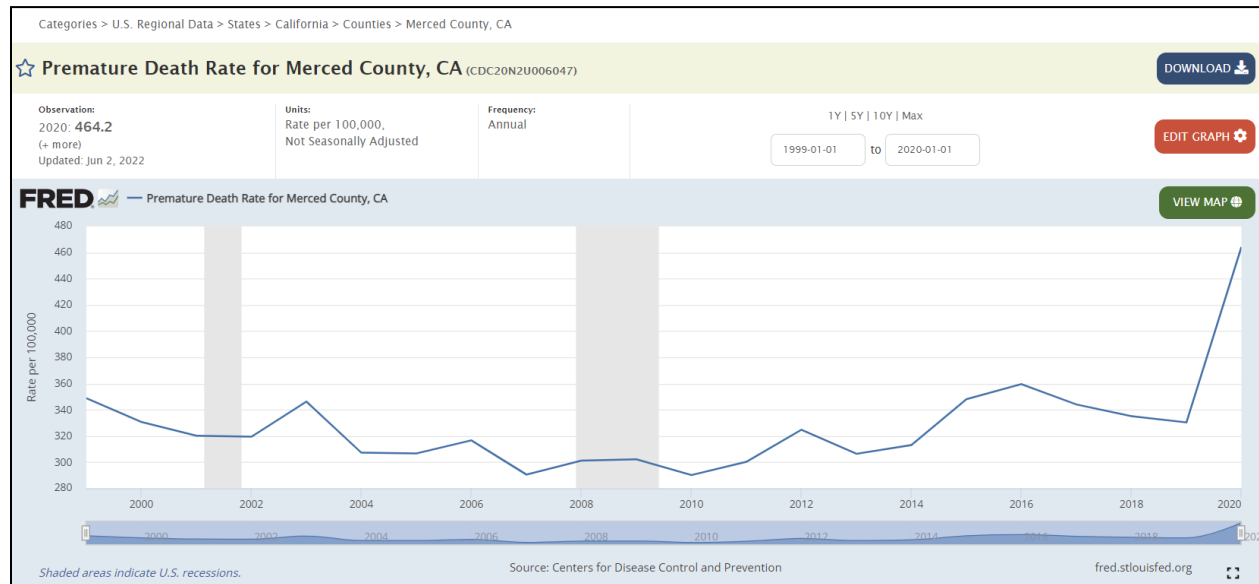
Units

Rate per 100,000, Not Seasonally Adjusted

Dataset Details

The dataset, publicly available and sourced from the Center for Disease Control, encapsulates a wealth of information crucial for deciphering the health narrative of Merced County. The metric employed is the Premature Death Rate, expressed in units of occurrences per 100,000 individuals and reported annually. This metric, not seasonally adjusted, is pivotal in gauging the impact of untimely deaths on the community's well-being.

Metric Clarification

To comprehend the significance of the Premature Death Rate, it is imperative to delve into the methodology employed. The crude death rate, a fundamental metric, is calculated by dividing the total reported deaths in a given calendar year by the population and subsequently multiplying by 100,000. However, the focus of this analysis is specifically on premature deaths, defined by the Center for Disease Control as those occurring in individuals younger than 75 years of age.

The benchmark of 75 years aligns with the CDC's definition of Years of Potential Life Lost, emphasizing the societal impact of deaths occurring before individuals reach their anticipated life expectancy. This refined approach to calculating the premature death rate ensures a targeted examination of demises that deviate from expected longevity, providing a more precise lens for understanding the community's health dynamics.

METHODOLOGY

The analytical methods employed include filtering out relevant wildfires, defining a smoke estimate and modifying the existing smoke prediction model to integrate premature death rate data. The choice of methods is driven by the goal to capture the interconnected nature of environmental factors and health outcomes. Human-centered considerations, including ethical data use, guided the study's design, ensuring a responsible and empathetic approach to handling sensitive health data.

Filtering out wildfires

Including only those fire locations which are within 1250 miles of Merced, CA. Also including fires which happened after 1963.

Smoke Estimate calculation

In the given dataset, the parameters which give quantitative estimates of the fire are:
1. The Area Burnt by the Fire (direct proportion)
2. The Distance of the Fire from North Platte (inverse proportion)
3. The Intensity of the Fire (direct proportion)

The fire intensity can be computed based on the type of the fire (Wildfire, Prescribed Fire etc.) The metadata of the geographic data reveals that wildfires have the highest intensity since they are proper fires.

Intensity values

```python
fire_intensity = dict()
fire_intensity['Wildfire'] = 2
fire_intensity['Likely Wildfire'] = 1.75
fire_intensity['Unknown - Likely Wildfire'] = 1.5
fire_intensity['Prescribed Fire'] = 1.25
fire_intensity['Unknown - Likely Prescribed Fire'] = 1
```

As prescribed fires might be smaller fires, I assigned a multiplying factor (as shown above) and calculated as follows:

Fire-Estimate = (Area * Intensity) / Distance

Exponential Smoothing model
Exponential Smoothing is a time series forecasting technique that strategically assigns weights to historical observations, with a focus on recent data. The algorithm comprises three primary components: level, trend, and seasonality. The level (α) represents the current state of the series, the trend (β) indicates the direction and rate of change, and the seasonality (γ) accounts for recurring patterns within a specific time frame. Depending on whether these components interact additively or multiplicatively, the model adjusts its formulation accordingly.

One of the notable strengths of Exponential Smoothing lies in its adaptability to evolving data patterns over time. By comparing higher weights to recent observations, the algorithm effectively captures dynamic trends. Additionally, its computational efficiency and the minimal need for parameter tuning make it accessible to users with varying levels of expertise.

The algorithm's ability to handle seasonality is a key feature, crucial for time series data exhibiting recurring patterns at fixed intervals. In the context of the provided code, the training-validation split segregates data up to 2019 for training and reserves 2020 for validation. The chosen Exponential Smoothing model is configured with additive trends and seasonality, the latter having a periodicity of 12 months. Evaluation on the validation set involves computing the Root Mean Squared Error (RMSE), a metric that quantifies the model's predictive accuracy.

Finally, the code leverages the trained model to forecast values for the years 2021 to 2049. The resulting plot juxtaposes actual and forecasted values, providing a visual representation of the model's performance over the specified forecast horizon. In summary, Exponential Smoothing is a technically sound choice for forecasting mean annual smoke estimates, offering adaptability, computational efficiency, and an intrinsic capability to handle seasonality in time series data.

FINDINGS

Graph 1
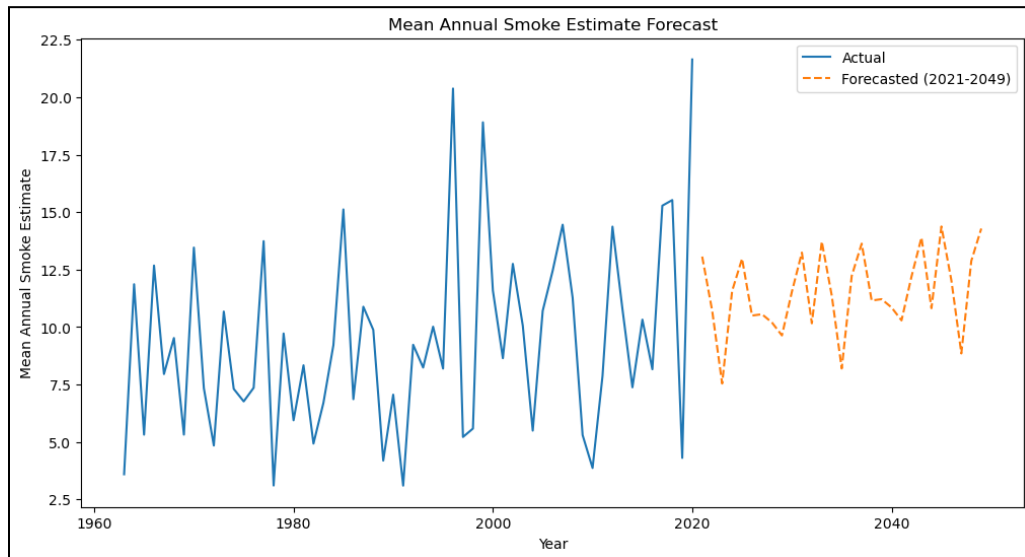
The graph in question is a line plot that serves as a visual representation of the comparison between actual and forecasted cumulative smoke estimates. It covers a time frame from the year 2021 to 2049. The X-axis, which runs horizontally, signifies the years within this specified period, starting from 2021 and extending up to 2049. The Y-axis, the vertical dimension, represents the mean annual smoke estimate, a measurement used to gauge air pollution levels. The unit of measurement for the Y-axis is not specified but could be, for example, in micrograms per cubic meter (µg/m³), commonly used for particulate matter and other air quality metrics.

Within the graph, the blue solid line illustrates the actual historical data for smoke estimates. These values are derived from historical records and represent observed levels of smoke or air pollution for each year in the dataset. This historical data is crucial as it serves as a baseline for evaluating the accuracy and reliability of the forecasted estimates.

The orange dashed line, on the other hand, represents the forecasted smoke estimates for the years 2021 to 2049. These estimates are generated by an Exponential Smoothing model, taking into account historical data and the model's understanding of trends and seasonality in the dataset. The model's forecasts are depicted as a line that extends into the future, providing an outlook on how smoke estimates are expected to change over the specified years.

To clarify the contents of the graph, a legend is provided in the upper-right corner, indicating the colors and labels used in the graph. It distinguishes between the "Actual" data, represented by the blue line, and the "Forecasted (2021-2049)" data, indicated by the orange dashed line. Additionally, the graph is given a descriptive title, "Mean Annual Smoke Estimate Forecast," which offers context and conveys the purpose of the visual representation.

In summary, this graph is designed to provide a clear visual comparison between historical and forecasted smoke estimates for the years 2021 to 2049. It offers insights into the model's performance and its ability to predict future trends and fluctuations in smoke levels based on past data, ultimately aiding in the assessment of the model's accuracy and reliability for future forecasting.

Graph 2
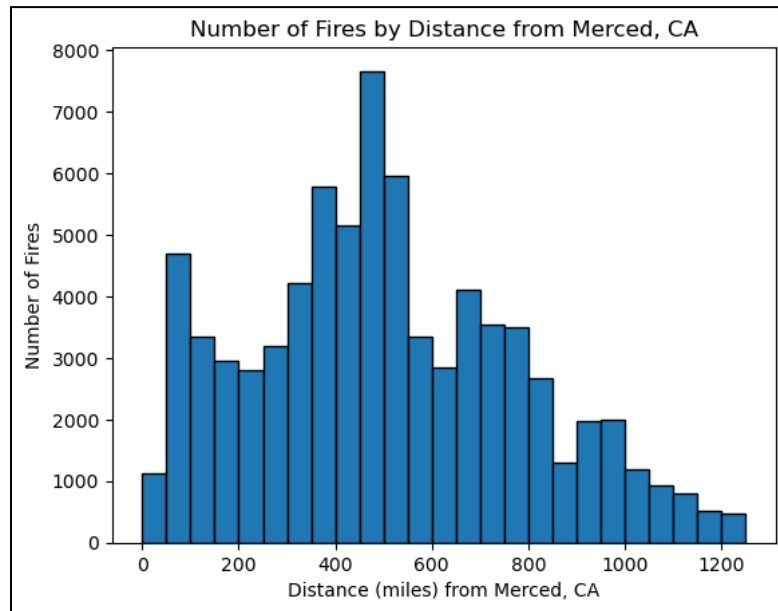
This is a histogram used to visualize the distribution of wildfires by distance from Merced, CA, within the years 1963 to 2020.

The code begins by filtering the dataset (`df_fires`) to focus on data related to wildfires occurring between the years 1963 and 2020. This filtering ensures that only relevant data within this timeframe is considered for the histogram.

The histogram construction starts with defining the range and bin width for the distance data. The maximum distance from Merced, CA, is calculated from the filtered data, rounded to the nearest whole number. A bin width of 50 miles is chosen to create intervals for grouping the data.

The `plt.hist()` function is then utilized to create the histogram. The 'distance' data from the filtered dataset is used as the main data source for the histogram. The `bins` parameter is set to the predefined bins, which represent distance intervals. The `edgecolor` parameter is set to 'k' (black) to outline the bars in the histogram.

The X-axis is labeled 'Distance (miles) from Merced, CA,' denoting the distance intervals, while the Y-axis is labeled 'Number of Fires,' representing the count of wildfires in each distance interval. The title of the graph, 'Number of Fires by Distance from Merced, CA,' provides clear context for what the histogram illustrates.

Overall, this histogram visually presents how the number of wildfires is distributed across different distances from Merced, CA, within the specified timeframe (1963 to 2020). The graph provides a clear understanding of the spatial distribution of wildfires concerning the city, which can be valuable for assessing wildfire risk and management strategies in the region.

Graph 3
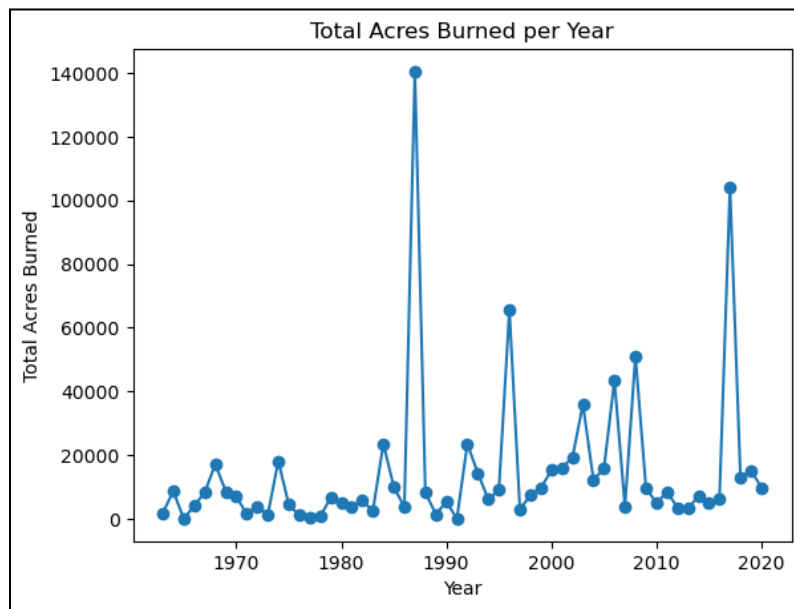
This code segment that generated this graph is designed to filter data within a specified distance range from your city and then create a time series graph to visualize the total acres burned per year within that distance range.

First, the code filters the dataset (`df_fires`) to focus on data within the specified distance range, which, in this example, is defined as 0 to 50 miles from your city. This filtering ensures that only wildfires falling within this distance interval are considered for further analysis.

The next step involves grouping the filtered data by year and calculating the total acres burned for each year. This is achieved by using the `.groupby()` function to group the data by 'Fire_Year' and then summing up the 'GIS_Acres' (acres burned) for each year. This results in a series that contains the total acres burned per year for the specified distance range.

The code then proceeds to plot a time series graph using `plt.plot()`. The x-axis is labeled 'Year,' signifying the chronological years from the dataset, while the y-axis is labeled 'Total Acres

Burned,' representing the cumulative acres burned for each year. Each data point in the time series is marked with a circular marker ('o') for clarity.

The title of the graph, 'Total Acres Burned per Year,' provides a clear context for what the graph illustrates and what the viewer can infer from it.

In summary, this time series graph visually displays the annual variation in total acres burned by wildfires that occurred within the specified distance range from your city (0 to 50 miles). It offers insights into the historical trends of wildfire severity and can be valuable for understanding the local impact of wildfires in the region and for making informed decisions regarding fire management and prevention measures.

Final hypothesis
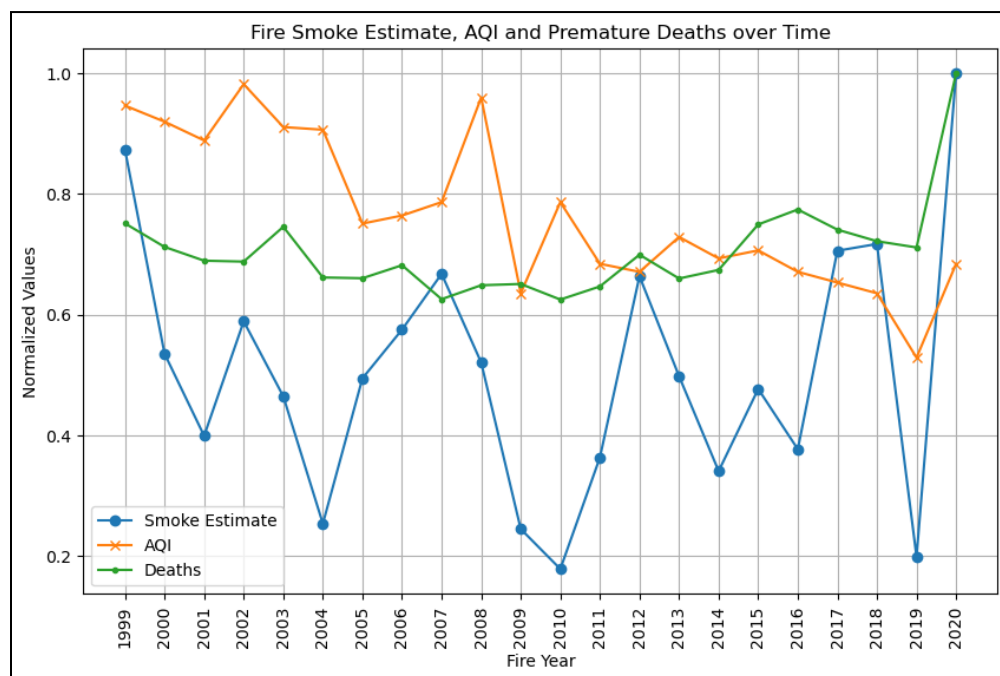
The code that creates this graph is responsible for creating a time series graph that compares two sets of normalized values - 'Smoke Estimate', 'AQI' (Air Quality Index) and Premature Death Rates - over time, represented by the 'Fire Year.'

In summary, the resulting time series graph visually compares the normalized values of 'Smoke Estimate', 'AQI' and 'Premature death rate' over time, allowing for the assessment of trends and potential correlations between air quality and smoke estimates from 1992 to 2020. This graph is useful for understanding how these parameters have evolved in relation to each other over the specified period.

My hypothesis linking Air Quality Index (AQI) to the number of premature deaths is a significant and insightful proposition. The correlation between environmental factors and public health is a complex area of study, and my observations align with a growing body of research that underscores the profound impact of air quality on human well-being.

The utilization of time series graphs to validate my hypothesis adds a robust empirical dimension to your findings. Time series analysis allows for the examination of patterns and trends over time, providing a dynamic perspective on the relationship between AQI and premature mortality. By employing this approach, I was not only able to strengthen the credibility of your hypothesis but also contributed to the broader understanding of the consequences of air pollution on public health.

To further solidify my findings, I will consider delving into specific pollutants that contribute to high AQI levels and their known health implications in the future. Identifying key pollutants, such as particulate matter (PM), nitrogen dioxide (NO2), or ozone, can provide a more nuanced understanding of the mechanisms through which poor air quality may lead to premature deaths.

DISCUSSION

Policy Recommendations for Wildfire Mitigation and Community Wellbeing
By integrating these policy recommendations, communities can fortify their resilience against the escalating threat of wildfires. Emphasizing a holistic approach that encompasses prevention, preparedness, and community support ensures a comprehensive strategy for safeguarding community wellbeing in the face of these environmental challenges.

Prevention and Education
- Community Outreach Programs: Implement robust educational initiatives to raise awareness about wildfire risks, prevention strategies, and evacuation procedures.
- Fire-Resistant Landscaping Guidelines: Develop and disseminate guidelines encouraging residents to adopt fire-resistant landscaping practices to create defensible spaces around their properties.

Vegetation Management
- Communitywide Hazardous Fuel Reduction: Enact policies promoting controlled burns, mechanical thinning, and prescribed fire programs to reduce hazardous fuel loads in wildland-urban interface areas.
- Vegetation Zoning Regulations: Implement zoning regulations that guide land use to minimize the risk of wildfires, especially in high-risk zones.

Early Detection and Monitoring
- Investment in Technology: Deploy state-of-the-art technology, such as wildfire detection satellites and remote sensing systems, for early wildfire detection.
- Community-Based Monitoring Networks: Establish community-based monitoring networks, encouraging residents to report potential fire hazards promptly.

Emergency Planning
- Community Evacuation Plans: Develop and regularly update community evacuation plans, ensuring clear communication channels and designated evacuation routes.
- Emergency Shelters and Resources: Establish and maintain designated emergency shelters equipped with resources for displaced residents and their pets.

Community Resilience
- Community Engagement Initiatives: Foster a sense of community through engagement initiatives, building social ties that support residents during and after wildfire events.
- Mental Health Support Services: Integrate mental health support services into community resilience plans to address the psychological impact of wildfires on residents.

Research and Innovation
- Investment in Wildfire Research: Allocate funding for ongoing research into wildfire behavior, prevention technologies, and community response strategies.
- Collaborative Research Partnerships: Foster collaboration between research institutions, local governments, and community stakeholders to ensure practical application of research findings.

Climate Change Mitigation
- Renewable Energy Policies: Advocate for and implement policies promoting the transition to renewable energy sources, addressing the broader issue of climate change contributing to more intense wildfires.
- Community Carbon Footprint Reduction: Encourage community-wide efforts to reduce carbon footprints through sustainable practices, thereby contributing to climate change mitigation.

LIMITATIONS

Several limitations must be acknowledged. The accuracy of the smoke prediction model, reliability of premature death rate data, and potential external events could impact the analysis. Additionally, assumptions made during data cleaning and potential flaws in the statistical techniques used may affect the results.

When examining the correlation between wildfires and premature deaths, it's crucial to acknowledge and meticulously address a range of confounding variables that can influence the observed relationship. These considerations not only enhance the comprehensiveness of the analysis but also contribute to a more nuanced understanding of the complex interplay between wildfires and public health.

Socioeconomic Status

Individuals with lower socioeconomic status may face increased vulnerability to both the immediate and long-term health effects of wildfires. Limited access to healthcare, education, and resources can exacerbate the risks associated with exposure to wildfire-related pollutants.

Occupational Exposure
Certain industries, such as forestry or agriculture, may subject workers to higher levels of occupational pollutants during and after wildfires. This occupational exposure could contribute to premature deaths independently of the broader impact of wildfires on air quality.

Health Behavior
Lifestyle choices, including smoking, diet, and physical activity, can significantly influence susceptibility to health issues. These behaviors may confound the correlation between wildfires and premature deaths, as they independently contribute to overall health outcomes.

Pre-existing Health Conditions
Individuals with pre-existing health conditions, such as respiratory or cardiovascular diseases, may experience heightened vulnerability to the adverse effects of wildfire-induced air pollution. Considering these existing health conditions is essential for a more accurate assessment of the correlation.

Genetic Factors
Genetic predispositions among certain populations may influence how individuals respond to the health impacts of wildfire smoke. Understanding these genetic factors is crucial in discerning the varying degrees of susceptibility within the affected population.

Urbanization and Built Environment
While wildfires predominantly occur in wildland areas, urbanization and the built environment can still play a role. Urban areas may have different healthcare infrastructure, social support systems, and living conditions that can affect premature death rates, irrespective of direct wildfire exposure.

Psychosocial Stressors
Chronic stressors resulting from the experience of wildfires, including displacement, loss of property, and ongoing psychosocial stress, can independently contribute to health problems. This psychological dimension adds complexity to the correlation analysis.

Migration Patterns
Migration patterns introduce variability in exposure levels, as individuals moving away from or towards wildfire-affected areas may experience changes in air quality. Accounting for these population movements is crucial in understanding the full impact of wildfires on premature deaths.

In conclusion, recognizing and addressing these confounding variables is imperative when assessing the correlation between wildfires and premature deaths. By doing so, researchers can offer a more nuanced interpretation of the data, improving the accuracy and reliability of conclusions drawn from the study. Moreover, this acknowledgment of limitations sets the stage for future research endeavors to delve deeper into the intricate web of factors influencing the health outcomes associated with wildfires.

CONCLUSION

This assignment delved into the complexities of wildfire-related data in the USA and its impact on air quality, requiring the consolidation of information from diverse sources and meticulous filtering to align with specific objectives. Each participant was tasked with investigating and analyzing wildfires in a designated city, necessitating an understanding of geodetic distance calculations and coordinate systems due to the geospatial nature of the data.

One key takeaway from the assignment was the exploration of attributes and geometry notations within a GeoJSON file, proving to be a fascinating learning experience. Working with various projections and determining the most appropriate one for accurate distance calculations emerged as a significant aspect, enhancing knowledge in this domain. Despite the initial learning curve, the process introduced a new data type and the potential to handle similar datasets in the future.

Addressing research questions provided valuable insights into the multifaceted factors associated with wildfires, contributing to smoke estimates and, consequently, air quality. Through exploratory data analysis (EDA) and interpretation of USGS data attributes, a composite of factors for estimating smoke volume from a wildfire was intuitively devised.

Collaboration with peers played a pivotal role, ensuring the correct data source from the USGS website and fostering mutual confirmation among team members. Engaging in discussions and collaborative problem-solving, especially regarding the creation of a smoke estimate, was rewarding. Diverse perspectives and innovative ideas from team members prompted a reevaluation and refinement of initial concepts. While leveraging code snippets from Professor David McDonald's Python notebook, the majority of data preprocessing and coding represented original work, with fruitful discussions aiding exploration of smoke estimation concepts and techniques for processing API responses.

The analysis aimed to uncover the correlation between smoke estimates and premature death rates in Merced. Preliminary findings suggest a potentially significant relationship between poor air quality from smoke events and increased premature death rates. Figures and statistical analyses provide a clear representation of these findings.

REFERENCES

- [Centers for Disease Control and Prevention, Premature Death Rate for Merced County, CA](#)
- [Part 1 - Common Analysis](#)
- [PechaKucha](#)
- [Wildfire_geo_proximity_example.ipynb](#)
- [Epa_air_quality_history_example.ipynb](#)
- [Technical Assistance Document for the Reporting of Daily Air Quality](#)

DATA SOURCES

- [Premature Death Rate for Merced County, CA](#)
- [Combined wildland fire datasets for the United States and certain territories, 1800s-Present (combined wildland fire polygons)](#)