

Air Quality Visualization Report

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The world currently has a growing shadow, called global warming, that is becoming a major political issue. So, going into the project, I thought it would be interesting to find a way to use data, on a global scale, regarding possible causes or trends that aim towards global warming in certain areas of the world. The dataset that I used was a global weather repository, which provided daily weather information for capital cities around the world. It provided over 40 features reflecting current weather conditions. To benefit my visualizations, I stuck to only using a quarter of those. Mainly the attributes which helped show climate trends. (temperature, wind, air quality) My process in designing the visualizations came from my prior knowledge of how to represent the questions I had about climate change. Those being, ‘How does air quality vary between different countries?’, ‘Are there specific pollutants that are more prominent in certain regions?’, and ‘Is there a correlation between air quality and other weather parameters?’, to start with. The goal was to uncover insights into air quality variations, pollutant prominence, and how it may affect the weather. My initial designs mainly involved brainstorming visualization types that would effectively convey this information. This forces a lot of trial and error in deciding which type would help me the most. Eventually I decided which visualizations to use. I chose to split my idea into five different visualizations. First, my goal was to show the air quality by country. Doing this would use the country’s name in the x-axis than the average air quality index as the y-axis, with the visualization being a basic bar chart. I felt like a bar chart would be effective in comparing the two values, making it suitable for showcasing variations in air quality between countries. There is an animation as the graph loads to make it interactive for the user and more pleasing than seeing a still graph. Next, the goal was to show the correlation between

the temperature in Fahrenheit and the air quality index. To best show this correlation, the x-axis is the index, and the y-axis is the temperatures, in the form of a scatter plot. Scatter plots are ideal for visualizing the relationship between two continuous variables, allowing for the identification of potential trends. I decided to add tooltips in this plot to help show the user the exact data for each dot, to help the user better understand what they are looking at. Next, I chose to use a grouped bar chart to visualize the pollutant prominence in our world, or the highest and lowest levels of air pollution. This chart is used to display the pollution levels for different pollutants to get a better understanding of which pollutant is more prevalent or maybe less prevalent. With these levels coming from a max and min function to find the highest and lowest pollutant level. This was color-oriented with the higher bar being a different color than the lower bar to help distinguish to the user which is which. Like the first chart, this visualization is also animated so when the graph loads it will be more pleasing. Next, I implemented a line chart to visualize air quality trends over time. Since the dataset is updated over a long period of time, this was able to work. The chart was made with a button to be able to change to whichever pollutant trend you would like to study, making it easier for the user to distinguish each individual trend rather than a jumble of lines. Each pollutant will be color-coated to help distinguish the difference in a different way. Line charts effectively illustrate trends in time-series data which made this perfect for this scenario. Lastly, I wanted to use a heatmap to show air quality patterns based on the wind direction and speed. Heatmaps are well-suited for showcasing patterns in two-dimensional data, in my case wind direction and speed. The color intensity encodes air quality levels, providing a spatial understanding of the pollution patterns. This map uses tooltips as well to help the user better understand what they are looking at. I have learned a lot from this data, but my visualizations are incomplete which altered my main goals throughout this project. I faced

issues during this project which I was not able to resolve in time but believe my thought-process and coding are going in the right direction. This is my first time using d3, JavaScript, and html, besides from the examples in class and hope to only grow from here.