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Project Summary

We created a program that would take data from an air pollution csv dataset in the United States from 2000 to 2021 to compare states and the total Air Quality index (AQI) from one of the 4 different types of air pollution within the 47 states available per selected year. In addition, we made it possible to search for an individual state to check the total AQI from 2000 to 2021 of the specific type of pollution selected. We accompanied both of these functions with illustrations, for the comparison it will create a bar graph of the selected years showing the top polluting states ranging from 5, 10, or 15 states that can be shown in the bar graph for the selected year. For the individual state search, we also made a bar graph that illustrates the total AQI per year. The problem we aim to resolve with the program is to illustrate the levels of pollution for each state and compare whether they have increased or decreased over the last two decades. This can potentially help environmentalists focus on U.S. States that have unhealthy to hazardous levels of pollution.

Our scope for this program is to show two comparisons: the AQI each year for an entire state or the top polluting states in a given year. The csv dataset contains data ranging from individual days, months, and counties within a state. To fit our scope, we created a new csv file that averages the AQI of each state for each year. For our purpose we are focusing on Year, State O3 AQI, CO AQI, SO2 AQI, and NO2 AQI. Air Quality Index values range from 0 to 500, 0 being good and 500 being hazardous.

Link to the original csv dataset:
US Pollution 2000-2021

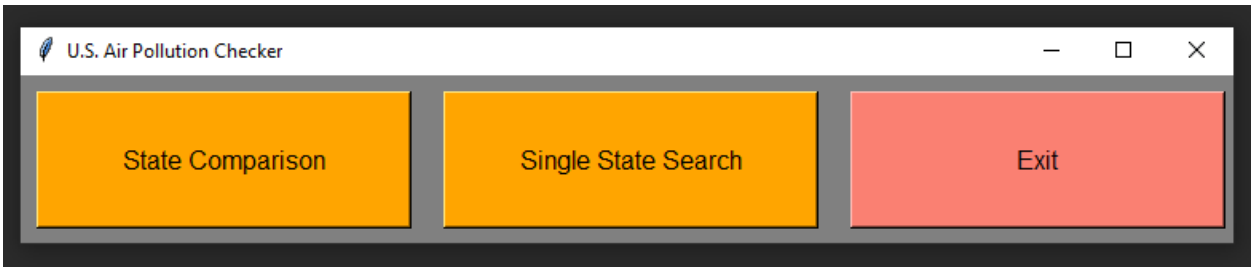
Program User Instructions

For the program to run, please use simple pollution file_2000_2021.csv

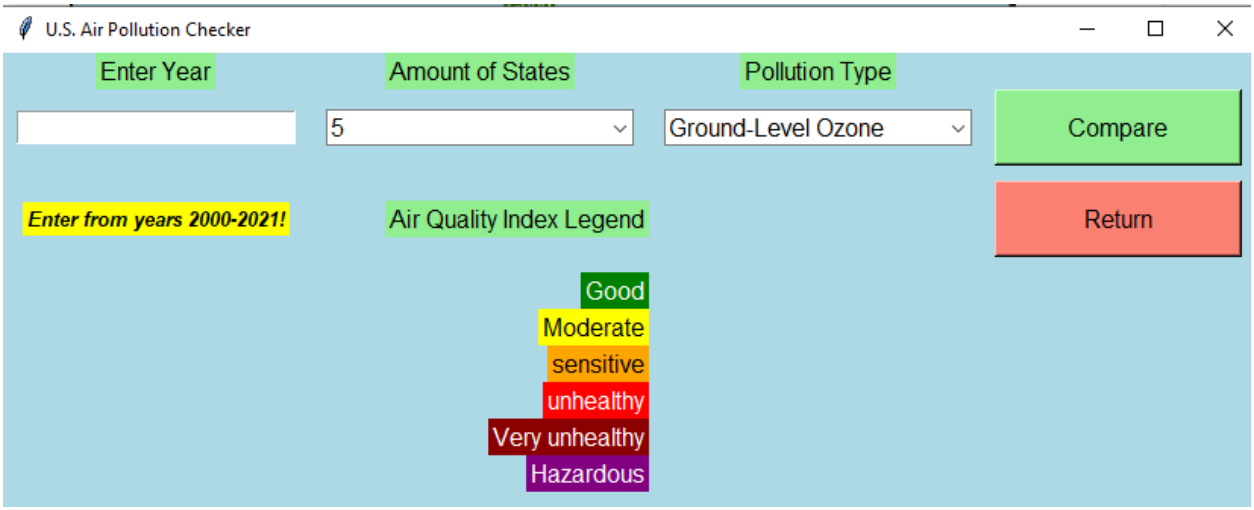
The user will need to install the following packages**:**

- matplotlib
- pandas
- numpy (should automatically install with pandas in PyCharm)

When starting the program, the first GUI illustrated below will be created with 3 different options that can be selected by the user. The first option is called “State Comparison” which when selected, will open a new GUI for the state comparison functionality of the program. The second option is called “Single State Search” which when selected, will also open a new GUI for the individual state search functionality of the program. The third option called “Exit” will terminate the program and any opened windows related to the program.



If the user selected option 1 “State Comparison” the program will create the GUI illustrated above containing a year entry box on the left where you must enter a year in between 2000-2021 as illustrated under the year entry box through a hover event. Next, there will be a dropdown box under the “Amount of States” that will allow the user to select the top 5, 10, or 15 states of the entered year. Below the entries, there is an AQI index which will serve as a legend for the bar graph that will be created. The third dropdown box under the “Pollution Type” allows the user to select from 4 types of pollution. To the right, there is a button named “Compare” which will use all information entered to create a detailed bar graph. Below this button is the return button which will close the current GUI and return to the main menu if the user wants to select a new option or exit the program.



If the user selects Option 2 “Single State Search” the program will create the GUI illustrated below which contains 2 dropdown boxes where the user must select a specific state under the “Choose State” label and the pollution type under the “Pollution Type” label. The AQI index will also be shown below. To the right of the pollution type dropdown is a button called “Enter” which will create a bar graph from the selected information. Below this button is the return button which will close the current GUI and return to the main menu if the user wants to select a new option or exit the program.