

MAJOR PROJECT REPORT

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INTRODUCTION: Using MATLAB plotted monthly, seasonal, and annual diurnal plots of the data file given. Also, dealt with the missing data (the NaN values) and recovered it using MATLAB's inbuilt functions.

CONTEXT: Data Analysis and Management using MATLAB. Working knowledge of inbuilt functions, structures and time series of graph and tables.

TECHNICAL REQUIREMENTS / SPECIFICATIONS:

A laptop/PC which has MATLAB that functions on it.

My Laptop Specifications(with MATLAB installed):

HP Omen 15

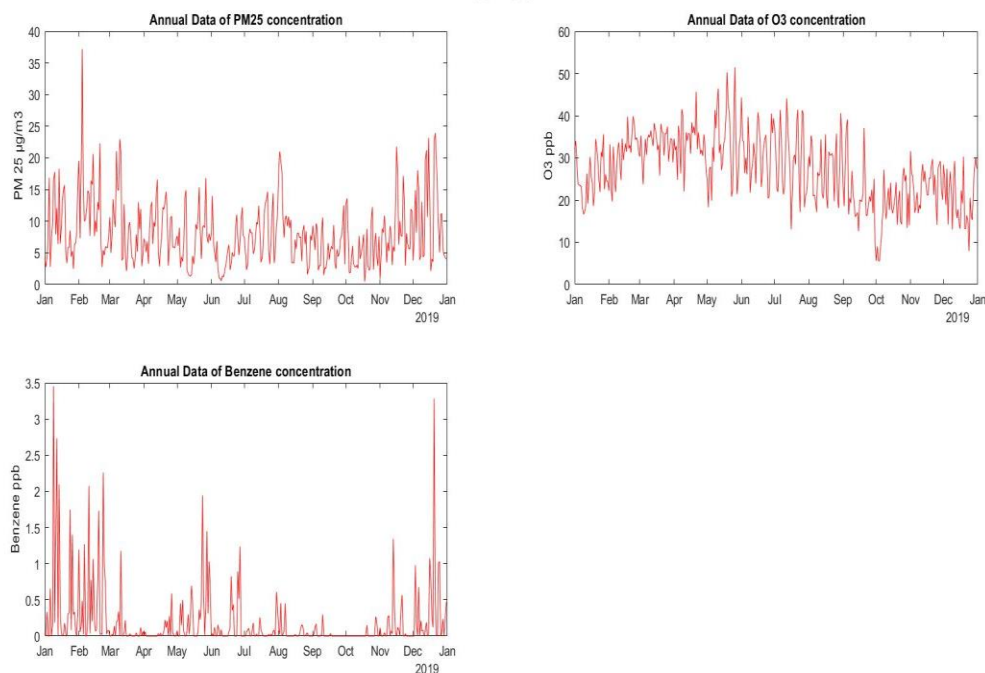
Processor: i7-10750H

RAM: 16GB

Storage:1 TB SSD

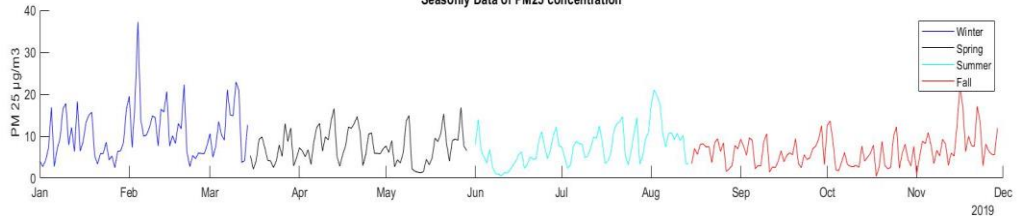
GRAPHIC CARD: NVIDIA GTX 1650Ti

Annual Data

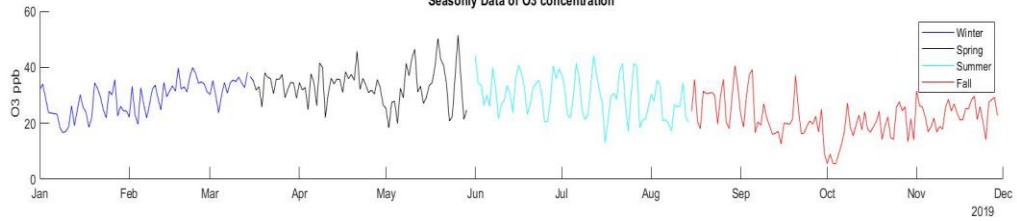


Seasonal Data

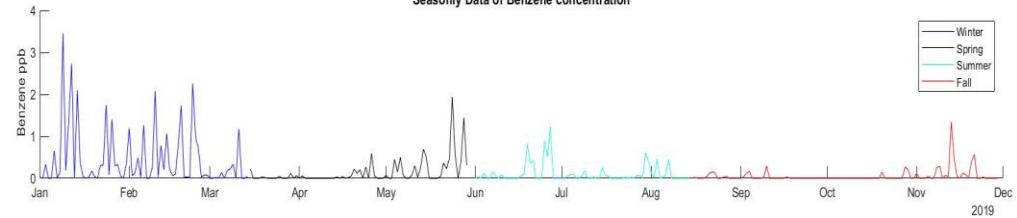
Seasonally Data of PM25 concentration



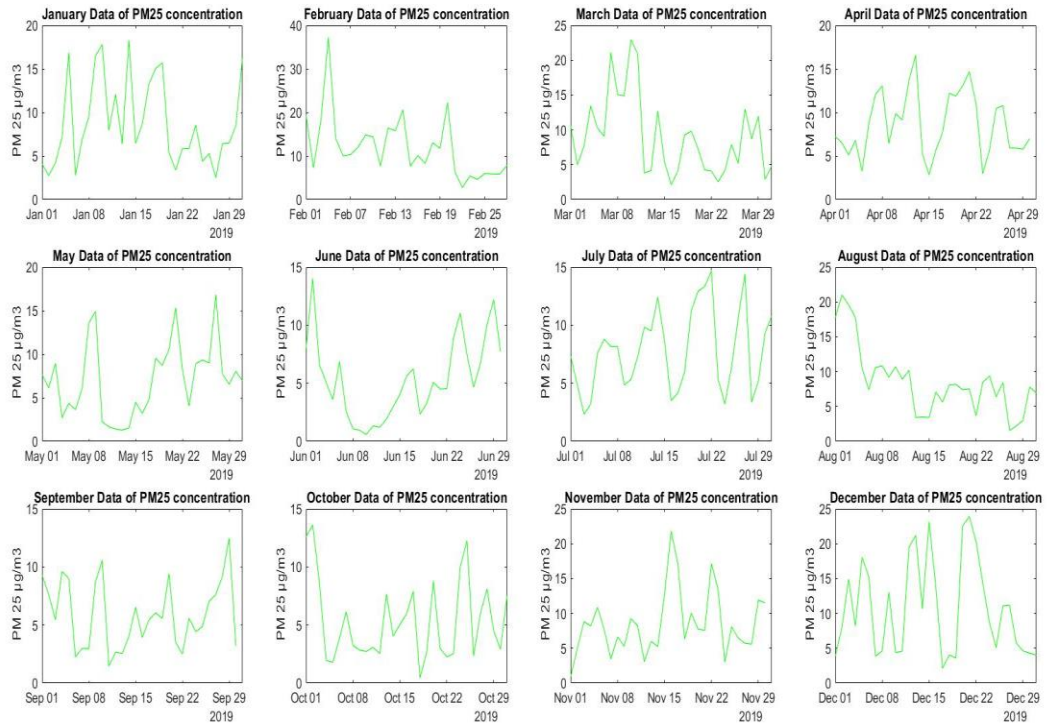
Seasonally Data of O3 concentration



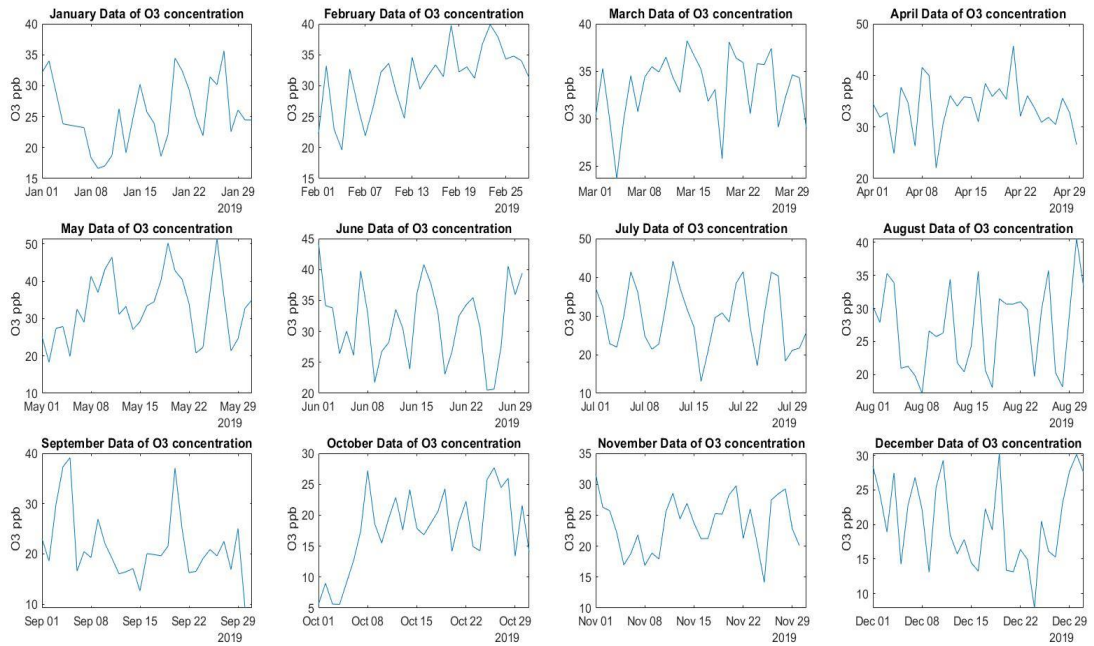
Seasonally Data of Benzene concentration



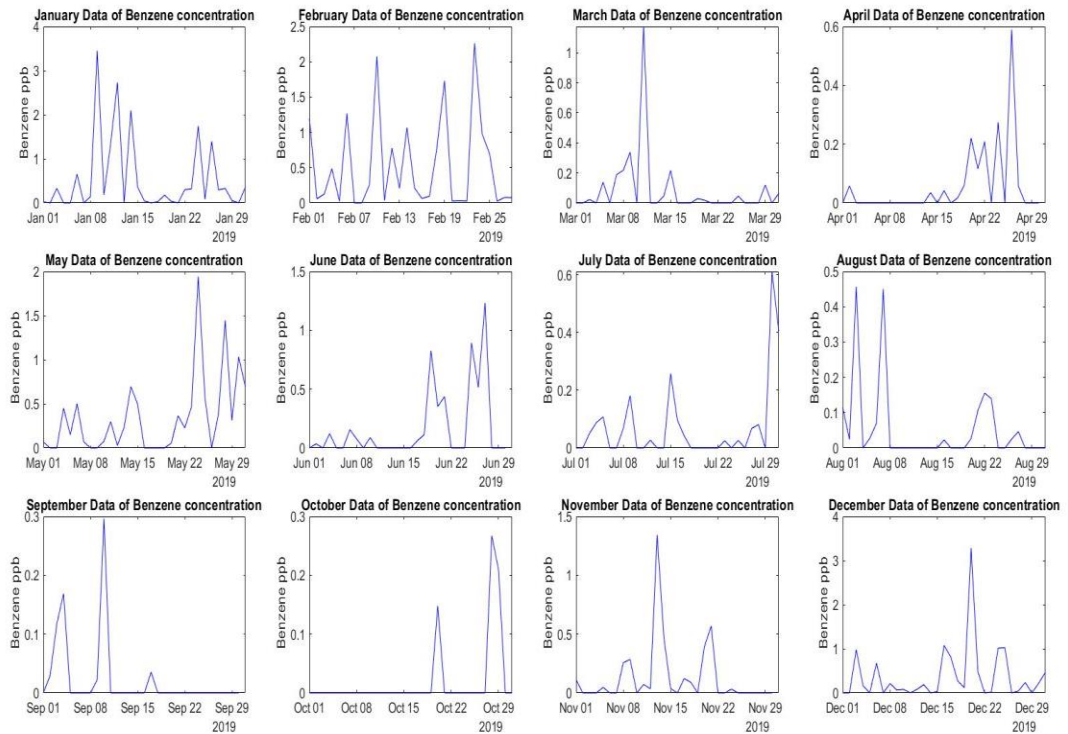
Monthly Data of PM25



Monthly Data of O3



Monthly Data of Benzene



PROCEDURE:

To plot the diurnal graphs the datatype of the date and time columns had to be changed and specified (dd MMM yyyy and HH:mm) according to the data provided and to remove the NaN values inbuilt functions like isnan and interp1 had to be used to find and replace the missing data values, respectively.

Then to plot the monthly plots, I made use of the timerange and datetime function to specify the initial date and end date of the month so that MATLAB recognizes it. I even had to specify the InputFormat as it was different from the predefined format. Then I plotted the graphs using the date/time on the x-axis and the Data of the pollutant on the y-axis.

To combine the monthly, annual, and seasonal plots of PM25, O3, Benzene into one figure each I made use of subplot and I added the suitable title and the labels for the x, y axis.

TEST:

To verify the working of my test I ran my code at first, I received a couple of errors, but I corrected my code and then it worked. The variables were now visible in the workspace and all the graphs for annual, seasonal, and monthly data were plotted.

CONTINGENCY:

At first, I was not able to process the data using datetime function to solve this I had to import the data manually specifying the datatypes of the date and time columns. Then I tried using the inbuilt command groupsummary to get the daily averages but that did not work so I had to use retime to get the daily mean.

All these errors and mistakes I did made me realize what I did wrong. Next time onwards I would try to read about all the inbuilt functions I will use to completely understand how they work so that I can implement them in my code properly.

I learnt that doing any work hastily would not make any progress. It also made me realize that completing half of the work and procrastinating the other would only make us lose our flow and waste a lot of time.

ADDITIONAL MATERIAL:

So, my project consisted of processing the data given to plot diurnal graphs of monthly, seasonal, and annual data. The data which was given consisted the date and time with their respective data of 3 pollutants (PM₂₅, O₃ and Benzene) and we plotted their graphs against time. These pollutants are harmful to the environment and people and these can cause deplete the air quality as well. By plotting the graphs of these pollutants, it can help us to analyse which pollutant is having the maximum concentration and we can also get to know in which month the pollutant is having the greatest concentration or in which month it has the lowest concentration. This can help researchers and analysts to use this data to solve the problem of air pollution too.

CONCLUSION:

From the graphs we plotted we can see a specific trend in the data which is the concentration of benzene is maximum in the starting and at the end of the year whereas PM₂₅ and O₃ have a uniform and high concentration throughout the year. Also, from the annual graph we can see that O₃ has the maximum amount of concentration.