Environment Sustainability: Study Of

Impact Of Air Pollution

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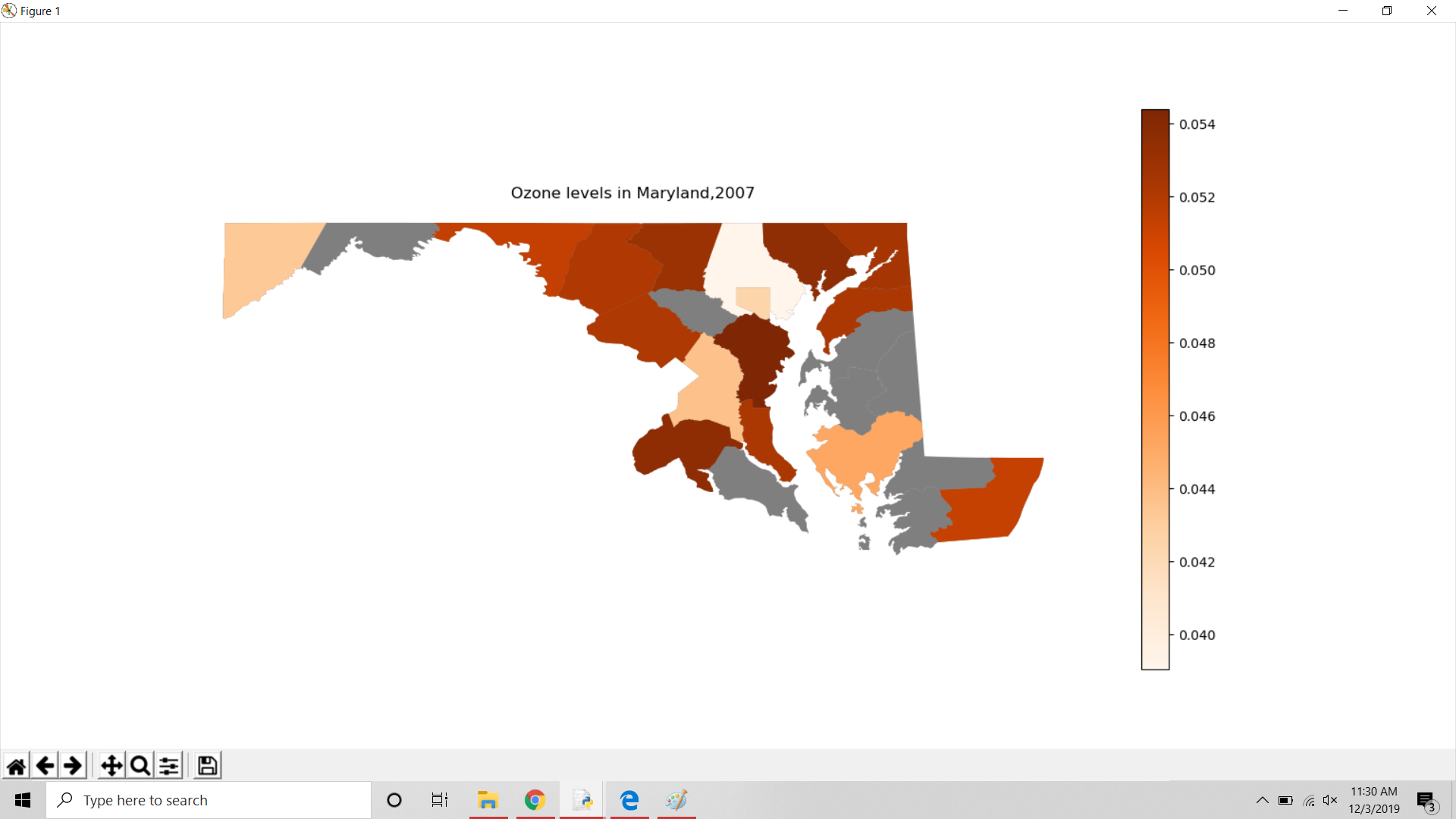


Figure 1 : ucgwde

*Abstract*— Although many of us are aware of the most common pollution causing factors that is harming the air we breathe and the atmosphere, there is a room for identifying some of the new and uncommon pollutants and their level of impact on the mother nature. For example, NO2 and the PM 2.5 produced by animal husbandry in various economies depleted the ozone layer considerably in past few decades. In this project such impact along with various other pollutants are highlighted and the impact is studied.

Keywords—environment, air pollution, ozone, pollutants, environment sustainability

# Introduction

Certain human activities have been harming the environment for past many decades. Various studies have come up showing the impact and causes of the man-made activities causing depletion of the environment. This paper includes the study of that impact along with a key focus on the pattern of air pollution that has been following in past two decades. The study intends to help the user to visualize the increase and decrease of air pollution level and its causes at various parts of the world over a period of two decades and use it as a basis to predict the future if the activities continue to occur. It can also be a basis to what pollutants are more prominent in certain regions over others and how can the sources be eliminated. The study can further be enhanced to develop a basis for incorporating governmental policies to control the pollution causing activities.

# Related Work

The paper S. De Vito, E. Massera, M. Piga, L. Martinotto, G. Di Francia, *On field calibration of an electronic nose for benzene estimation in an urban pollution monitoring scenario, Sensors and Actuators* B: Chemical, Volume 129, Issue 2, 22 February 2008, Pages 750-757,

ISSN 0925-4005 highlighted the content of chemical gases that pollute the air. “On field calibration of an

electronic nose for benzene estimation in urban pollution monitoring scenario” lists down data from about nine thousand cases captured by chemical sensors in one of the polluted regions in Italy during the year 2004 and 2005. The paper *MATLAB Implementations and Applications of the Self-Organizing Map* - *By Teuvo Kohonen, s*tructured diagram of the data set chosen to describe the standard of living in 126 countries of the world in the year 1992. The abbreviated country symbols are concentrated onto locations in the (quantized) display computed by the SOM algorithm.

There have been numerous other works done in terms of analysing environmental data and develop a visualization to show the impact. The advantage of this study is reflected in studying pattern of the degradation of environment in past two decades and it can be used as basis to predict future patterns.

# METHODS AND ANALYSIS

The data used has been taken from the client AirNow [2] which contains the information like states (Florida, Georgia, Maryland), their sites (Essex, Edgewood, Horn Point), their pollution parameters (SO2, PM2.5, PM10, O3) and the measure of those parameters during the selected period as shown in figure 2.

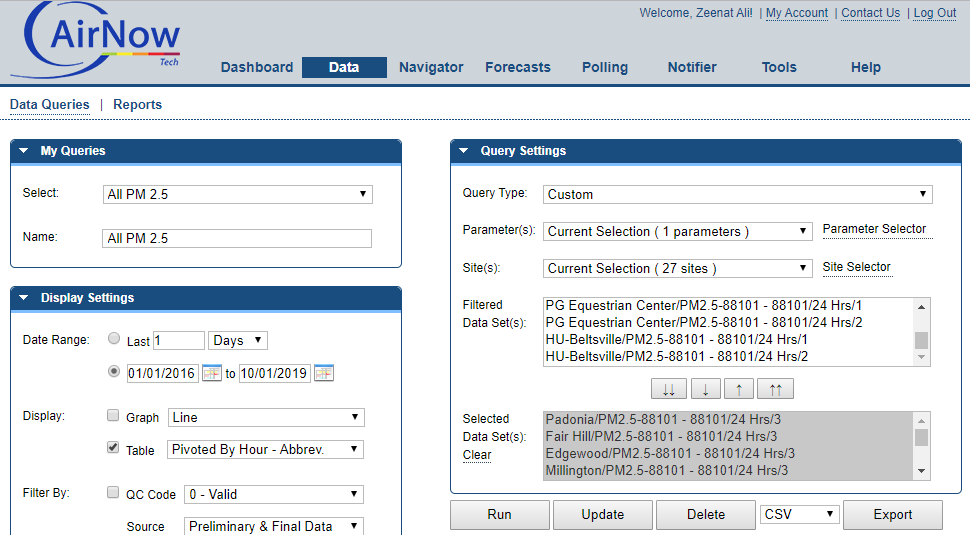


Figure 2: chbfehjbvjehjh

Inspired from Kohonen [1] who used SOM structured diagram to exhibit quality of living in 126 countries in the year 1992, the data was analysed and structured to show the quality of air in certain regions of the state Maryland in a span of 3 years, viz. January 2016 to January 2019. This was achieved by analysing the data in two ways:

1. Goal 1: It is redundant to study each site of a state Maryland to study the pollution of Maryland, instead the reduction in number of sites to be considered and selecting the ones that have most impact on the overall study will help towards a better and more efficient data visualization.
2. Goal 2: The other approach could be the pollutants that have most impact on quality of air for a specific region can be considered to implement data visualization.

Based on the above two analytic goals, two sets of data were selected as follows:

1. The pollutant was kept fixed which was PM2.5(Particulate matter of size less than 2.5 microns in diameter) and four sites of Maryland were considered for the same pollutant.

2. In the second analysis, the site was fixed which was Horn Point and three type of pollutants were considered, viz. SO2, PM2.5 and PM10.

**Case 1: Image representing data before analysis:**

Figure 3 depicts representation of data before data analysis. A pollutant was chosen and kept fixed which was PM2.5 (Particulate matter of size less than 2.5 microns in diameter) and four sites of Maryland were considered for the same pollutant.

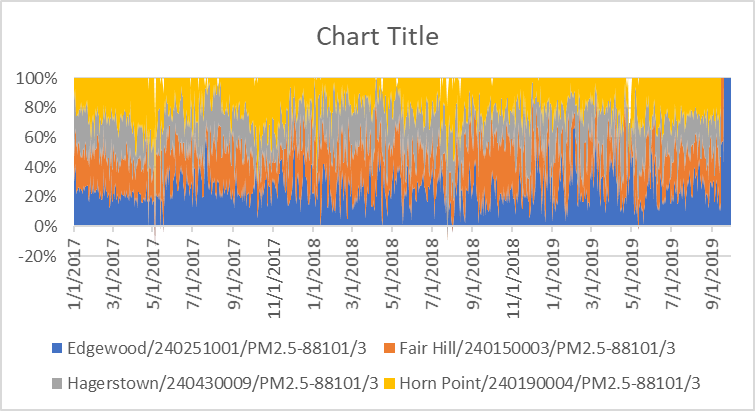
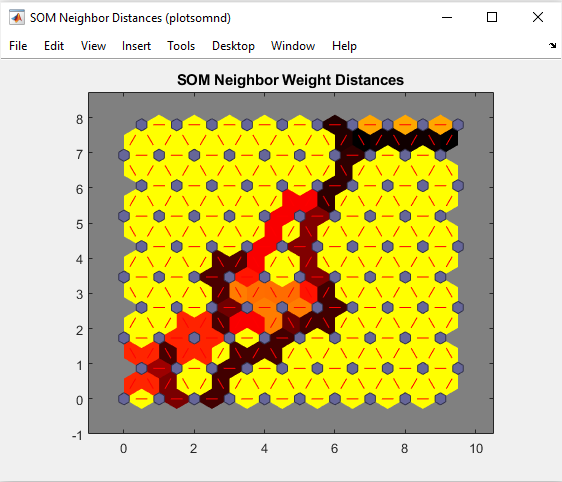
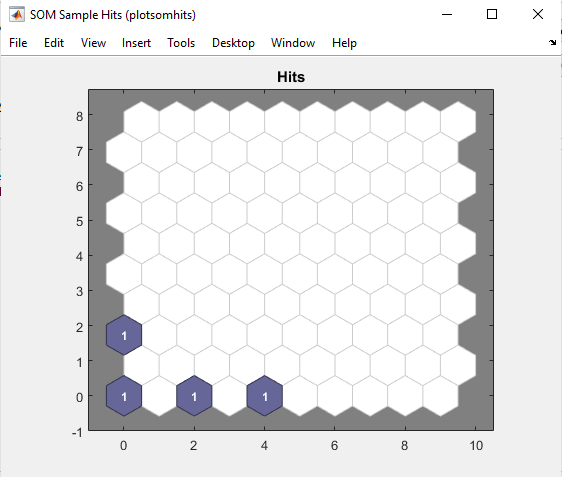
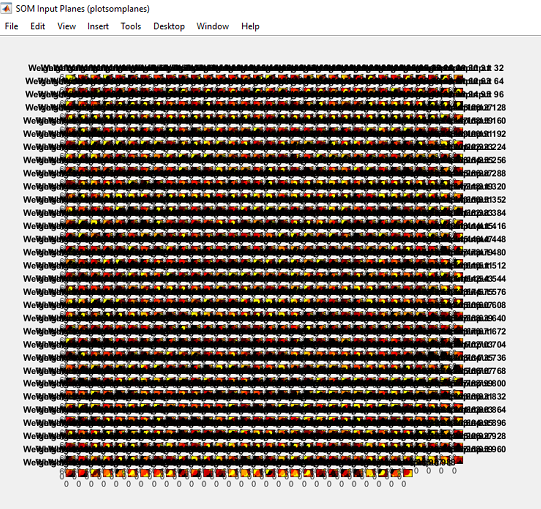
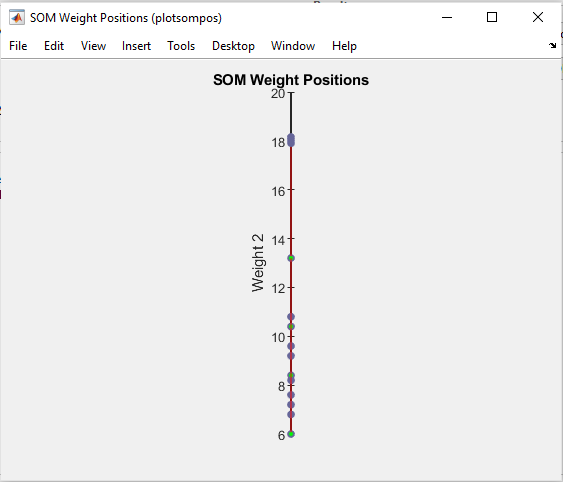


Figure 3: pollutant was kept fixed which was PM2.5 (Particulate matter of size less than 2.5 microns in diameter) and four sites of Maryland were considered for the same pollutant

**Case 1: Image representing data after analysis:**

Figure 2, 3, 4 & 5 represents the data after analysis. In figure 2, the blue hexagons represent the neurons. The distances between neurons is indicated by red lines. The lighter the color, smaller the distance and vice versa. The SOM network shows that a band of dark segments crosses from the left-lower region to the upper-right region, representing clusters showing two regions of Maryland are dominant for depicting pollutant PM2.5 and can be considered for study.



Other source of data is https://mde.state.md.us/programs/Air/AirQualityMonitoring/Documents/MDNetworkPlanCY2020.pdf to plot the latitudes and longitudes of the sites on the world map using geo scatter bubble plot..

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*a**b* 

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5. R. Nicole, “Title of paper with only first word capitalized,” J. Name Stand. Abbrev., in press.
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7. M. Young, The Technical Writer’s Handbook. Mill Valley, CA: University Science, 1989.

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