

ANALYSIS OF AIR POLLUTION CAUSED DUE TO VEHICLES.

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Abstract: This paper delineates air pollution induced by vehicles. Vehicle contributes more than half harmful gases in the air, which causes threat to human life as well animal life. Due to heavier traffic, air pollution degree in cities is rapidly extending. Our proposed system delivers the solution to these problems with the help of IOT and Natural resources available. The utilization of IOT (IoT devices), secondary data analysis and physical data visualization were methodology used in this propose system. Data is obtained by real time survey conducted by means of Google forms. Based on data set some of visualizes are done to make the predictions and trends of increasing pollution due to vehicles.

Index terms: vehicle, IOT, data visualization, analysis.

I. INTRODUCTION:

Vehicles are the extreme contributors of the pollution which is emitted directly into atmosphere by producing the gases such as carbon mono-oxide, nitrogen oxide, sulphur di-oxide, and other polluting gases, which not only harm human life but as well are threat to animal and plant lives. Transportation contributes beyond the half of the carbon monoxide (CO) and nitrogen oxide (NO₂) in the air which causes excessive air pollution. Due to which causes injurious impacts on nearly every organ system in body, due to which global warming is increasing and also ozone layer is depleting day by day. Our personal transportation choices are causing enomours impact on air Quality and on environment. Pollutants emitted from vehicles contribute to human problems such as asthma, heart disease, birth defects, eye irritations etc. So to deal with the above problem a propose system is proposed in this paper which will surely reduce the percentage of the harmful pollutants increased in air due to vehicles.

The proposed idea make use of Data Visualization and IoT technique to reduce human power and also make use of naturally obtained resource which will not harm any of the creature in environment. IoT technique i.e. Internet of Things is the network of devices such as vehicles, and home appliances that contain electronics, software, sensors, actuators, and connectivity which allows these things to connect, interact and exchange data. In this paper IoT devices is used to reduce the human efforts. Data Visualization is used to make a graphical representation of the data and information which is easily understood, by using visual elements like bar plots,3 graphs, maps, histograms etc. in more effective, accessible and informative way.

II. DATA DESCRIPTION :

Data set is obtained by real time survey conducted by the Google forms across Pune city Maharashtra India.

Data collection period: January 15 2019 to February 25 2019

Data observations: 206

Data contains information of no of family members, no of vehicles owned by a family, which type of fuel they use in vehicle, weekly expenses required for the fuel like petrol, diesel, etc. how frequently they use their vehicles.

City	Age	Location ex. Vshrant	Number of family me	No of vehicles you have	No. of family membe	Which type of vehicle do	Distance of your work fr	Which type of fuel	Weekly expenses on fuel	How frequ If you
Pune		Kharadi		4 & more		3 Two wheeler;Four wheel	10-15 kms	Petrol;Diesel;LPG	500 Rs & more	5 & more Vehicle
Pune	21-25	lohegaon	4,5 & more	1,2;3	1,2;3	Two wheeler;Four wheel	8-10 kms;10-15 kms	Petrol;Diesel	300 Rs - 400 Rs	4 - 5 time; walk
Pune	21-25	lohegaon	4,5 & more	1,2;3	1,2;3	Two wheeler;Four wheel	8-10 kms;10-15 kms	Petrol;Diesel	300 Rs - 400 Rs	4 - 5 time; walk
Pune	18-20	No	5 & more		3	3 Two wheeler;Four wheel	15-20 kms	Petrol	500 - 700 Rs	2 - 3 times Walk
Ahmednagar	18-20	Dighi		4,2,4 & more		2 Two wheeler;Four wheel	10-15 kms	Petrol;Diesel	700 Rs & more	4 - 5 time; Walk
Pune	18-20	Chandannagar		4 & more		2 Two wheeler	8-10 kms	Petrol;Diesel;LPG	400 Rs - 500 Rs	5 & more Depen
Pune	18-20	Vshrantwadi		4	3	2 Two wheeler;Four wheel	8-10 kms	Petrol	300 Rs - 400 Rs	4 - 5 time; Vehicle
Pune	18-20	Vshrantwadi		4 & more		2 Two wheeler	8-10 kms	Petrol	200 Rs - 300 Rs	2 - 3 times Vehicle
Pune	18-20	Chandanagar		4	1	1 Two wheeler	8-10 kms	Petrol	200 Rs - 300 Rs	2 - 3 times Walk
Pune	26-30	Karve Nagar		2	1	2 Two wheeler	8-10 kms	Petrol	200 Rs - 300 Rs	4 - 5 time; Cycling
Pune	18-20	Pride World City		3	1	2 Two wheeler	Less than 1 km	Petrol	100 Rs - 200 Rs	2 - 3 times Vehicle
Pune	18-20	DY patil college loheg	5 & more		1	1 Two wheeler	8-10 kms	Petrol	100 Rs - 200 Rs	2 - 3 times By veh
Pune	21-25	Pune		4	3 & more	Four wheeler	More than 20 kms	LPG	400 Rs - 500 Rs	2 - 3 times By wal
Pune	18-20	Hinjawadi		4 & more		3 Four wheeler	Skim	Diesel	500 - 700 Rs	5 & more By veh
Pune	18-20	Kalasi		4	1	1 Two wheeler	8-10 kms	Petrol	100 Rs - 200 Rs	2 - 3 times By wal
Pune	18-20	Vadgaonsheri	5 & more	4 & more	4 & more	Two wheeler;Four wheel	10-15 kms;15-20 kms	Petrol	100 Rs - 200 Rs	2 - 3 times Walk
Pune	18-20	Thitewasti		4	3	3 Two wheeler;Four wheel	10-15 kms	Petrol	700 Rs & more	5 & more Walk
Pune	18-20	Sangvi		4	2	3 Two wheeler;Four wheel	10-15 kms	Petrol	200 Rs - 300 Rs	4 - 5 time; Vehicle

Fig.1

Attributes i.e. columns in the data set are city, age, location, no of family, no of vehicle used by family member, type of vehicle, distance of their work, type of fuel, weekly expenses.

III. LITERATURE REVIEW:

Patil, P their proposed system used an MQ-7 and MQ-2 sensor to detect carbon monoxide and sulphur dioxide. system uses microcontroller name raspberry pi to compares the level of Pollutants with the stipulated level allowed by the Government. When pollutant level exceeds the fixed threshold value, traffic department and agencies of national environment will get notify. Due to heavier traffic and powerful engines , noise level in cities is rapidly increasing .Vehicle makes the noises because of trying to start the car with bad battery, valves tapping, Engine running without oil, Engine seizing up, lifter adjustment, piston slapping, and tranny slipping. Combustion engines are used by most of the vehicles on the road.[7]

Sylla, F.K., Faye, A., Fall, M. and Anta, T.D in this research paper the author has studied of the diseases caused due to air pollution. The author stated that chronic respiratory diseases (CRD) are obvious effects of air pollution. Chronic respiratory diseases are responsible for 4.2 million deaths a year worldwide. [1]

Budiarto, A. and Febriana, T in this research paper to reduce the air pollution they have introduced use of cycling and developing the cycling habit. Motivating people to use cycling instead of vehicles. Because of that, by creating awareness about air pollution, it is expected to be a motivation for people to do more cycling to create a better environment.[5]

IV. DATA VISUALIZATIONS:

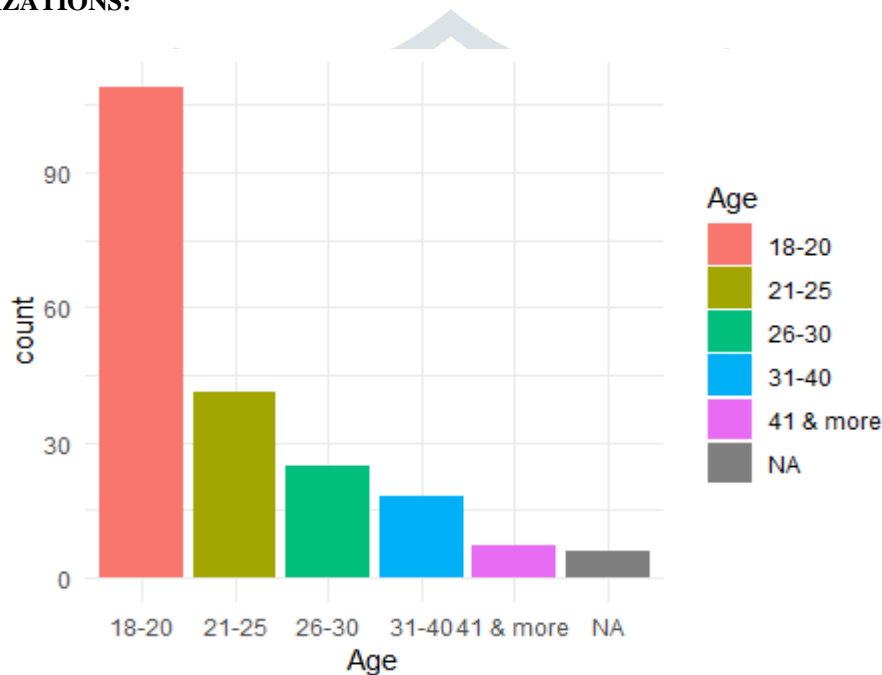


Fig.2

- The above bar graph shows the age of people from the data set that use vehicle for their day today use. It is seen that there are more than count of 100 people who uses vehicle.

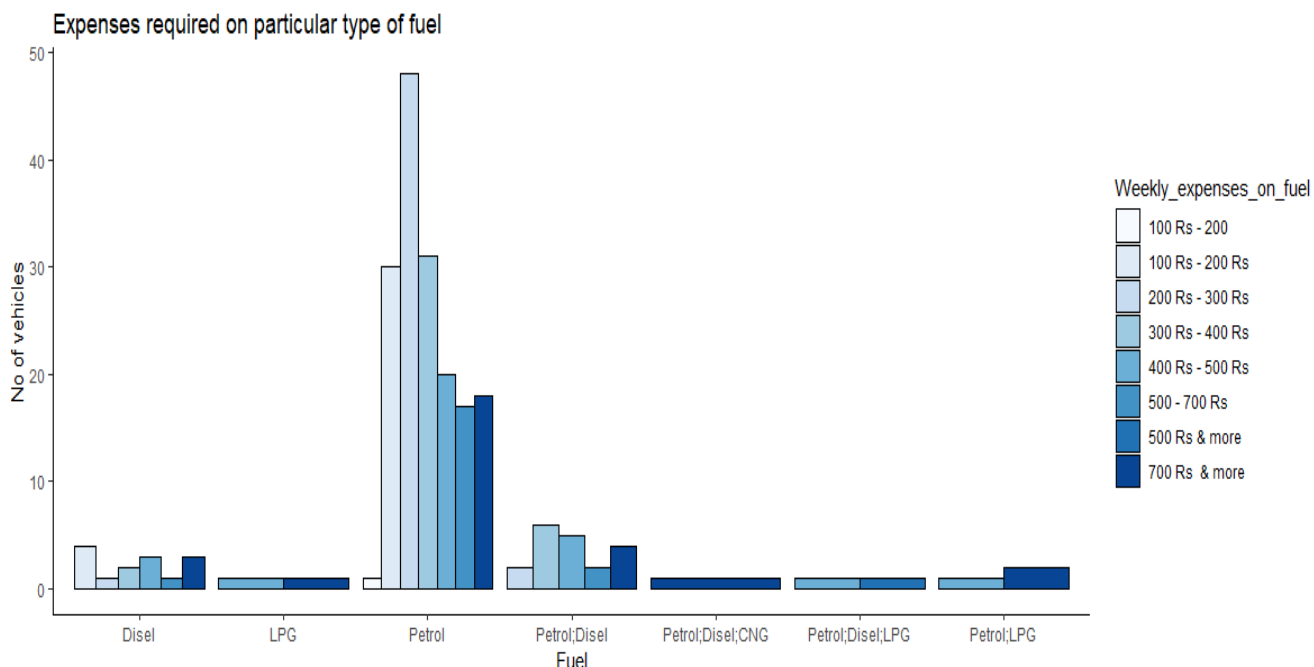


Fig.3

➤ The above grouping bar graph shows the relationship between two attributes i.e. weekly expenses required on fuel and on which fuel how many expenses are required. It is observed that petrol is highly used and more than 50 vehicles requires 200 – 300 Rs weekly.

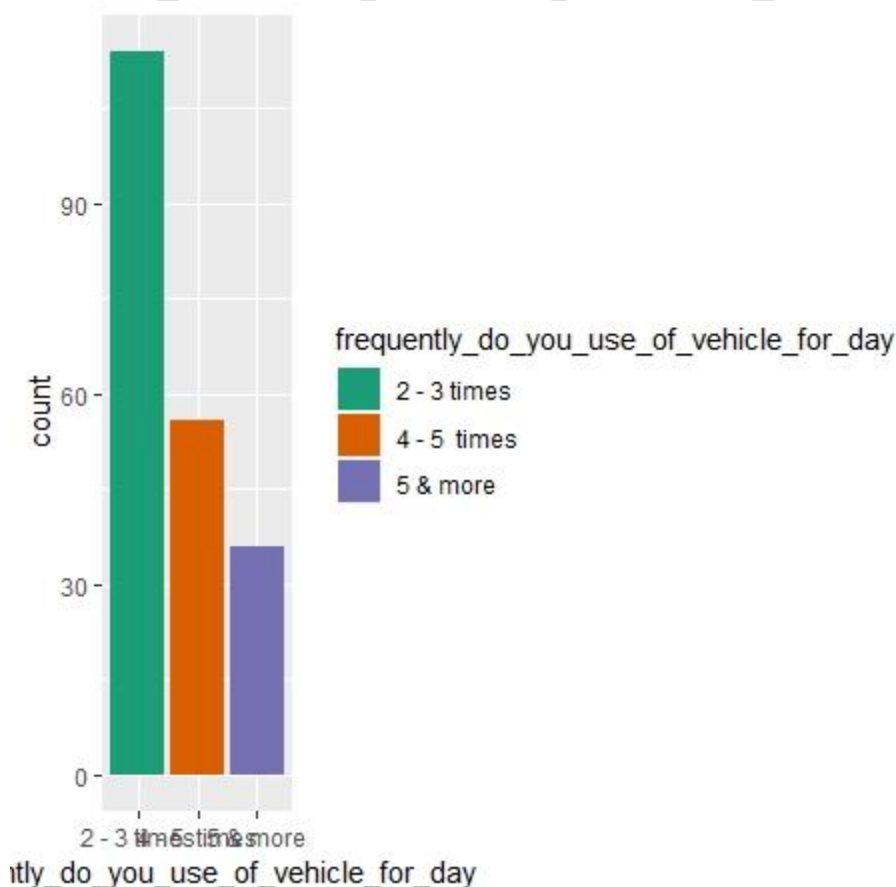


Fig.4

➤ The above histogram shows the how frequently a person uses a vehicle in a particular day. It is seen that more than 100 people from the data collected uses their vehicle 2 - 3 times.

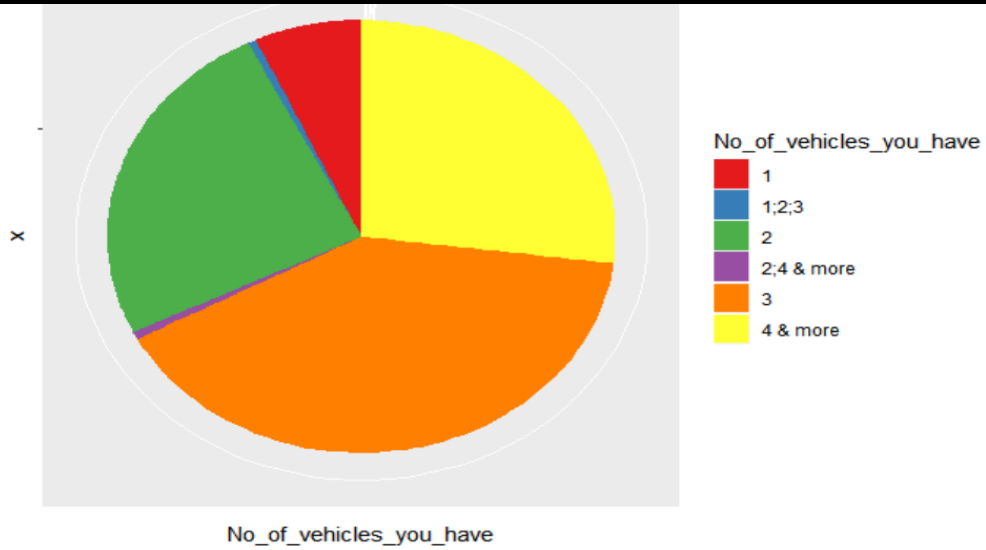


Fig.5

- The above pie diagram represents count of the vehicles in a family and it is observed that 3 vehicles is the maximum count.

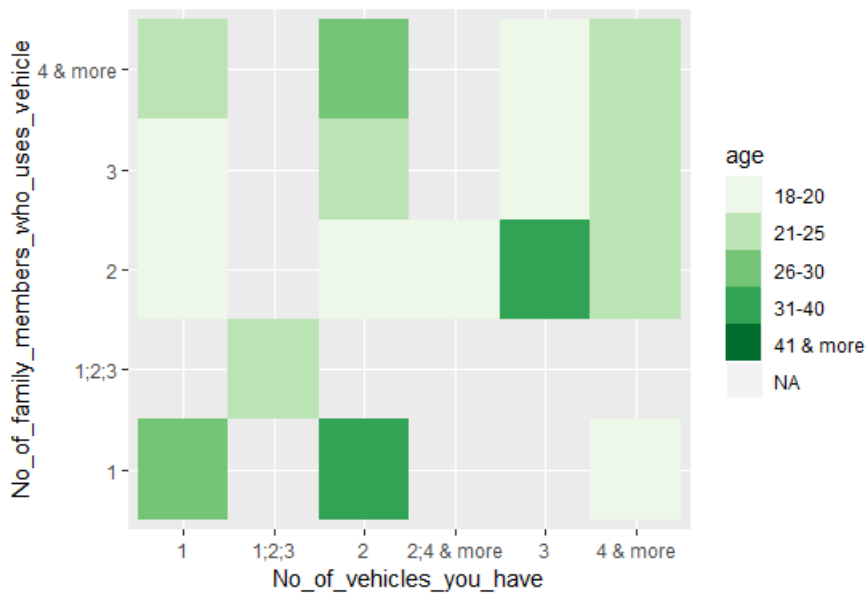


Fig.6

- The above heat map represents the relation between 3 attributes on x axis no. of vehicles in a family and no. of users in family and also age of the users.

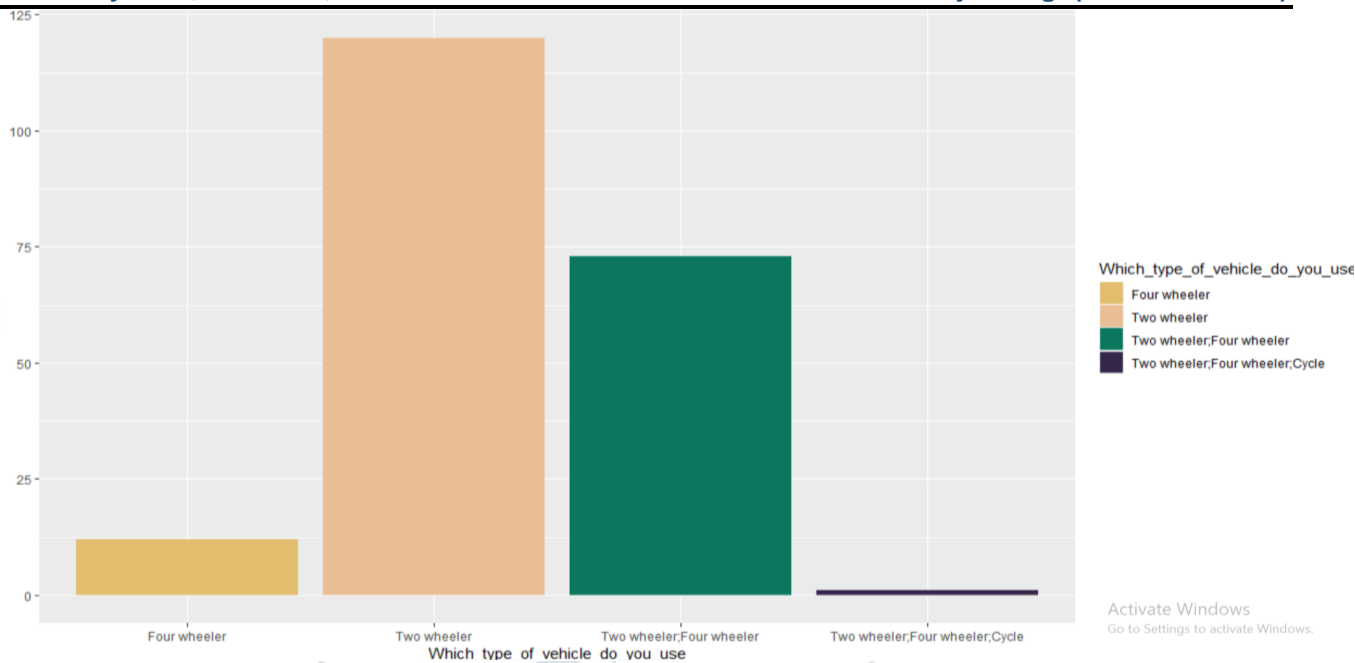


Fig.7

➤ The above bar graph shows use of two wheelers and four wheelers in a family.

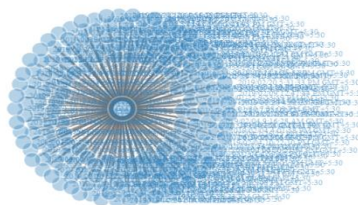


Fig.8

➤ The above network diagram show the full representation of the data collected.

V. OBSERVATIONS:

It is observed from the above data visualization that maximum air pollution is caused due to vehicle. It is seen that most of the people have more than 3 vehicles in one family and mainly youth i.e. age range from 18- 20 uses the most. Due to frequent use of vehicle emissions are increased and therefore air quality is going bad. Pollutants like carbon mono-oxide (CO), sulphur di-oxide (SO₂), nitrogen di-oxide (NO₂), is increasing in atmosphere and harming the living life.

VI. PROPOSE SYSTEM:

In this propose model a car is made which will work on solar energy. It will work only on sun power by using the solar panels on top of the cars. By use of photovoltaic cells the solar energy will be converted into electric energy and car will work. This is relevant method which can be used to lower down the air pollution. IOT will also be applied on car which will reduce the human power to drive the car. In this propose model as natural resource solar energy is used which is free of cost and there will be no expenses required weekly on vehicles for fuel.

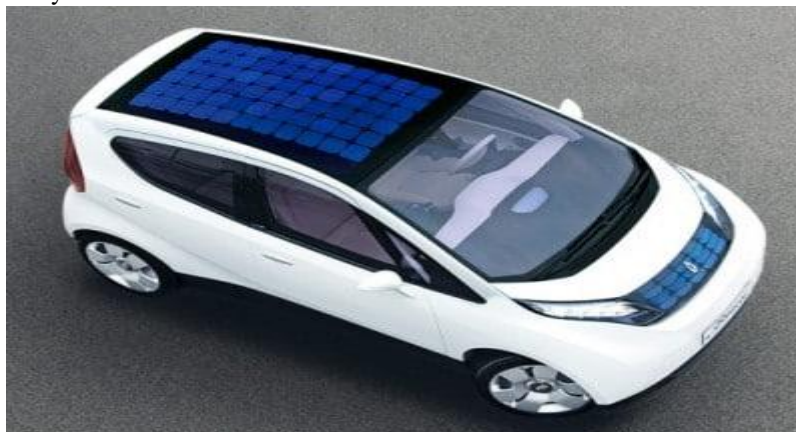


Fig.9

VII. CONCLUSION:

Most of air pollution is caused due to vehicles. And mainly the youth is using the vehicles on large scale for small purposes. Air pollution can be lowered using low polluting fuels like natural gases, fossils fuels, instead of petrol. By using the proposed model use of natural resource is possible and is more effective in use.

VIII. REFERENCES:

1. Sylla, F.K., Faye, A., Fall, M. and Anta, T.D., 2017. Air Pollution Related to Traffic and Chronic Respiratory Diseases (Asthma and COPD) in Africa. *Health*, 9(10), p.1378.
2. Holland, S.P., Mansur, E.T., Muller, N.Z. and Yates, A.J., 2016. Damages and expected deaths due to excess NO_x emissions from 2009 to 2015 Volkswagen diesel vehicles. *Environmental science & technology*, 50(3), pp.1111-1117
3. Lelieveld, J., Evans, J.S., Fnais, M., Giannadaki, D. and Pozzer, A., 2015. The contribution of outdoor air pollution sources to premature mortality on a global scale. *Nature*, 525(7569), p.367.
4. Ritz, B., Lee, P.C., Hansen, J., Lassen, C.F., Ketzler, M., Sørensen, M. and Raaschou-Nielsen, O., 2015. Traffic-related air pollution and Parkinson's disease in Denmark: a case-control study. *Environmental health perspectives*, 124(3), pp.351-356
5. Budiarto, A. and Febriana, T., 2017, November. IoT device used for air pollution campaign to encourage cycling habit in inverleith neighborhood. In *2017 International Conference on Information Management and Technology (ICIMTech)* (pp. 356-360). IEEE.
6. Djebbri, N. and Rouainia, M., 2017, August. Artificial neural networks based air pollution monitoring in industrial sites. In *2017 International Conference on Engineering and Technology (ICET)* (pp. 1-5). IEEE.
7. Patil, P., 2017, May. Smart IoT based system for vehicle noise and pollution monitoring. In *2017 International Conference on Trends in Electronics and Informatics (ICEI)* (pp. 322-326). IEEE.
8. <http://www.yourarticlelibrary.com/pollution/vehicular-pollution-in-india-2118-words/19796> dated: 24/3/2019

