

Design and Fabrication of Traffic Air Purifier

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Abstract— Among all the problems arising in the world. Air Pollution is the most critical in the dense populated cities. As population is increasing at very fast rate the peoples are migrating towards cities like Delhi, Mumbai in search of occupation. As for transportation, peoples have vehicles which are drive burning fossil fuels. The reaction in the exhaust releases harmful compounds such as Cox, Sox, Nox and VOC's. In cities like, Delhi the emission by vehicles have reached such a critical level that it is causing many health issues. Our project is a solution to this problem. We are making a machine which will suck the polluted air from the environment and purify it using Filters. This will improve the Air Quality at a satisfactory level. Which will decrease the health risk to Asthama and make a healthy environment?

Keywords— asymmetric cryptography, decryption, encryption, key, RSA algorithm.

I. INTRODUCTION

Nowadays, Population is growing at very fast rate. Which is leading to the problem of Global Warming. Among the causes of Global Warming, Pollution have large contribution. The pollution is mainly caused due to burning of fossil fuels and forest. The emission of poisonous gases such as CO_x, SO_x, NO_x. Which have chemical compounds which are harmful for the human beings. In cities like, Delhi the emission by vehicles have reached such a critical level that it is causing many health issues like Allergy, Asthama, Eye irritation, Breathlessness.

While finding solution to such a problem, We are implementing an new idea. This idea is based on basic concept of Air purification. We are designing and fabricating a machine that will suck the harmful pollutants from air and purify it and the fresh and healthy air is delivered to the environment. Which will reduce the AQI of the air at satisfactory levels.

The objective of our project is to improve the AQI of environmental air in critical polluted cities. We will record data of harmful compounds present in the polluted air and then design the purifier according to the data and will purify and deliver the fresh air to the environment.

According to reports in TOI, Delhi is heavily polluted city in India. Particulate Matter (PM) of 2.5 and 10 micrometers diameter is found in air. As Delhi is populated city due to this there is Heavy Traffic Jam which leads to Jam a vehicle in one place and pollutants are emitted at very high rate which creates SMOG which harmful for Human Body. There must be some solution to this problem. So to solve this problem we are making machine which will suck the pollutants inside and deliver fresh air. We will install this machine at Road Dividers and at Residential Areas where high pollution is found. We will use filters to purify the air to make design simple and Cost Effective.

Based reports in TOI and Google Search we conducted study and gather reports about AQI of cities where pollution is critical.

Table.1
Statistical Reports of Cities Having Critical AQI

Sr. No.:	City	Air Quality Index
1	Pune	45 to 75 AQI
2	Mumbai	100 to 180 AQI
3	Chennai	60 to 200 AQI
4	Delhi	365 to 525

II. METHODOLOGY OF PROJECT

In order to achieve our objective we have to take certain steps which will take us to the solution of the problem we are facing So following are the steps we will be taking to achieve our objective.

1.1 Step 1 : Identifying and Understanding the problem by conducting study among critical polluted cities.

We conducted a study by news report and identified the problem and its ill effects on nature and discussed on final solution.

1.2 Step 2 : Finding an feasible solution to the problem by referring research papers and patents

We found an feasible solution by coming to the decision of making an air purifier which will purify the air in environment and improve the AQI of the air to the satisfactory level.

1.3 Step 3 : Design an machine which will fulfill the purpose of the project with considerations from research

We are making a machine that will suck the air from the environment and then purify it using Filters and then deliver the fresh air to the environment. The machine will consist of Carbon filters and Dust filter which will purify the harmful Carbon Compounds like CO_x and dust, pollen grains and particulate matter. The Sulphur compounds from air will be purified by the process Desulphurization. In this process, the water molecules will trap the Sulphur molecules and form sulphuric acid. The Filters will get exhausted in 2 to 3 months and the filers can be cleaned by washing them with water at room temperature this will remove the dirt dust and buildup on the filter tissue. We can reuse the filter several times until it gets completely exhausted. The replacement of the filters must be done after every 1 year.

The process will go as depicted in the flowchart given below.

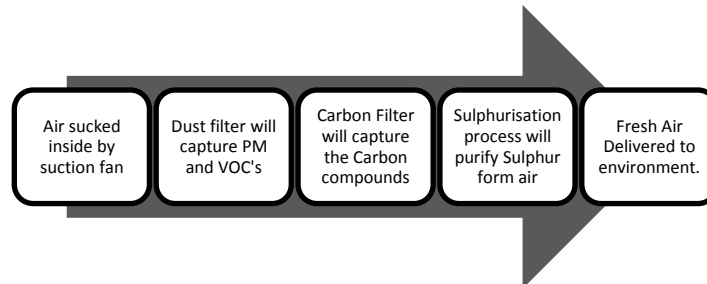


Fig 1. Flow Diagram of our process

Based on the process layout we made SolidWorks Model which gave us a basic idea of our project model and tentative dimensions of our model.

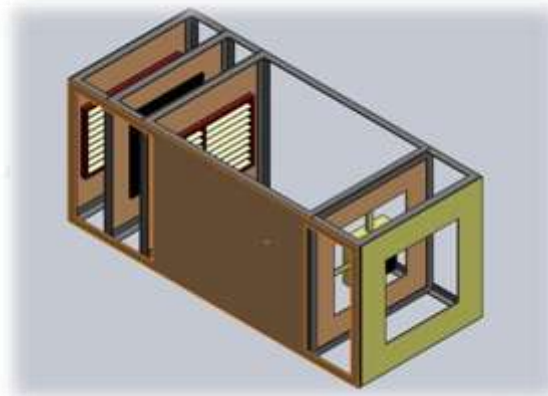


Fig 2. SolidWorks Model of our machine

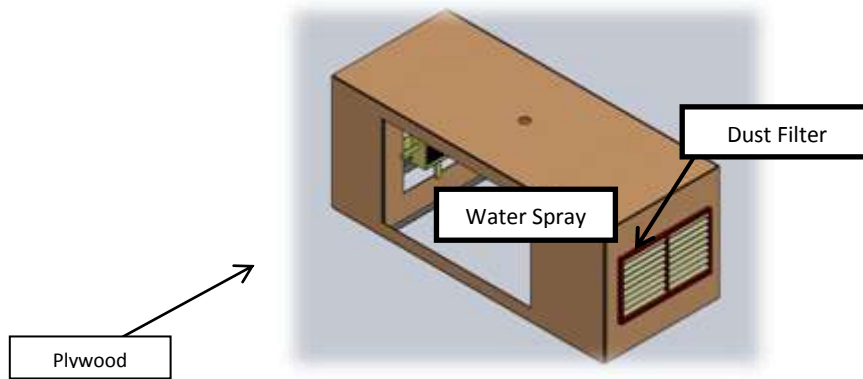


Fig 3. SolidWorks Model of our machine

1.4 Step 4 : Making a Prototype of model to get basic idea of our model

As we finalized the design then we must get a basic idea of what our model will look physically. We made a scaled prototype using cardboard which gave us a basic idea of our real model.



Fig 4. Scaled Prototype of model

1.5 Step 5 : Manufacturing of Machine

We ordered the components and started manufacturing. We made a structure by reference to some of best air purifiers and arranged filter accordingly to that and then we used slotted angles as it has a feature to change the distance between filters. We used Plywood sheet for casing covering and mounting all components.

Following are photos of our real physical model done till date.



Fig 5. Slotted Angles Structure



Fig 6. Filters mounted on Plywood Sheet



Fig 7. Suction Fan mounted on Plywood

1.6 Step 6 : Testing of machine and recording the data

After completion of manufacturing we moved forward for testing of our machine and conducted test under supervision of PUC (Pollution Under Control) department and recorded data about performance of machine under worst conditions. We recorded the quality of air before intake and after exhaust and came to conclusion that we have to do some optimization and necessary changes to be done.

1.7 Step 7: Optimization of problems encountered based on test results and make necessary changes

After testing we concluded what changes are to be made to make our machine more effective for environment. Our guide suggested some ideas and we also discussed with some mechanics and specialist persons in purification.

III. CONCLUSION

From the information , research papers and journals We concluded that our machine can purify the polluted air and improve the Air Quality Index (AQI) of air. Areas where pollution was at critical levels our machine is effective in purifying the harmful VOC, SO_x, NO_x and CO_x which are harmful for human beings.

Our Traffic Air Purifier will be able to purify the air and reduce the pollution to lower levels at the areas of Traffic Jam which causes suffocation and various health issue to living beings. The AQI can be reduced to satisfactory level.

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