SMOG REDUCTION SYSTEM

A PROJECT REPORT
Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report titled **"SMOG REDUCTION SYSTEM"** is theBonafide work of **"MANJU.K, HARSHA VARTHINI.M, GAYATHRY NANDA ,THILAGAVATHI.A"** who carried out the project work under my supervision

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DESIGN THINKING AND INNOVATION

Design Thinking is a design methodology that provides a solution-based approach to solving problems. It's extremely useful in tackling complex problems that are ill-defined or unknown,by understanding the human needs involved, by re-framing the problem in human-centric ways,by creating many ideas in brainstorming sessions, and by adopting a hands-on approach in prototyping and testing.

EMPHATIZE

The first stage of the Design Thinking process is to gain an empathic understanding of the problem you are trying to solve. This involves consulting experts to find out more about the area of concern through observing, engaging and empathizing with people to understand theirexperiences and motivations, as well as immersing yourself in the physical environment so youcan gain a deeper personal understanding of the issues involved. Empathy is crucial to a human-centered design process such as Design Thinking, and empathy allows design thinkers to set aside their own assumptions about the world in order to gain insight into users and their needs.

DEFINE

During the Define stage, you put together the information you have created and gathered duringthe Empathize stage. This is where you will analyze your observations and synthesize them inorder to define the core problems that you and your team have identified up to this point. Youshould seek to define the problem as a problem statement in a human-centered manner.

IDEATE

During the third stage of the Design Thinking process, designers are ready to start generating ideas. We have to "think outside the box to identify new solutions to the problem statement. Brainstorm and Worst Possible Idea sessions are typically used to stimulate free thinking and to expand the problem space. It is important to get as many ideas or problem solutions as possible at the beginning of the Ideation phase. You should pick some other Ideation techniquesby the end of the Ideation phase to help you investigate and test your ideas so you can find thebest way to either solve a problem or provide the elements required to circumvent it.

PROTOTYPE

The aim is to identify the best possible solution for each of the problems identified during the first Three stages. The solutions are implemented within the prototypes, and, one by one, theyare Investigated and either accepted, improved and re-examined, or rejected on the basis of theusers. Experiences. By the end of this stage, the design team will have a better idea of the constraints Inherent to the product and the problems that are present, and have a clearer view of how real users Would behave, think, and feel when interacting with the end product.

TEST

Designers or evaluators rigorously test the complete product using the best solutions identifiedduring. The prototyping phase. This is the final stage of the 5 stage-model, but in an iterative process, the Results generated during the testing phase are often used to redefine one or more problems and inform. The understanding of the users, the conditions of use, how people think,behave, and feel, and to Empathize. Even during this phase, alterations and refinements are made in order to rule out problem. Solutions and derive as deep an understanding of the productand its users as possible.

ABSTRACT

Designing a smog reduction system which is powered by solar energy and testing the effectiveness of the system to diminish the air pollution. The focus is on extracting the suspended particulate matter from the air which are the major contributors in the pollution of air in many urban cities.

Designing only the air purifier is not sufficient solution for today's life. So, implementing the smog reduction system in street lights on the roads which reduces the outdoor air pollution and economically beneficiary. It works on a non- conventional method and intents to achieve best possible air purification results using eco-friendly . The fans and light in system are operated with the help of solar energy, produced by solar panels ,which converts the solar radiations into electricity.

C H A P T E R 1

OBJECTIVE

Smog reduction system are portable devices that is a combination of an internal filter and fan to pull in unwanted particles from the air to release a purified air . And then, the purified air is circulated back. The filtration process repeats several times an hour, continually boosting outdoor air quality.

By this process, air around the area becomes pure which doesn't affect any livings. Limit the spread of harmful residues or allergic or even viral elements, prevent asthma or allergy problems linked to poor outdoor air quality in people at risk.

CHAPTER 2

PROBLEM STATEMENT

Thika, Kenya is taken as the location of the context for this project. Dating back to 1990, Thika can be considered one of the most polluted urban centres in Kenya due to major industrialist's desires to place their plants nearby residents (Ndungu, 2003).Characteristic of homes in Thika are single 8- 12 people rooms with little to no provisions for ventilation, making for very crowded and polluted living spaces for 80% of the population.

Over the past few years, the level of pollution in Delhi in the winter months has hit hazardous levels because of the high presence of fine particulate matter in the air. This pollution has resulted in nearly 15,000 people dying prematurely in 2016 alone in the city and has reduced the average life expectancy of the residents by over 6 years.

Fig.2.1.Delhi Air Pollution

CHAPTER 3

LITERATURE SURVEY

LITERATURE SURVEY : 1

TITLE : Designing and Fabricating of Solar Powered Air Purifier

AUTHOR : Manjeet Kumar
Satinder Jeet Singh
Prabhat Kumar Shukla
Raj Varun Singha
Manash Dey
Ashutosh Singh

PUBLISHED YEAR : APRIL 2018

Designing and fabricating an air purifier system which is powered by solar energy and testing the effectiveness of the system to curb the air pollution.

LITERATURE SURVEY : 2

TITLE : Air Purification By Using Solar Power Resolving Air Pollution Problem

AUTHOR : Rohit.B.Madane
Aniket.D.Hatkar
Sapna.N.Rathod
Suraj.R.Gillurkar

PUBLISHED YEAR : JUNE 2021

Design and hardware implementation of air purifier for fine dust particle. Solar power source and batteries are utilized to develop a prototype.

LITERATURE SURVEY : 3

TITLE **:** Fabrication and Design Of Solar Powered Air Purifier for Improving Air Quality Index

AUTHOR : Rushikesh Kadam
Oshin Pojta
Kunal Jugtap

PUBLISHED YEAR : APRIL 2021

The fabrication of low-cost solar powered air purifier made using a HEPA filter, Activated Carbon Filter, Solar Panel and some miscellaneous components that can become a low cost but efficient alternative for surviving in difficult times (i.e. Air Pollution).

LITERATURE SURVEY : 4

TITLE **:** Design of Solar Powered Air Purifier with Air Quality Monitoring

AUTHOR **:** Arun Chakravarthy.R
Bhuvaneswari.M
Arun.M
Suresh Kumar.C

PUBLISHED YEAR : JULY 2021

Solar powered air purifier deals with a nonconventional procedure and purpose to achieve absolute best air filtration results exploitation eco-accommadating and efficient method**.**

CHAPTER 4

EXISTING SYSTEM

SMOG TOWER

China has already developed and been utilizing its smog tower in Xian, which is able to clean 10 mn cubic meters of air daily. Essentially, this device is an industrial size air purifier that is used to filter the particulate matter outside.

Fig.4.1.Smog Tower

SOLAR POWERED AIR PURIFIER

PSU SEDTAPP has tasked Penn State students to develop an affordable solar-powered air purifier. The technical design of the new prototype included features of a standard air purifier with modifications to make the air purifier portable and affordable. The air purifier is designed to be powered by a solar source and the solar panel is designed to be flexible and detachable from the system so that the device can be placed and used regardless of circumstance.

CHAPTER 5

PROPOSED SYSTEM

7+7: INDUSTRIAL VERTICALS AND INNOVATIVE TECHNOLOGY

Industrial verticals : Smart city

Solar power innovation

The smog reduction system is designed to be powered by a solar source and the solar panel is designed to be flexible and detachable from the system .Solar panel which connects both the system and street light is more effective and conserve the energy.

It designed to remove particulates sized between 1 and 10 microns effectively. Being an affordable design that costs less than $100. It is compatible multiple types of filters so that the user can use whatever is available to them. Be a portable size that is non-obtrusive to current living environment of user.

CHAPTER 6

BLOCK DIAGRAM OF PROPOSED SYSTEM

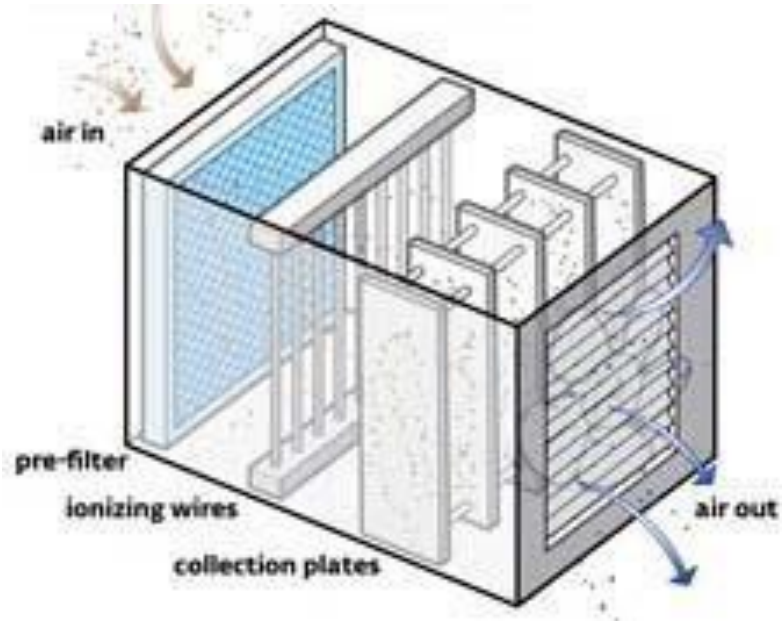

Fig.6.1.Integrated Air Purifier

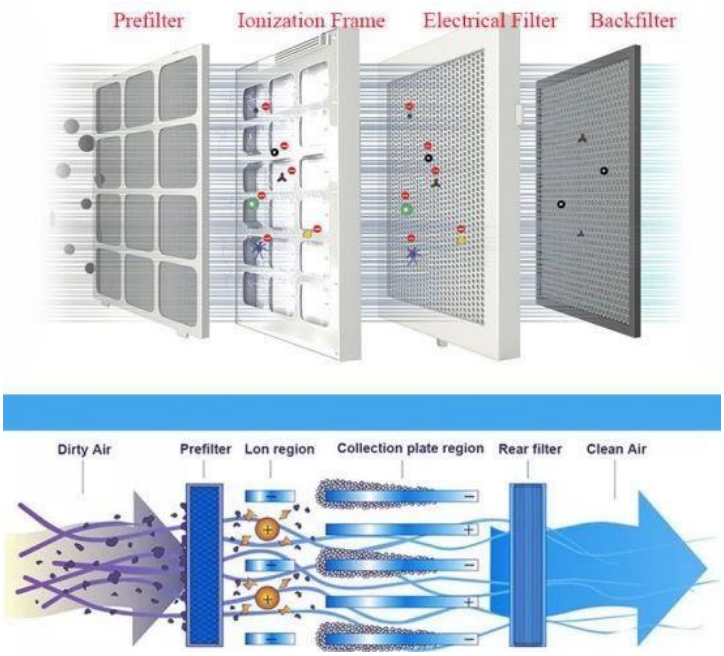

Fig.6.2.Central Air Purifier Disinfection and purification

CHAPTER 7

HARDWARE REQUIREMENT

DC FAN

A computer fan is any fan inside, or attached to, a computer case used for active cooling. Fansare used to draw cooler air into the case from the outside, expel warm air from inside and moveair across a heat sink to cool a particular component. Both axial and sometimes centrifugal (blower/squirrel-cage) fans are used in computers. Computer fans commonly come in standard sizes, such as 92 mm, 120 mm (most common), 140 mm, and even 200-220 mm. Computer fans are powered and controlled using 3-pin or 4-pin fan connectors.

AIR FILTER

A particulate air filter is a device composed of fibrous, or porous materials which removes solid particulates such as dust, pollen, mold, and bacteria from the air. Filters containing an adsorbent or catalyst such as charcoal (carbon) may also remove odors and gaseous pollutants such as volatile organic compounds or ozone. Air filters are used in applications where air quality is important, notably in building ventilation systems and in engines.

SOLAR PANEL

A solar cell panel, solar electric panel, photo-voltaic (PV) module, PV panel or solar panel is an assembly of photovoltaic solar cells mounted in a (usually rectangular) frame, and a neatlyorganized collection of PV panels is called a photovoltaic system or solar array. Solar panels capture sunlight as a source of radiant energy, which is converted into electric energy in the form of direct current (DC) electricity. Arrays of a photovoltaic system can be used to generatesolar electricity that supplies electrical equipment directly, or feeds power back into an alternate current (AC) grid via an inverter system.

CHAPTER 8

RESULTS AND DISCUSSION

Resulting that air purifier which is implemented in solar panel street are more beneficial to society for energy conservation. An air purifier or air cleaner is a device which removes contaminants from the air in a outdoor to improve air quality. This device being beneficial to allergy sufferers and asthmatics, and at reducing or eliminating second-hand tobacco smoke.

Now- a- days we use more vehicles for transportation and different factories which cause air pollution. Tackling this problem cannot be achieved by trying to resolve a single source of pollution but through a strategic and consistent effort across all the sources.

CHAPTER 9

FUTURE ENHANCEMENT

Increase in vehicular population, severe construction activities, and industries are largely contributing to an increase in outdoor pollution across Indian cities. So, there will be consequences for these actions. Starting from groundwater, the crops and the air – they are all becoming toxic. In addition, there are a number of industries and plants at the outskirt of Delhi that release harmful emissions into the air. Actions that can at least reduce the burden to the only planet that we have, smog reduction system which is efficient in both energy conservation and reducing air pollution.

CHAPTER 10

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