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Modified Indoor Air purifier

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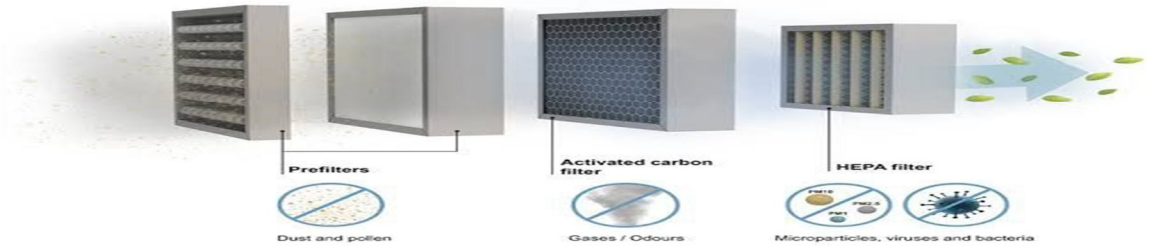
Abstract: ***Air purifier filters utilize fine sieves that filter particles out of the circulating air. As air flows into the air purifier, the finer the sieve inside of the air purifier, the smaller the particles it will trap. High Efficiency Particulate Air (HEPA) filters are the benchmark for air purifier filters, which are guaranteed to trap 99.97% of airborne particles larger than 0.3 microns in size. Microns are the standard unit that is used to measure the size of particles in the air. Each micron is equivalent to 1/25,400 of an inch. The naked eye cannot see anything that is smaller than 10 microns in size, so pollutants like bacteria and viruses escape detection. HEPA filters efficiently remove smaller-sized allergens like dust, smoke, chemicals, asbestos, pollen, and pet dander. Room air conditioner filters can only capture particles 10.0 microns or larger, so they are not as efficient as air purifier filters for cleaning the air. HEPA filters are designed to capture particles as small as 0.3 microns, including pollen, dust mites, and pet dander. Activated carbon filters are effective at removing odors and volatile organic compounds (VOCs) from the air. UV-C light is used to kill bacteria and viruses that may be present in the air. Air purifiers come in a variety of sizes and styles, ranging from small portable units to larger models that can purify the air in an entire building. Some air purifiers are designed for specific purposes, such as removing cigarette smoke or pet odours. Air purifiers are essential devices that help improve indoor air quality by removing harmful contaminants. They can be used in a variety of settings to reduce the risk of respiratory problems and improve overall health. With the advancement of technology, air purifiers have become more efficient and effective in removing harmful pollutants from the air we breathe.***

Keywords: Air purifier, switch, fan, solar panel, battery.

I. INTRODUCTION

An air purifier or air cleaner is a device which removes contaminants from the air in a room to improve indoor air quality. These devices are commonly marketed as being beneficial to allergy sufferers and asthmatics, and at reducing or eliminating second-hand tobacco smoke. The commercially graded air purifiers are manufactured as either small stand-alone units or larger units that can be affixed to an air handler unit (AHU).Heating, ventilation, and air conditioning (HVAC)unit found in the medical, industrial, and commercial industries. Air purifiers may also be used in industry to remove impurities from air before processing. High-efficiency particulate air (HEPA) filters remove at least 99.97 % of 0.3-micrometer particles and are usually more effective at removing larger and smaller particles. Particle size less than 2.5 micrometers in diameter is more harmful for human lungs and heart. As of 2015, the United States residential air purifier total addressable market was estimated at around $2 billion per year.

Air purifiers are commonly used in homes, offices, hospitals, and other indoor spaces to improve air quality and reduce the risk of respiratory problems. They can also be used to control odors and reduce the spread of airborne viruses and bacteria. An air purifier can be used in a preventive and/or curative way, at home, in closed offices, open spaces or co working places, shops, hairdressing salons, hotels or restaurants, medical and paramedical practice. By extension, as a result of Covid-19, it is becoming increasingly important in schools, hospitals, the medical and paramedical sector, the tertiary sector, etc. It concerns people or companies with no particular problems but who wish to protect their health, that of their entourage or employees, for example for the latter in a situation of resumption or continuity of the activity.



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A. Problem Statement

The problem that air purifiers aim to solve is the presence of harmful contaminants in indoor air, such as dust, pollen, pet dander, smoke, and other allergens or pollutants. These contaminants can cause respiratory problems and other health issues for individuals who are exposed to them. Air purifiers use various technologies to trap and eliminate these particles from the air, improving indoor air quality and reducing the risk of health problems.

B. Objective

1) Indoor air can contain harmful contaminants such as dust, pollen, and smoke.
2) Exposure to these contaminants can cause respiratory problems and other health issues.
3) Poor indoor air quality can be especially problematic for individuals with allergies or asthma.

II. LITERATURE REVIEW

Research scholars at home and abroad have done a lot of research. Nowadays, indoor air purification technology is mainly divided into two types: capture type and reactive type. The capture type separates the contaminants from the air fluid by filtration or adsorption, leaving the contaminants in the air purifier. The reaction type principle mainly removes gaseous pollutants (molecular type pollutants) in the air by chemical reaction or ionization. Common reaction mechanisms are UV sterilization, photocatalysis and chemical catalysis, room temperature thermal catalysis, plasma and ozone oxidation. However, this purification method is easy to cause secondary pollution.

There are three common capture air cleaning systems: mechanical filtration, electrostatic precipitator (ESP), and hybrid air purifiers (Chan et al., 2015). In 1963, the German Hammer brothers developed the first indoor mechanical filter to remove soot from indoor air. The main components of mechanical filtration (also known as fiber filtration) are fans and filter dust collectors. The built-in fan draws indoor air into the purifier.

The particulate pollutants in the air are filtered by diffusion, interception, impact or inertial force. Its filtration efficiency is affected by the structure of the air purifier, the nature of the filter material and the power of the fan. This type of purifier uses a wide variety of filter materials, and the filtration function depends mainly on the nature of the material. Porous filter materials such as nonwovens, filter paper and fibrous materials are most commonly used.

The air filter for filtering PM2.5 is usually made of high-efficiency air filter material (HEPA: High Efficiency Particulate Air), and the material is ultra-fine glass fiber or synthetic fiber, which is often processed into paper. As early as the 1940s, the United States developed the earliest HEPA filter in the Manhattan project, which was used to prevent the spread of radioactive pollutants in the air. Nowadays, it has been widely used in the nuclear Research scholars at home and abroad have done a lot of research. Nowadays, indoor air purification technology is mainly divided into two types: capture type and reactive type.

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III. COMPONENTS

1) Air purifier
2) Fan
3) Carbon Filter
4) UV light

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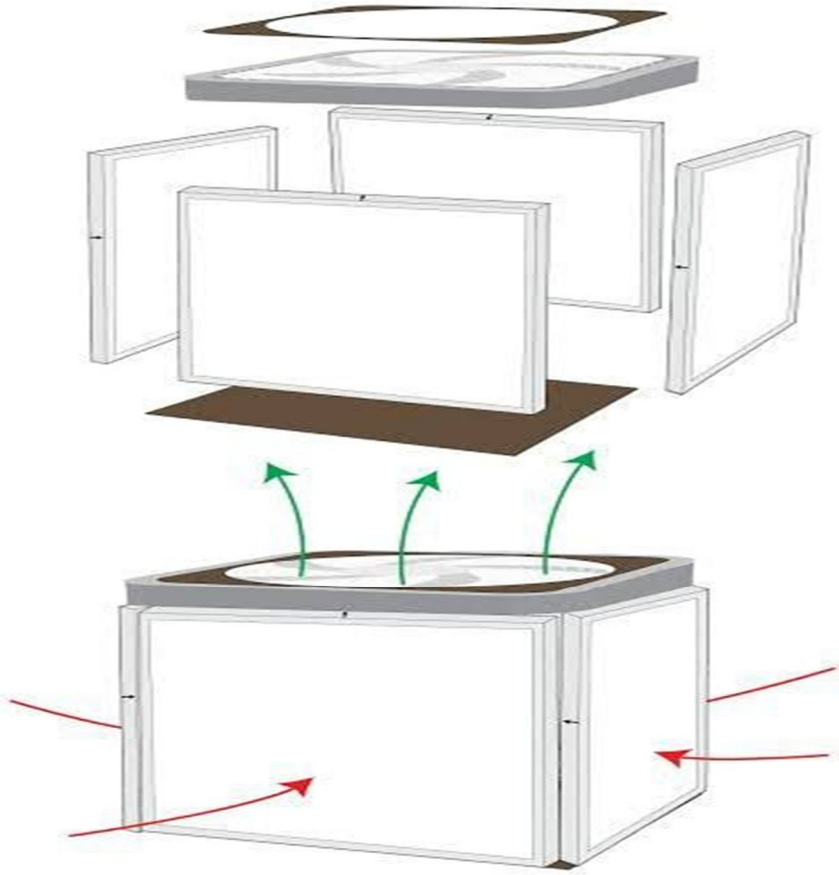
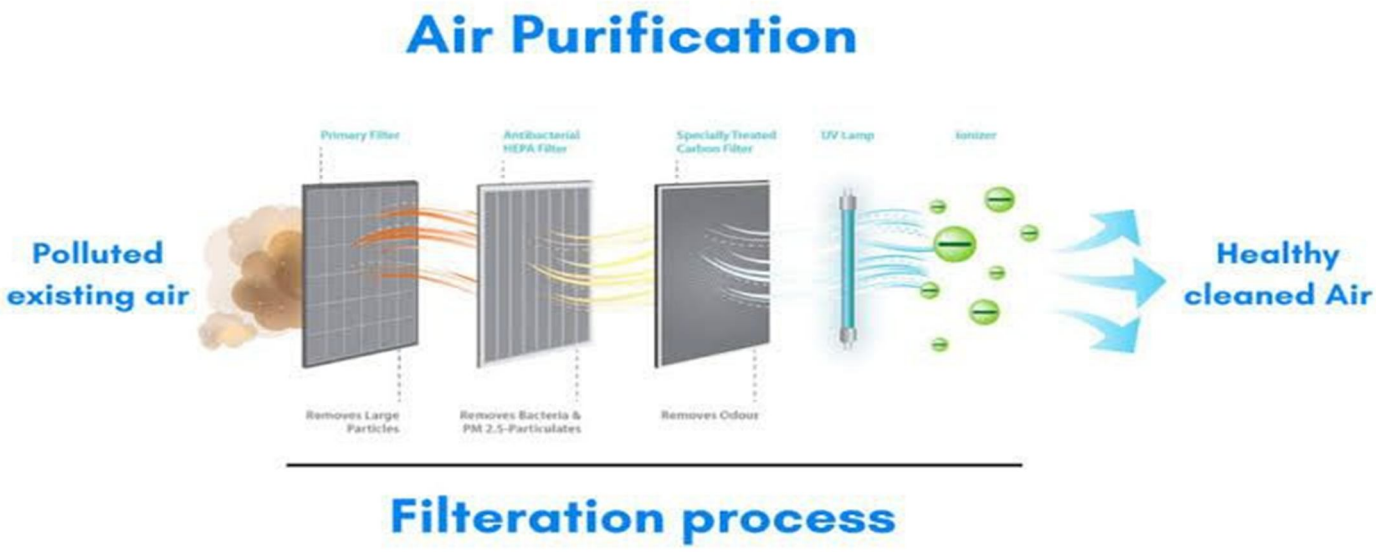


IV. CONSTRUCTION

In air purifier generally we used two types of air purifier. In which rectangular air purifier attached to the environment and other circular air purifier are connected to the fan and fan are also connected to the environment. First rectangular air purifier absorb air to the environment and clean and supply to the circular air purifier and after purifying air supply in the air



V. BENEFITS OF AIR PURIFIER

The Air Purifiers help in eliminating pollutants from the air while generating clean air, essentially protects from chronic respiratory diseases, eliminates infecting mosquitoes to prevent infections and diseases, reduces levels of carbon dioxide in the house, eradicates allergens and even eliminates triggers of Asthma.
Air purifiers can be used in homes, offices, and other indoor spaces to improve air quality.

VI. CONCLUSION

The Air Purifiers help in eliminating pollutants from the air while generating clean air, essentially protects from chronic respiratory diseases, eliminates infecting mosquitoes to prevent infections and diseases, reduces levels of carbon dioxide in the house, eradicates allergens and even eliminates triggers of Asthma.

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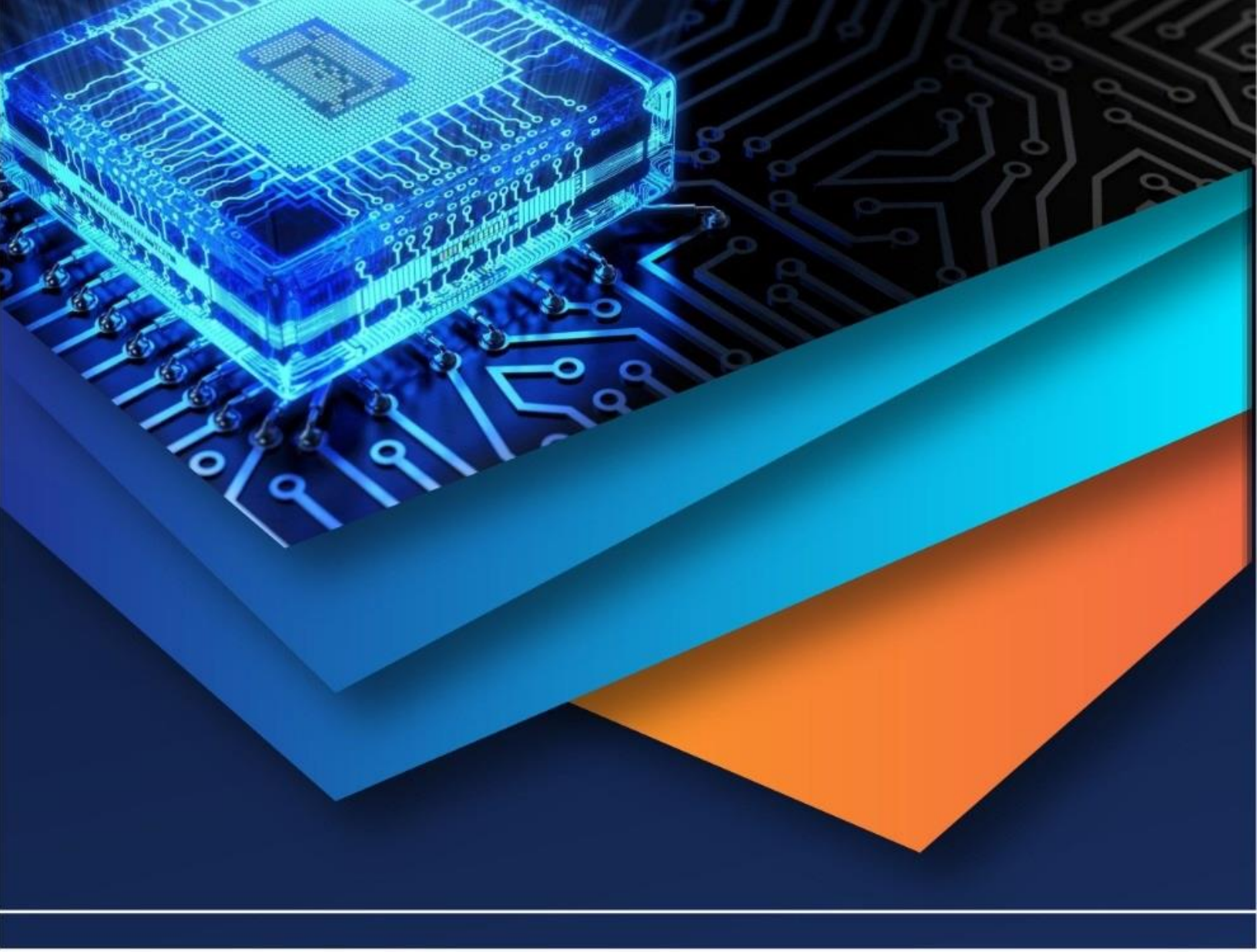

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