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## Silent Air Purifier and Humidifier

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### ABSTRACT:

Poor indoor air quality is commonly found in homes in larger cities, and it's result of a growing industrialization that pollutes air we breathe with contaminants like industrial dust, smoke and other particles from traffic. The solution from user perspective, is to use an air purifier that clean the air from these particles inside the users home. An air purifier can also be used to ease annoyance for people suffer from allergies. This matter thesis concerns the design and development of the next generation of the air purifier for indoor use. The project has been conducted with human centred design process and co-design approach. The development of this project contains several methods commonly used in order to achieve a result that is trustworthy and in line with user needs. The project also resulted in a patient application for new type of filters that the user can clean without the need of continuous buy of new filters. The filter also consumes less energy is smaller and more compact than competitors on the market. This leads to less material use which results in less negative environmental impact

### 1 INTRODUCTION:

**AIR PURIFIER:** 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.

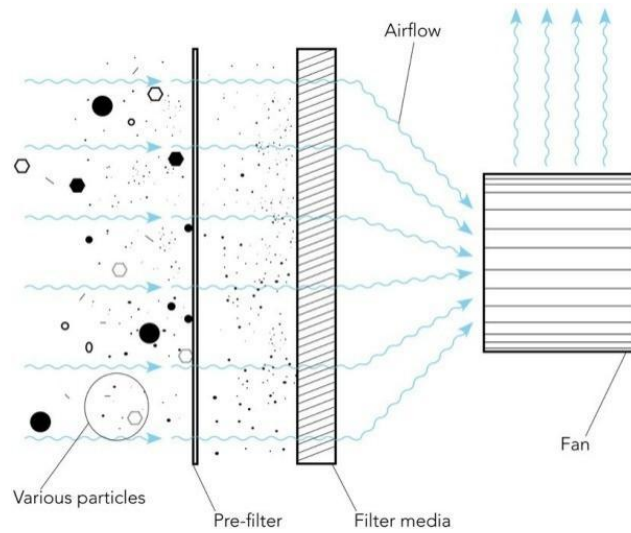
The commercially graded air purifiers are manufactured as either small stand-alone units or larger units that can be affixed to an air handler unit (AHU) or to an HVAC unit found in the medical, industrial, and commercial industries. Air purifiers may also be used in industry to remove impurities from air before processing. Pressure swing adsorption or other adsorption techniques are typically used for this.

**HUMIDIFIER:** A humidifier is a device, primarily an electrical appliance, that increases humidity (moisture) in a single room or an entire building. In the home, point-of-use humidifiers are commonly used to humidify a single room, while whole-house or furnace humidifiers, which connect to a home's HVAC system, provide humidity to the entire house. Medical ventilators often include humidifiers for increased patient comfort. Large humidifiers are used in commercial, institutional, or industrial contexts, often as part of a larger HVAC system.

Low humidity may occur in hot, dry desert climates, or indoors in artificially heated spaces. In winter, especially when cold outside air is heated indoors, the humidity may drop to as low as 10–20%. This low humidity can cause adverse health effects, by drying out mucous membranes such as the lining of the nose and throat, lead to a snoring problem, and can cause respiratory distress. The low humidity also can affect wooden furniture, causing shrinkage and loose joints or cracking of pieces. Books, papers, and artworks may shrink or warp and become brittle in very low humidity.

### 2 BASIC PRINCIPLE:

An air purifier is usually equipped with a fan that absorbs air and lets the air pass through a filter media where particles get stuck. Usually there is a pre-filter that captures larger particles. Behind the pre-filter, some air cleaning technology, usually a finer filter, captures smaller sized particles (Figure 1). The air that comes through is clean from harmful particles



**Figure:1**

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### 3 PARTS OF SILENT AIR PURIFIER AND HUMIDIFIER:

1. **Adaptor or Transformer** :- main purpose of adaptor is to convert alternate current (AC) to direct current (DC).
2. **Air blower pumps or centrifugal pumps**:- these pumps are used to suck the air from the atmosphere and transports the air through the fans to pipes.
3. **Pipes**:- The pipes are attached to the air blower pumps. it transports the air from air blower pumps to water tank.
4. **Nozzle**:- Nozzles are attached at the end of the pipes which are used to increase the velocity of the air.
5. **Mounts and joints** :- these mounts and joints are used to create a base for the air blower pumps.
6. **Base frame**:- Base frame is used to create a base for the system.
7. **Supporting frame**:- these are used to support the system and also as side frames of the system.
8. **Screws and fittings**:- Screws and fittings are used to combine the parts of the system.
9. **Water tank**:- water tank is used to store the water.

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### 4 OPERATION:

- Initially we supply current to the system (230v, 10 Amps).
- Adaptor converts the AC current to DC current and supplies it to the air blower pumps.
- Air blower pumps converts the electrical energy into mechanical energy and the fans starts rotating. Due to rotation of fans it sucks the air from atmosphere.
- And that air is transported to pipes by air blower pumps.
- The pipes transports the air to the water tank. At the end of pipes nozzles are fitted which are used to increase the velocity of the air.
- And the air enters into water. Water eliminates the impurities like dust, fungus etc from the air .
- Due to water the humidity percentage of the air gets increased.
- This purified and humidified air comes out from the system.

## 5 RESULT:



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## 6 CONCLUSION:

The outcome of this project is a next generation air purifier with a new filter innovation. The new filter makes it possible to have a smaller housing compared with competitors but still having high performance. This means that it does not take up as much space and is easier for the user to move around from place to place inside the apartment; it is also equipped with a handle. The 360o Air is also easier to fit in more places in a home because its design does not restrict its position as much as competitors. That is, it has been given a round shape and have therefore no defined backside that needs to be placed towards a wall. The uniform round shape allows more varieties of how it can be positioned in a home. The filter is cleanable and does not need to be changed. The filter also has a low pressure drop which results in less generated noise and lower energy consumption. All these advantages that is the outcome of the new filter innovation makes this a product that stands out from competitors and makes it easy to sell for sellers and should generate revenue for the brand owners.

The air purifier is a product that solves the problem of bad indoor air quality. It is a problem that most of all have its effect on large cities and where the population is dense. Many cannot afford an air purifier and many have problem to cover the expenses of buying new filters. The 360o Air is a more socially sustainable than most competitors because it is cheaper in long term which results in more people being able to buy an air purifier that might be vital for their health. Even if the brand owners, manufacturers and sellers would not earn money from people regularly buying new filters, the 360o Air should still be economically sustainable because of the new filter innovation and its benefits that would attract more buyers. The fact that the 360o Air use less material than competitors will most likely also result in cheaper manufacturing. As mentioned before, the air purifier developed in this project is also more environmentally sustainable than competitors in the existing market.

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