

# Voice Controlled Indoor Air Purifier with Sleeping Aid

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## Article Info

**Page Number:** 8479-8485

**Publication Issue:**

**Vol. 71 No. 4 (2022)**

## Abstract

The degree of pollutants has improved with time because of lots of elements which bring about dangerous effects on human well being via means of directly affecting the fitness of the population. It has been determined that the individuals breathing in particulate count in air are at greater chance of lung cancer and akin to non-smoker liable to 2nd hand smoke. Poor indoor air is commonly determined in homes, large cities, and the end result of a developing industrialization that pollutes the air. The atmospheric air is blended with the contaminants like business dust, smog, and other debris from traffic. Because of these patterns, the issue of feasible and sound indoor climate has got expanding consideration. Different air filtration procedures have been embraced to improve indoor air quality. Air Filtration procedures can eliminate air poisons and reduce the decay of indoor air quality. This paper presents a complete survey on the synergistic impact of various air cleansing advancements, air filtration hypothesis, materials, and principles. It assessed diverse air filtration advances by considering elements like air quality improvement, separating execution, energy, and financial conduct. By the investigation of the current situation of the issues of air contamination, seriousness of the issues has been featured. An assemblage of the most widely recognized and huge strategies for air purifiers is the utilization of HEPA filtration added with UV to filter as well as kill any bacteria or virus. Purifier integrated with a sleeping aid which plays pleasant music which triggers good sleep. The solution is to use an air purifier that cleans the air from these dust particles along with a sleeping aid that plays music which helps to sleep.

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## Article History

**Article Received:** 15 September 2022

**Revised:** 25 October 2022

**Accepted:** 14 November 2022

**Publication:** 21 December 2022

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**Key words:** HEPA filter, UV LED, Bluetooth Module, Arduino uno.

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## 1. Introduction

An air cleanser is a tool which reduces unwanted materials from the air which is present in the atmosphere.

Air cleanser is extraordinarily beneficial for lowering air pollutants in a rather polluted environment, as an example Chennai, Bangalore; which might be some of the maximum air gets polluted towns withinside the world. They additionally help dispose of virus and microorganisms from a room which prevents the unfolding of disease.

Airborne debris encompasses such things as dust, pollen, plant spores, and fungi. By lowering air pollutants level, it's miles feasible to lessen the weight of disease from stroke, coronary heart disease, lung cancer etc., so it's miles clever to dispose of them from the air present in the inner home. HEPA filters are taken into consideration to the best in putting off those debris, that may vary in length drastically however are all microscopic.

High Efficiency Particulate Air generation was made famous via way of means of use in medicine, and it's far nevertheless the maximum reliable and powerful generation used. Air purifiers prepared with a HEPA air clear out out soak up as much as 99.7% of all debris, like allergens, pollen, dust, and others which might be 0.030 microns and large in length; dangerous indoor air debris that cause allergic reaction and bronchial allergies signs and symptoms are measured to be approximately 0.030 microns or large.

As a result, extra debris is gathered and the charged debris are brought at once to the HEPA air clear out which captures them. Bacteria, dust, and pollen and different microscopic debris are absorbed via way of means of HEPA air filters, so the air that gets purified and re-circulates in your own home is clean, fresh, and scarce of dangerous contaminants

Purifier included with slumbering useful resources which performs first-class tunes which

triggers sleep.

## 2. PROBLEM STATEMENT

Air pollutants are envisioned to have caused over a million deaths in India in 2017, with outside PM2.5 concentrations accounting for 56% and household air pollution accounting for 44%.

It is India's second most serious public health risk factor. Many cities' air pollution levels regularly exceed air quality standards. Sleep deprivation is another problem faced by most people due to stress. It affects every aspect of our lives by influencing how we think, learn, behave, feel, and connect with others.

## 3. BLOCK DIAGRAM

A 5V DC supply is required for the Arduino Uno R3 sheets, MQ135 sensors, LCD, Clean Sensor and DHT11. A USB cable or 12V connector can be utilized to control the Arduino. As the voltage supply and ground pins of the other modules are associated with the VCC and GND of the Arduino board, the rest of the components are fueled by the 5V yield from the board.

Sensor DHT11 gives relative mugginess esteem and the temperature, which can be examined on the 2nd stick of Arduino utilizing one wire convention, which is associated with the moment stick of DHT11 sensor. Sensor DHT11 gives two values: supreme stickiness and temperature.

The Show of the Vehicle Control Unit is associated with Arduino I2C pins in 4-bit mode, with FAN and UV LEDs associated with Arduino 3rd and 4th advanced pins. LCD show holds Temperature, Stickiness, Discuss Quality File, Tidy thickness and purifier status. The HC-05 Bluetooth module is associated with UART of microcontrollers subsequently working by using the Serial Harbour Convention. Basically, manage the module with +5.0V and interface receiver adhere the element to the transmitter of the processor unit and transmitter adhere element to receiver of the processor unit. Bluetooth module gets voice commands from portable phone, based on the command the discuss purifier can be set to ON and OFF, while resting help can moreover be controlled utilizing remote through voice command.

Voice Controlled Indoor Air Purifier with Sleeping Aid System integrates with HEPA air purifier system which filters pollen, dust, and moisture. And also it is integrated with a sleeping aid which plays pleasant music which triggers good sleep. Both purifier and sleeping aid can be controlled wirelessly over Voice command using Bluetooth.

## 4. COMPONENTS

The hardware of the proposed system consists of following components

1. Arduino uno

2. LCD

3. MQ135 Sensor

4. Dust Sensor

5. Bluetooth Module

6. HEPA Filter

### **1.Arduino uno**

Arduino is an open-supply pc equipment, computer program company, and consumer group that plans to make single-board microcontroller and microcontroller packs for constructing superior devices and sensible items which can experience and manage items inside the bodily and automatic systems.

Arduino sheets are totally open-source, enabling clients to construct them autonomously and in the long run adjust them to their specific needs.

The program is open-source and it is developing through the commitments of clients around the world.

### **2.LCD**

LCD have materials, which integrate the both stuff fluids and gems.

Instead of getting a softening point, they have got a temperature run internally in which the debris are almost as transportable as they could be a fluid, but are assembled together in a requested frame comparable to a gem. When adequate voltage is connected to the anodes, the fluid precious stone atoms would be adjusted in a particular heading.

The light beams passing through the LCD would be pivoted by the polarizers, which would result in activating / highlighting the required characters. The LCDs are lightweight as if they were some millimetres thick. Since the LCD's dissipate much less manage, they may be congruous with moo manage digital circuits, and may be fuelled for lengthy durations.

### **3.MQ135 Sensor**

The Air fine sensing element is moreover a MQ-a hundred thirty five sensing element for figuring out venomous gases which might be displayed in the speakers in houses and workplaces.

The fuel line detector layer of the detector unit is developed by tin dioxide; it starts to decrease its reaction in comparison to easy and because of contamination, the conductivity increases.

The air fine sensing element identifies alkali, carbon-dioxide, sulphide, and different dangerous gasses.

The 5V strength delivery is used for air first-class sensors. The analogue output is a unit, growing voltage is immediately proportional to growing unit.

#### 4.Dust Sensor

Dust sensor with a visual sensing system. It detects the reflected mild dirt in air. It is specifically powerful to hit upon very first-class debris like cigarette smoke. It can also differentiate smoke from residence dirt through the heart beat sample of output voltage.

Inside the Visual Dust Sensor, the materials are diagonally organized close to the air inlet, to permit it to hit upon the dirt withinside the air. As stated earlier, it really works at the precept of laser scattering. More the dirt debris withinside the air, the extra may be the depth of mild.

#### 5.Bluetooth Module

Since the HC-05 module makes use of the Serial Port Protocol (SPP), it's far too smooth to join the module with microcontrollers. Simple energy is given to the element with +5V and joins the receiver pin of the element to the transmitter pin of the processor unit and the transmitter pin of the element to the receiver pin of the processor unit .

When electricity is supplied to the module the important thing pin can be earthed to go into Command mode, if left loose it will through automatic input into the records mode. As quickly as the element was provided with the supply, it needs to be capable of finding out. The Bluetooth tool then joins with it the use of the automatic password for speaking.

#### 6.HEPA Filter

Filters that clear out, and also called as excessive-performance particulate soaking up clear out and excessive performance particulate filters performance popular of air clear out out.

HEPA filters consist of organized fibres. The fibres are usually made of plastics or fiberglass with diameters.

.In most cases, these filters consist of an intertwined bundle of high quality fibers. These fibers form a narrow winding path through which air flows. When the largest debris passes through this path, the fiber bundle acts like a kitchen sieve, physically blocking the debris that passes through.

However, the small debris skips with the air, but the small debris cannot withstand the movement of the air because the air rotates and rotates and collides with the fibers. The smallest debris has a very low inertia and constantly moves around the air molecules as if they were being impacted by these molecules.

This is because when it hits the fiber, the movement of the stops. The main factors that affect its properties are fiber diameter, clearance thickness, and flow velocity.

The air area between HEPA-removed fibers is typically tons or more than that. HEPA filters very highly for the smallest amount of fine dust. Unlike screen and membrane filters, which can skip debris smaller than openings and pores, HEPA filters are designed to target several

particle sizes and above. This debris is captured a mixture of mechanisms.

## 5. RESULT

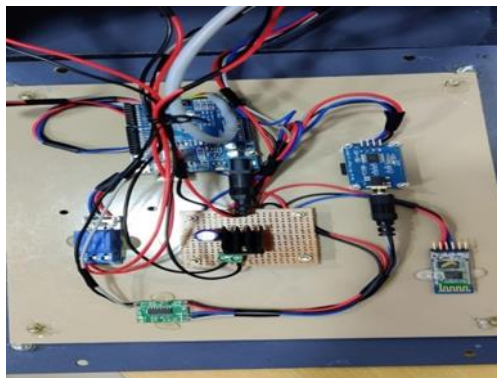
The LCD display shows the air quality, dust, gas, temperature and humidity. The filter is turned on and off using the voice commands so that the air in the room can be filtered by means of HEPA filter and the UV light.

HEPA Filter captures harmful particles as small as 0.003um and it can remove allergens and dusts.



It also removes 99.5% particles as small as 0.0030 microns, 850 times smaller than PM2.5.

So that one can inhale pure air in the indoor by using this air purifier.



## 6. FUTURE SCOPE

It can be upgraded to real time online monitoring with advanced gas filtration and also integrated in home automation to function as a smart home device with advanced air purifier.

## 7. CONCLUSION

There are numerous distinctive sorts of discuss purifiers accessible within the advertise with different applied science. Some purifiers moreover contain more than one innovation for progressing working and better results.

In this way, select the leading one coordinating your necessity and budget. The primary work of HEPA Channel is to expel sullied infections from the air and provide clean and immaculate discussion. In this way, HEPA Channel could be a significant buy component for the one loss from tidy or dust sensitivity.

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