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Arduino based Home Kitchen Air Monitoring System

Gaurav Bhargava[1], Varun Kumar Yadav[2], Manjeet Kumar[3], Prof. Shahab Ahmad[4]
[1, 2, 3, 4]*Department of Electrical and Electronics Engineering, Babu Banarasi Das Institute of Technology & Management, Lucknow, Uttar Pradesh 227105*

Abstract: ***Home Kitchen Air pollution is an addition of harmful substances in the atmosphere, which results in environmental damage. The industrial development and reduction in forests which are two main root cause of air pollution has increased the death rates people dying from diseases like breathing problem and lung cancer. So, to fight against this serious threat to mankind, we decided to standby this society and we made our mind to do something to detect the amount of impurities in the air and considerably reduce the amount of impurity present in the air. In the project, we are detecting impurities using gas sensor. Impure air is input to the gas sensor. The sensor is connected to the Arduino which consist of code which will help us in detecting the amount of impurities in the air. After taking the inputs regarding the amount of impurities from the doctor we have set a limit up to which extent impurities are not harmful. If the limit exceeds then a buzzer sounds along with LCD display which gives us the information that it's time to switch ON the filtering device. After that filtering device gets turned ON and home kitchen air gets purified. Coming to applications it can be used in the place where there is a need of oil mist collectors, dust collectors, UV air purifiers etc.***
Which is defined to describe acute health and discomfort effects that appear to be linked to poor kitchen air quality and the time spent in a building.
In this project, we are going to present an kitchen air quality monitoring system. Our system is connected to the sensor, and as a result we will get good air.

I. OVERVIEW

The figure-1 gives overview of the whole Air Purifier through block diagram shown below

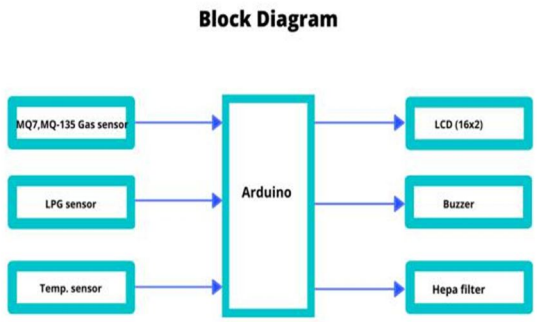

Fig. 1. Block diagram of the filter

II. INTRODUCTION

Arduino Based Home Kitchen Air Monitoring System pollution has been. Average person spends an estimated 90% of their time indoors so that poor Kitchen air quality (KAQ) poses a substantial risk to public health. Poor air quality may cause increased short-term health problems such as fatigue and nausea as well as chronic respiratory diseases, heart disease, and lung cancer.

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III. RELATED WORK

There has been a Arduino Based Home Kitchen Air Monitoring System of research going on in this important area field. Kitchen air quality forecasting systems they are increasingly being proposed and they are all using a machine learning to achieve their goal. The wind is definitely measured restrictions such as carbon monoxide content, carbon dioxide content and concentration are caused by nerves and patterns identified in the measured data . The machine learning algorithms and then used for reading and prediction future air quality. This can mean a Arduino in homes kitchen built by people who are also sensitive to dust usually for everyone too. Solutions and monitoring can be taken earlier to prevent predicted events.

IV. HARDWARE DESCRIPTION

1) *Arduino:* Arduino you have a microcontroller board containing ATmega328. It has 6 Analog anchors and 8 digital anchors where the 13th pin has internal resistance. In our purifier Arduino plays a very important role as we use a gas sensor, temperature sensor and humidity that absorbs inputs in the form of an analog signal. Arduino contains a built-in AC -DC converter that assists sensor interaction with other devices such as transmissions connected to fans and UV lamps.

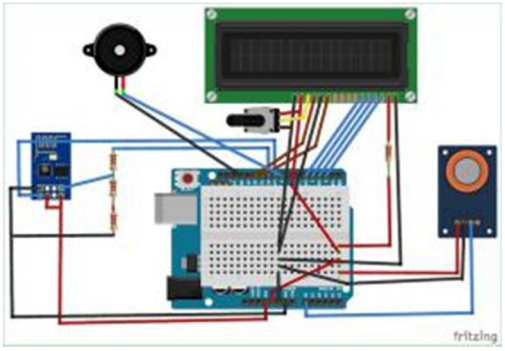

Fig.: Arduino connected with different parts of the monitoring device.

2) *LCD (16x2):* LCD screen (Liquid Crystal Display) is a display mode and is used in various programs. The LCD is easily configured. For our project, we use a 16x2 LCD display sensor input that helps to study the cooling, humidity and other features of the gas sensor.

Fig.: LCD display

3) *MQ-135 Gas Sensor:* MQ-135 Gas Sensor is widely identified in the field of domestic air pollution detection. This sensor can measure gases such as ammonia, NOx, alcohol, benzene, smoke and CO2. This sensor is used in this work to detect CO2 levels in the air. It carries a simple circuit and fast and responsive circuit. It also has a good sensitivity to all gases that can measure and consume less than 800mW of power. It is less expensive, more stable and has a longer shelf life. It is easily compatible with a NodeMCU-like board and is therefore used in this function.

Fig. : MQ-135 Gas Sensor

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4) *Filtering Part:* The filter component is nothing but a filter with several layers of air passing through each layer in sequence. Figure below shows each layer of the filter.
5) *HEPA Filter:* HEPA can be abbreviated as a "highly efficient air filter", used for dust collection and disinfection. The minimum particle size taken by it is 0.3 micro meter. Ajay N Bhagwat, said the HEPA filter could provide up to 99.97% efficiency in cleaning up particles of matter and bacteria in the atmosphere. Subramanian Sundarrajan mentioned in his research paper the HEPA filter and carbon filter designed to remove dust particles from the air.

Fig. : HEPA filter

6) *Activated Carbon Filter:* Synthetic carbon is made up of tiny carbon particles in a granular form and is very environmentally friendly. Activated carbon can advertise in household chemicals, carbon dioxide, smoke, etc. Shengbo Ge , has clearly proven that activated carbon can remove sulfur particles that may form in the form of sulphates and sulphites forming bond formation with sodium and iron. He concluded that Na2SO3, Na2S2O8, Fe2 (SO4) 3 and S could be advertised as carbon, but the amount of advertising would vary over time.

V. WORKING

The main purpose of the "Kitchen Air purifier" is to use fresh air by taking dirty air as input. The figure given below shows the flow of the whole process. Polluted air is detected by the MQ2 gas sensor. The gas sensor is connected to a resistor that takes care of its sensitivity, whenever the gas sensor encounters any gas present in the air-resistant variable and the electrical power of the sensor. This number is given to Arduino. Temperature and humidity sensor is mainly for testing the moisture content in the air. The sensor contains a moisture sensor component consisting of two electrodes and a humidity sensor. Due to the moisture resistance between the electrode changes experienced by Arduino .

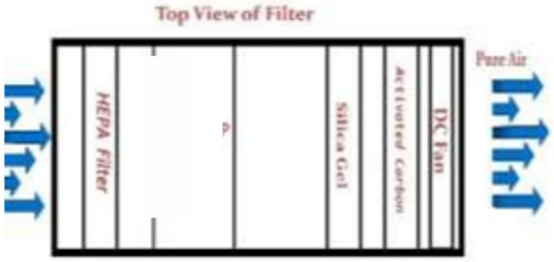

Fig.: Top view of filter

The first layer of HEPA filter is used to collect dust particles in the air, followed by filter that remove fungus and kill other airborne pathogens. Behind that layer of silica is there which reduces the moisture content present in the air. Finally, carbon dioxide is released to reduce carbon dioxide and other harmful gases in the atmosphere. Fans play a dual role, firstly taking air inside and passing it through several layers and secondly sending pure air from the filter.

VI. FURTHER SCOPE

This project discusses an effective solution for determining kitchen air quality. Carbon monoxide, carbondioxide, particulate matter particles and fine particles are some of the pollutants measured in this project. There are other limitations such as Volatile organic compounds, bacteria and fungi that also pose significant threats to human health when inhaled. So this work can be expanded to measure these levels of pollution as well, to plan to paint a larger picture of kitchen air and to measure it better. This will also help prevent respiratory infections and disorders.

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VII. CONCLUSIONS

The Arduino Based Home Kitchen Air Monitoring System specially designed for old age homes, kitchens, etc. This can be used to remove dust, fungus and reducing harmful gases from the air. It is handy and works on direct AC power supply by using an adapter connected to Arduino which works on DC. The technology used in Arduino Based Home Kitchen Air Monitoring System Air Purifier has a bright future because it works on as and when required basis and thus air makes clean.

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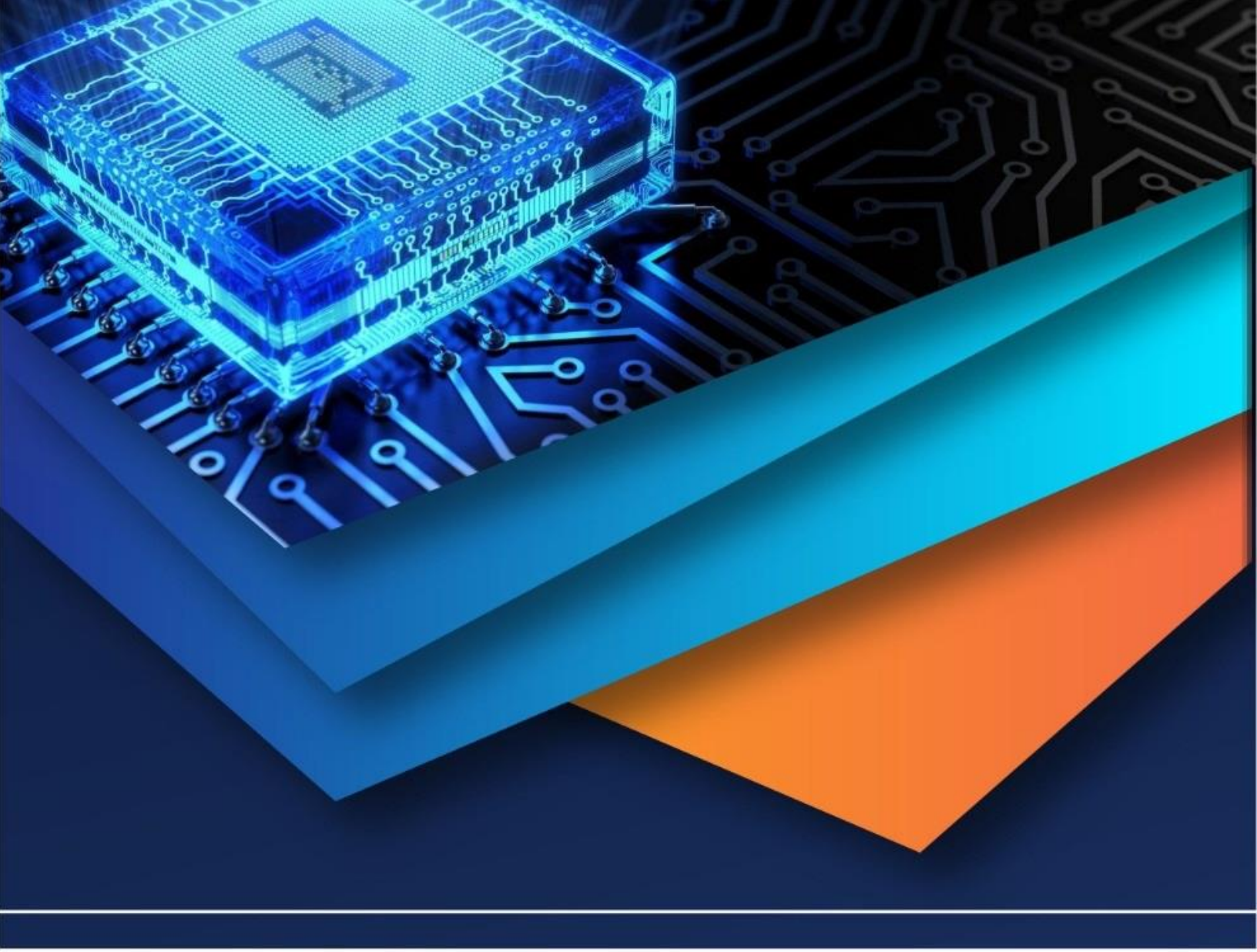

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