HOME AIR QUALITY MONITORING SYSTEM

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***Abstract*— The paper reports the designing of a smart Home Air Quality Monitoring System. As we know that today indoor pollution is a serious issue which is affecting public health. Nowadays the quality of air is degrading day by day due to the pollution caused by the industries and the vehicles as a result of which increasing the risk of lung diseases and breathing problems. This Home Air Quality Monitoring System calculates the amount of one of the most harmful gas for the environment that is Carbon-di-Oxide (CO2) gas which is present in the atmosphere as well as the amount of moisture that is the humidity and the temperature in degree Celsius both in and out in a particular room or a building.**

Keywords*— *Temperature, Humidity, Sensor, CO2, Pollution, IOT

I. INTRODUCTION

The Indoor air pollution has been constantly considered by the US Environmental Protection Agency (EPA) to be among the top five reasons which are causing environmental public health related issues. As it very well known that air the most important and primary source which is necessary and essential for the existence of all the living beings on the Earth. Air pollution today in India is arising due to the major sources such as burning of fossil fuels, and the emissions from factories such as disposal of wastes and toxic and harmful gases released and also the emissions from the vehicles. Approximately, 1.5 million of the total deaths is due to the polluted indoor air. Carbon di Oxide is primarily one of the most harmful gas which is mostly responsible for the indoor pollution. It not only causes the pollution, but it is causes greenhouse effect and global warning. Apart from CO2 gas, humidity is also responsible for the indoor air pollution. Hence this Home Air Quality Monitoring using Arduino UNO consists of temperature + humidity sensor and CO2 sensor. This project helps the user to measure the quality of air in a house or an apartment. Both the sensors and the sensing device are connected with the equipment or the system present inside the room and hence it helps to find the room temperature, humidity level and CO2 (Carbon-di-Oxide) level. An LCD screen is attached to the whole system on which all these data are displayed.

II. THE LITERATURE REVIEW

Nowadays many steps are taken in order to get purifying air. The whole proposed system works on microcontroller Arduino UNO and is also based on IOT. Arduino UNO is one of the most common and used microcontrollers. In this project using IOT it helps to record the temperature and humidity levels of each hour and with the help of which the user can calculate the overall average temperature and humidity level of the whole day. Using this particular model the user can not only observe and note the temperature and humidity contents inside the house but also can find out their levels outside the house. This model hence helps the user to calculate CO2 levels inside the house and hence helps in making us aware of the levels of this harmful gas present around in the atmosphere and hence one can take appropriate steps in order to control it.

III. THE PROPOSED MODEL

The proposed model consists of:-

Temperature sensor + Humidity Sensor, CO2 Sensor, LCD Display Crystal Oscillator, Resistors, Capacitors, Transistors, Cables wires and Connectors, Diodes ,PCB and Breadboards, LED, Transformer/Adapter, Switch.

This particular project hardware is connected to a Wi-Fi Module. The use of this module is that it helps the user to connect to the system with the help of mobile phone or any laptop(any desktop) in a certain distance. The user can monitor the values of both the sensors on the laptop also by staying at a distance from the system. A Wi-Fi appears as soon as the whole system is switched on and through that Wi-Fi we can connect to the system by adding or writing an IP Address on the laptop.

As a result, after connecting through the device all the values are displayed on the laptop and these values can be further accessed by the user in future times.

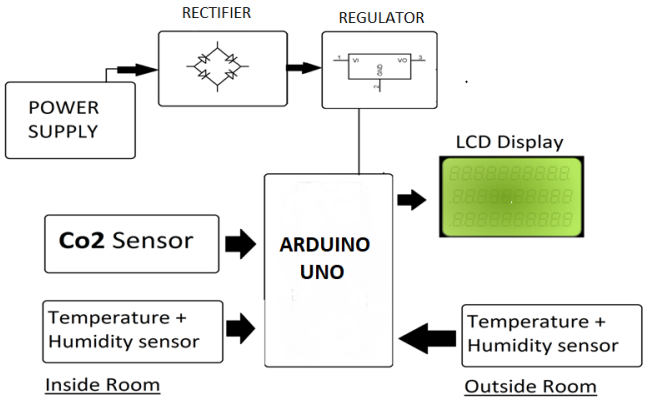

Fig1. Proposed model of Home Air Quality monitoring system

IV. THE HARDWARE DESCRIPTION

1. ARDUINO UNO

Arduino UNO is a microcontroller board which is based on principle of or which works on ATmega328P. It consists of 14 input and output pins(these all are the digital pins), out of these 6 pins can work for PWM outputs. It also consists of a USB connection and a power jack etc. The different programs can be loaded on it from different computer program. The operating voltage is 5V.

2. Temperature and Humidity Sensor

The temperature and humidity sensor is used to calculate the temperature in degree Celsius and humidity content inside and outside the house and displays on LCD. The temperature sensor used in this project is DHT 11. It is a basic level (fundamental) and low cost(easily affordable) digital temperature and humidity sensor. It uses a humidity sensor and a thermistor to calculate the surrounding air and gives out a digital signal as a result on the data pin(analog input pins are not needed).

3. CO2 Sensor

The CO2 Sensor is used to measure the amount of CO2 level present in our atmosphere. The CO2 sensor used in our project is MQ2 sensor. The Grove-Gas Sensor which is present in the project is used for the detection on any gas leakage in homes and industries. It has very high sensitivity and provides a very quick response and hence as a result measurements can be taken very quickly. It is highly stable and hence a long lifetime.

V. ADVANTAGES AND APPLICATIONS

Advantages:-

1. Sensors are easily available.
2. Simple , compact and easy to handle.
3. The quality of air can be checked indoor as well as outdoor.
4. Detects a large range of parameters such as temperature level, humidity content and CO2 level in air.

Applications:-

1. Used in Industries.
2. Remote sensing for firefighters.
3. Used in hospitals and clinics.
4. Used in homes and offices.

Monitoring systems are used to collect and analyze the pollutant data from the traffic roads emissions. In primitive monitoring systems it was a difficult task in order to monitor the air quality over a large infrastructure and hence the system was quite bulky. Accurate reading of pollution is necessary in order to generate awareness among people who suffers from breathing problems and hence this proposed system has helped us to achieve all this upto a great extent.

VI. CONCLUSION

To monitor the content of air and to monitor the air pollution this sensor network system has large number of advantages as compared to primitive or traditional monitoring system. In primitive or the traditional monitoring systems the whole model design was very bulky and it was most of the times impossible to load the from one place to another and to examine the contents of the different harmful gases present in the atmosphere and hence due to this large size it was not possible to interface more devices and sensors with the system.

But in today's modern monitoring systems it is easily possible to interface more sensors and devices with the proposed system as the size of the systems are small and they can be easily loaded from one place to another and the contents can be measured with them very easily.

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