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IOT BASED AIR QUALITY MONITORING AND AIR PURIFICATION SYSTEM

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1.ABSTRACT:

Air pollution is one of major problems that we are facing in our day-to -day life. It effects human health by causing allergies and other lung diseases which may lead to loss of life. The increases in the number of industries and vehicles contribution to air pollution to a greater Extend. Fresh air is necessary for all human being and many technologies were employed for real time monitoring of air pollutants. This paper puts a kind of real time air pollution monitoring system in which the concentration of major pollutant gases like carbon monoxide(co), carbon dioxide (CO2) in air is sensed by commercially available sensors. By employing an internet of things (IOT) platform, this system displays the air quality in PPM, on real time basis, in a webpage which can be monitoring easily through our PC or smart phone. In addition to that, the system offers a previous measured data. This allows the authorities to analyser the air quality to desired area, for a period for making valuable conclusion. Also, the system detects air quality and if the number of pollutants increases beyond a particular level it alert the stake holders by sending messages. And, due of its compact design, it can be installed anywhere for monitoring air quality.

Keywords: Microprocessor, ESP8266, MQ2 sensor, MQ135 sensor, Relay, IOT.

2.INTRODUCTION:

Reduction of air contamination in ICU/LABS and nursery environment with an air purification system will provide the automatic air quality detection and purification process. For this we are using NODEMCU-ESP8266 microcontroller which is basically an advance virtual RISC (AVR) microcontroller. NODEMCU-ESP8266 has several different features which makes it the most popular device in today's market in IOT sector.

This microcontroller has following features: good performance low power consumption real time counter NODEMCU-ESP8266 has input from MQ2 sensor, MQ135 sensor and its output is given to exhaust fan. MQ2 gas sensor can easily detect smoke, lpg, methane, propane and hydrogen in the air. MQ135 gas sensor has ability to check air quality and it has high sensitivity to ammonia gas, sulphide and other toxic gases well and it is a low-cost sensor. The voltage that the sensor output changes accordingly to the gas level exits in the atmosphere. The voltage at the sensor output is proportional to concentration of gas. The output can be either analog or digital that can be read with analog or digital input of microcontroller. Exhaust fan used in the output is a DC fan. To drive this fan, we use ULN 2003 IC which is the most common motor driver ICs. It draws out the polluted air from the room and replaces it with fresh air. Air is considered polluted when it contains high amount of moisture, carbon dioxide and other vaporized chemicals.

3.Existing System:

The existing project has to use many mechanical devices to collect the data. Those devices are heavy and not economical to install at many places. Periodical collection of data is difficult. Still manual intervension is required for collecting and feeding data to central servers. The existing project has only detection of air contamination but not purification.

4.Proposed System:

Since it is IOT based product, all the functional units are connected in a network. All things such as sensors, microcontroller, server work together by means of communication over network. Data collected from uploaded to cloud servers instantly. We can draw conclusions and can take action instantly.

5.LITERATURE SURVEY:

Xiaoke Yang, Lingyu Yang, Jing Zhang et.al proposes an open foundation of a WiFi-empowered indoorair quality observing and control framework, which could be joined into a particularly 'shrewd structure' structure. The total programming and equipment plan of this framework is introduced, alongside a progression of control tests. The proposed framework works over a current WiFi remote organization using the MQTT convention. It is fit for observing the indoor air quality aswell ascontrolling an air purifier to

control the particulate matters fixation. Examination results under a genuine office climate exhibit the adequacy of the proposed plan.

Sujuan Liu, Chuyu Xia, Zhenzhen Zhao et .al A low-power continuous air quality observing framework utilizing LPWAN dependent on LoRa. This paper presents a low-power constant air quality checking framework dependent on the LoRa Wireless Communication innovation. The proposed framework can be spread out in an enormous number in the observing region to shape sensor organization. The framework incorporates a solitary chip microcontroller, a few air contamination sensors (NO2, SO2, O3, CO, PM1, PM10, PM2.5), LongRange (LoRa) - Modem, a sun oriented PV-battery part and graphical UI (GUI).

6.BLOCK DIAGRAM:

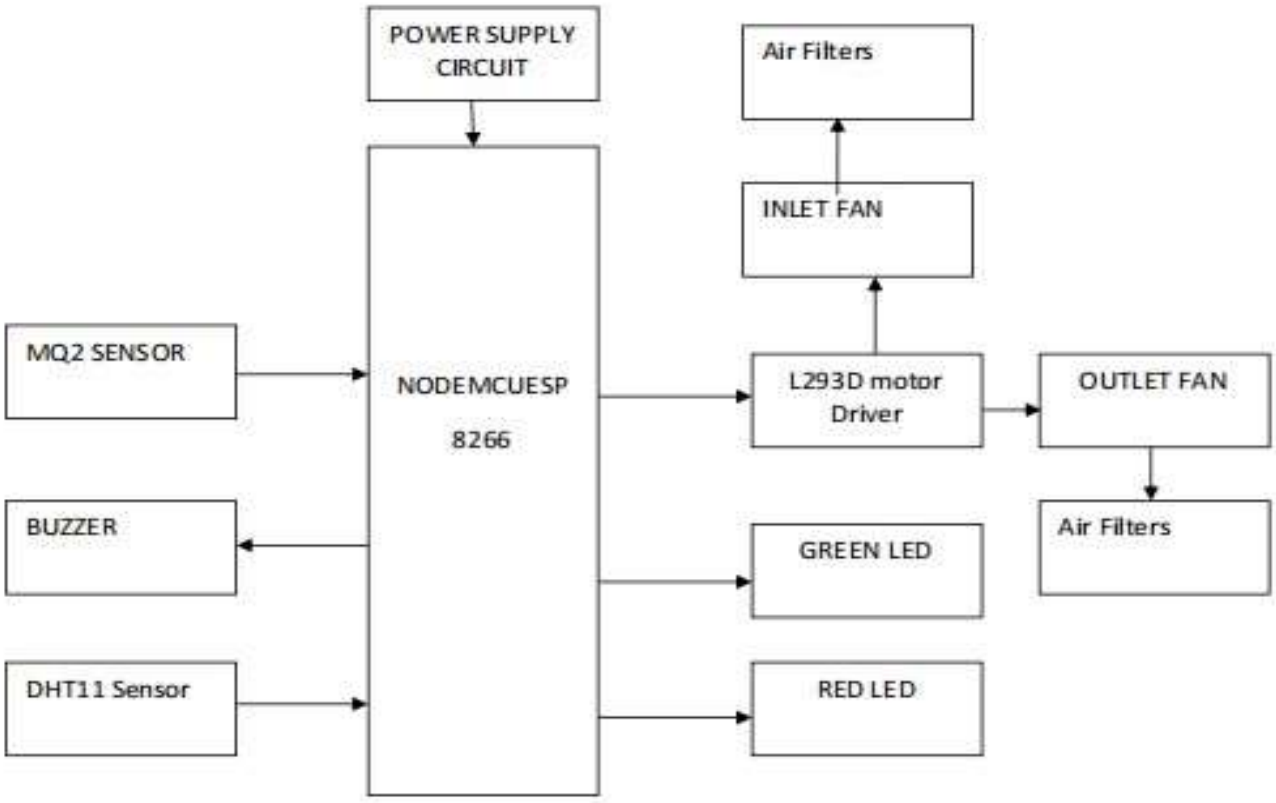

Fig: IoT based air quality monitoring and purification system.

7.WORKING:

Hardware setup: The MQ2 gas sensor will be used to measure the concentration of harmful gases like CO, LPG, and smoke. The DHT11 sensor will be used to measure temperature and humidity. The LED green and LED red indicators will be used to display the air quality status. The air filters will be used to purify the air and the DC fans will be used to circulate the filtered air. Data acquisition: The MQ2 and DHT11 sensors will collect data on the concentration of harmful gases, temperature, and humidity. The collected

data will be processed by the microcontroller and transmitted to the cloud server using Wi-Fi or Bluetooth. Data processing: The collected data will be processed by the microcontroller to calculate the air quality index (AQI) based on the concentration of harmful gases, temperature, and humidity. The AQI will be displayed using the LED green and LED red indicators. The LED green will indicate good air quality and the LED red will indicate poor air quality.

Air filtration: The air filters will be used to purify the air by removing dust, smoke, and other harmful particles. The DC fans will be used to circulate the filtered air in the room. Remote monitoring: The data collected from the sensors will be transmitted to the cloud server, which can be accessed remotely using a web or mobile application. The user can monitor the air quality status remotely and take necessary actions. Alert system: If the AQI exceeds a certain threshold level, an alert system can be triggered to inform the user about thepoor air quality status. The alert system can be in the form of a push notification, SMS, or email.

8.CONCLUSION:

This paper presented a detailed study on Automated Air Purifier. From the study of various papers, focus was on indoor gases like CO, CO2, NOx and the filtration was done using electrostatic forces, which consume lots of power. Few had monitoring systems, without air purifier whereas few were purifiers without monitoring system. However, an air purifier which can monitor the air quality continuously and automatically controlled by the collected data and a decision algorithm will be the complete solution to solve this problem.

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