AIR QUALITY MONITORING SYSTEM BASED ON IOT USING RASPBERRY PI

[1]Vijayakumar Sajjan , Research Scholar, Department of ECE, University of Technology,Jaipur
[2]Dr.Raghavendra Patidar, Professor, Department of ECE, University of Technology,Jaipur

ABSTRACT: The gadget is designed the usage of the python coding language. The monitored values may be accessed from the Internet of Things platform. The air pollutants parameters are taken from the low cost gas sensors. The parameters consist of: concentrations of smoke, carbon monoxide and nitrogen-di-oxide, temperature and humidity. Also an alarm is triggered to signify high concentrations of emissions. This acts as a warning to the government about the air pollution price. A graph is plotted using the monitored values the usage of Thing speak platform.

Keywords:IOT, Raspberry PI, Arduino UNO, Sensors, IP, Etc

I. INTRODUCTION

Air pollution method presence of excessive concentrations of dangerous gases collectively with dirt, smoke. Inhaling those gases can increase the probabilities of fitness hassle .In truth, dust while inhaled can cause breathing troubles, harm lung tissue, and accelerate present health troubles. Greenhouse gases entice heat and make the earth warmer. Human sports are answerable for almost all the will increase in greenhouse gases. Therefore, each federal government has stringent pointers which require prevention and reduction of emission levels. In our undertaking, the main air pollutants like CO2, NO2, CO is monitored the use of sensors and values acquired are processed using Raspberry Pi. Then the facts' are dispatched to an IP deal with and may be monitored from anywhere from logging into the IP deal with The rest of the paper is prepared as follows: Literature survey is explained in phase II, Existing device in section III, proposed machine in section IV, Results and dialogue in section V and Conclusion in section VI.

II. LITERATURE SURVEY [1]

Air top notch tracking structures that can monitor gasoline consisting of CO and Sox on ambient air in a real-time and may be accessed with net line were advanced. Sensor detail in this system is primarily based on Nano installed zinc oxide skinny film synthesized the use of moist chemical path. Monitoring machine is designed the use of arduino Uno microcontroller as analog to digital converter, and ethernet protect for records transmission, laptop server for database middle and information acquisition. The facts from this tracking gadget can be accessed and considered as net-page. The sensor detail that applied in this device is made at nanostructure so it'll yield excessive sensitivity. The most desirable experimental parameters so as to be used are temperature, publicity time to gas goal, sampling period, and additionally ratio for regeneration time. Measurements is probably held beneath nicely-controlled and artificially CO/Sox polluted surroundings. [2] Due to the increasing industrialization and the large urbanization, air pollutants monitoring is being considered as one of the essential demanding situations of smart cities. A cautious deployment of sensors is therefore essential to get higher Performances at the same time as making sure a minimal financial cost. The proposed gadget has an inexperienced method that goals to find maximum useful sensors and sinks locations at the same time as ensuring air pollutants insurance and community connectivity. Unlike maximum of the prevailing methods, which rely upon simple and ordinary detection fashions, our technique is based on the spatial analysis of pollutants facts, permitting to bear in thoughts the person of the pollutants phenomenon.

A Wi-Fi primarily based plug and feel smart tool for devoted air pollutants tracking using Internet of Things is designed. Once the sensor node reads man or woman pollutants composition and vicinity coordinates, Air great index (AQI) can be calculated. All the ones information is probably driven to detail communicate cloud garage, an open deliver application Programming interface for IoT based totally totally devices. These driven statistics in conjunction with Date and time may be retrieved as a separate excel sheet for destiny evaluation. Through factor view android app, real time pollution degree with region can be visualized in phrases of line graph.
With the implementation of this low price and small size smart device, alert may be given to humans to wear anti-pollutants mask and reroute path in transportation where there's excessive air pollutants ensuring excessive reliability and consistency.

III. EXISTING SYSTEM
A. AIR POLLUTION MONITORING USING ARDUINO UNO BOARD:

The commercial enterprise meters to be had inside the market which incorporates Fluke C0-220, Carbon monoxide meter for CO, am probe CO2 meter for CO2, Forbix Semicon LPG fuel leakage sensor alarm for LPG leakage detection were utilized in earlier than instances. The present device is construct the use of the Arduino Uno board and output is proven in the LCD display. Arduino board is not entire computer systems and moreover they're designed for unique cause. They do not have an in build Wi-Fi port. They don't run a complete operating device, however in reality execute the written code.

B.DISADVANTAGES OF USING ARDUINO UNO BOARD:

The arduino is not built for community connectivity directly. It calls for a bit greater tinkering to installation a proper connection, though it's miles feasible. There is a want of more chip with an ethernet port and it have to be coded to wire with the arduino board. This introduces the drawback that it calls for extra hardware. The raspberry pi comes geared up with an in-constructed Wi-Fi port which makes the gadget less difficult for IOT applications. This is one of the motives why the pi is the device of choice for topics like private webservers, printer servers and VPN's. Ready with an in-constructed Wi-Fi port which makes the system less hard for IOT packages. This is one of the reasons why the pi is the device of desire for topics like private webservers, printer servers and VPN's. The clock pace in arduino is low in comparison to Raspberry pi this is forty times slower than pi.The RAM of raspberry pi is12, 800 instances larger in evaluation to arduino.

C. ESP8266 WITH ARDUINO:

In order to attach a Wi-Fi module with arduino, there may be a want of extra chip. ESP8266 is the maximum commonly used chip for Wi-Fi connectivity. This chip isn't always capable of 5-3 good judgment moving and requires an outdoor convertor. It also has risks that there may be no get right of access to to all the input and output pins of this chip and issues arise for complicated initiatives. The arduino libraries are not very inexperienced in fine additives and waste RAM and CPU cycles and additionally limited to small amount of MCU's. Also arduino is excellent formally supported on Atmel AVR and Atmel SAM collection. There are ports and

adaptions to three other MCU's like ESP2866 or the NRF51 series, but they do not appear to be absolutely supported.

IV. PROPOSED SYSTEM

In the proposed gadget, we are going to make an IOT based totally definitely air pollutants monitoring gadget the use of raspberry pi.

A.RASPBERRY PI

This task is build the usage of raspberry pi 3b. It does not embody a integrated difficult disk or robust state power, however it uses an SD card for booting and persistent storage. Also the pi is does not come shipped with an running system. Tools are to be had for python coding as the main language. The pi also may be coded with c, Perl, java languages.

Figure.1 Raspberry pi 3b

B.GPIO PORTS IN RASPBERRY PI:

These pins are a bodily interface among the pi and the outdoor world. At the best level, out of 40 pins, 20 pins are GPIO pins and the others are electricity or ground pins.

Figure.2 Raspberry pi GPIO pinout diagram
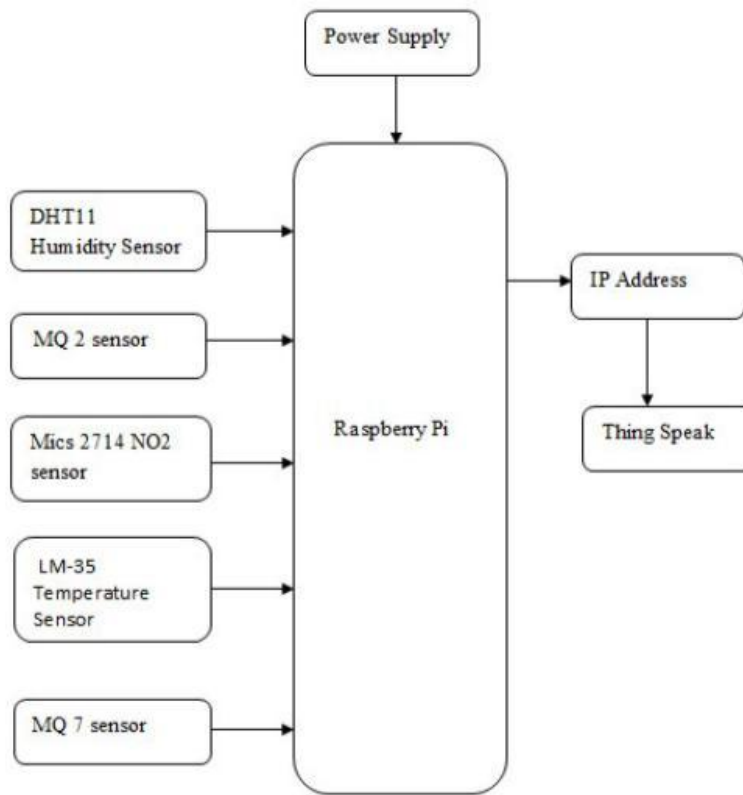
C.BLOCK DIAGRAM OF PROPOSED SYSTEM:

Figure.3 block diagram of proposed system

D.SENSORS USED

1) Humidity sensor:

The DHT11 Sensor is used for humidity measurement. It is reasonably easy to use however requires cautious timing to grab records. The new studying is obtained every 2 seconds. This sensor is good for 20-80% humidity readings with 5%accuracy.It have 4 pins with 0.1 spacing.

2) C02 fuel sensor:

This is a perfect sensor to come across the presence of dangerous LPG gas concentrations. This sensor also can imply LNG, propane, butane and cigarette smoke .It has excessive sensitivity with detection variety one hundred-ten thousand ppm.

3) MICS 2714 sensor:

This sensor's resistance varies regardless of small concentrations of NO2.The resistance varies among $2K\Omega$ and $2M\Omega$.It has air resistance of 0.eight to eight kilo ohms. The sensitivity ranges from 6 to a hundred ppm and the response time is 30 seconds.

4) MQ7 sensor:

This sensor is used for sensing CO concentrations. It has excessive sensitivity and speedy response time. It offers values in the range of 20 to 2000 ppm.It calls for energy deliver of 5v.

5) LM35 sensor:

LM 35 sensor is a precision temperature sensor with its output proportional to the temperature. With this sensor, temperature may be measured extra as it should be than with a thermistor. Temperature upward push in nevertheless air. The running temperature range is -55°C to 150°C.

D) MCP3008 ADC:

This is a low cost Analog to digital convertor. Since raspberry pi do not have analog pins, analog to virtual conversion is done. It has 8 channels and so eight sensors can be interfaced.
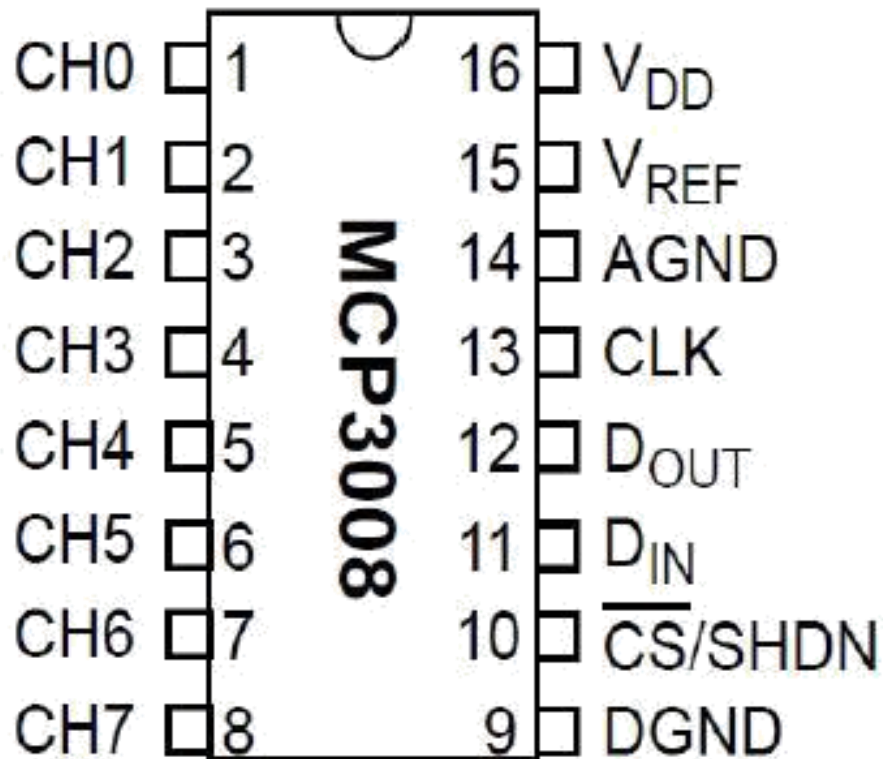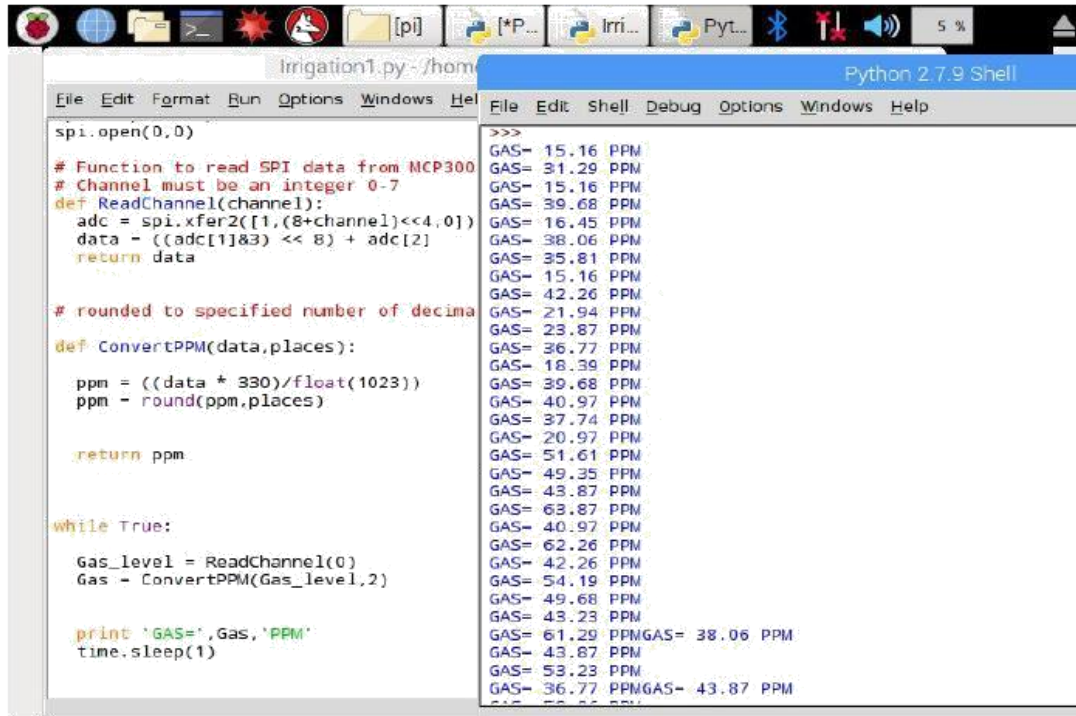
Figure.4 MCP3008 PIN diagram

V. RESULTS AND DISCUISSION

The MQ2 gas sensor has been interfaced with the raspberry pi the usage of the python coding language. The values measured are in ppm (components in step with million) range. Similarly other sensors may be interfaced with raspberry pi.

Figure.5 MQ2 sensor with raspberry pi

VI. CONCLUSION

The threshold cost may be constant as a end result to trigger out alarm. These facts are sent to an IP deal with and also graph can be plotted for every half-an-hour to signify the concentrations of the pollutants the use of the factor speak platform.

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