Smart Weather Monitoring and Real Time Alert System using IOT (January 2020)

(TEAM 2)

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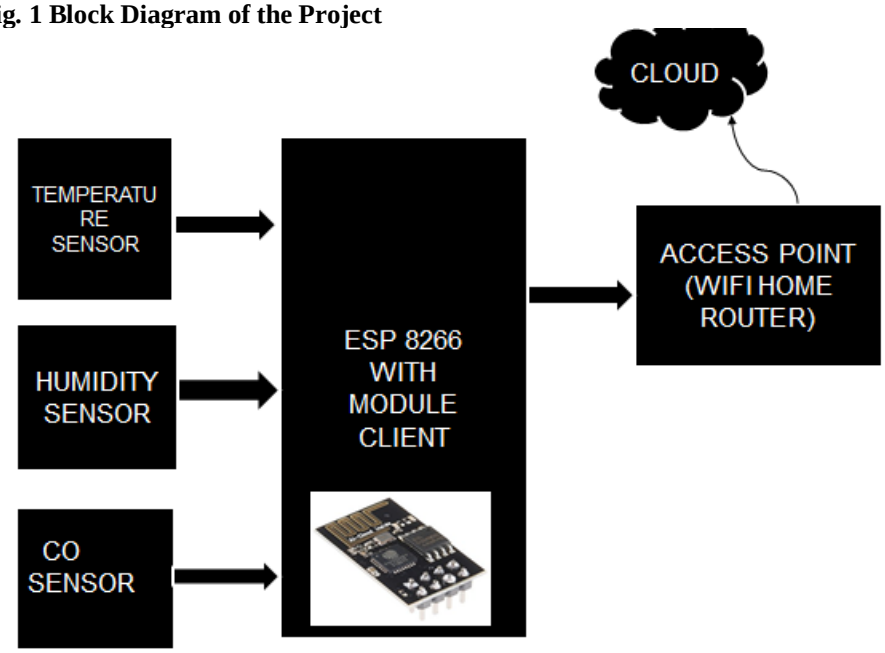
Product Design (Application Architecture with Explanation):

SYSTEM ARCHITECTURE

The implemented system consists of a microcontroller (ESP8266) as a main processing unit for the entire system and all the sensor and devices can be connected with the microcontroller. The sensors can be operated by the microcontroller to retrieve the data from them and it processes the analysis with the sensor data and updates it to the internet through Wi-Fi module connected with it.

A. BLOCK DIAGRAM

Fig. 1 Block Diagram of the Project



B.WI-FI MODULE

Fig 2 .ESP8266

Here we used ESP8266 Wi-Fi module which is having TCP/IP protocol stack integrated on chip. So that it can provide any microcontroller to get connected with Wi-Fi network. ESP8266 is a preprogrammed SOC and any microcontroller has to communicate with it through UART interface. It works with a supply voltage of 3.3v. The module is configured with AT commands and the microcontroller should be programmed to send the AT commands in a required sequence to configure the module in client mode. The module can be used in both client and server modes.

C.SENSORS:

The system consists of temperature and humidity sensor (DHT 11) and CO sensor (MQ 6). These 2 sensors will measure the primary environmental factors temperature, humidity and the CO levels. All this sensors will gives the analog voltage representing one particular weather factor. The microcontroller will converts this analog voltage into digital data.

D.TEMPERATURE SENSOR AND HUMIDITY SENSOR

The DHT11 is an essential, ultra minimal effort computerized temperature and humidity sensor.

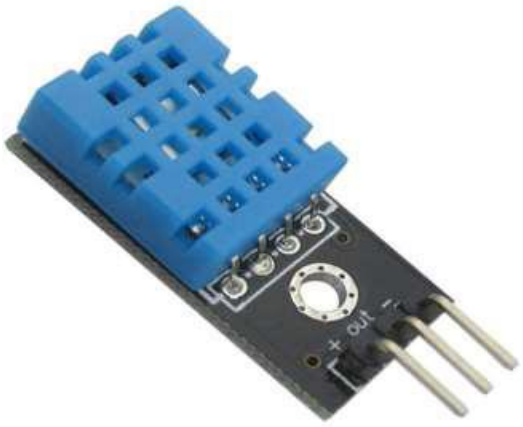


Fig. 3 Temperature and Humidity Sensor DHT 11

It utilizes a capacitive humidity sensor and a thermistor to gauge the surrounding air, and releases a digital data on the data pin (no analog information pins required). The main genuine drawback of this sensor is you can just get new information from it once every 2 seconds, so when utilizing our library, sensor readings can be up to 2 seconds old. It works on 3 to 5V power supply. Good for 20- 80% humidity readings with 5% accuracy and for 0-50°C temperature readings ±2°C accuracy.

E. CARBON MONOXIDE (CO) SENSOR

Carbon Monoxide (CO) sensor, suitable for sensing CO concentrations in the air.

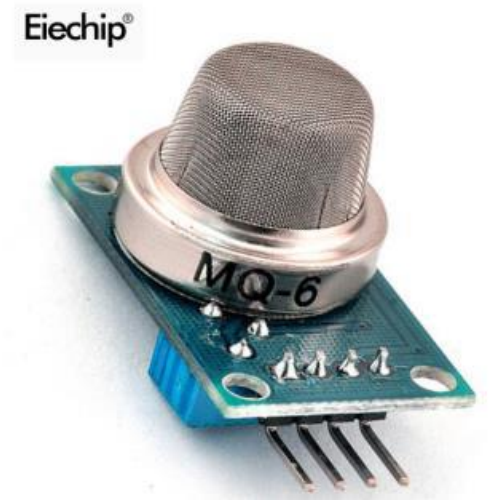


Fig. 4 Carbon Monoxide (CO) sensor MQ 6

Carbon monoxide sensor, suitable for sensing CO concentration in air. The MQ-6 can sense CO-gas concentration somewhere in the range of 20 to 2000ppm. This sensor has a high affectability and quick reaction time. The sensor's yield is analog resistance. The drive circuit is exceptionally straightforward; you should simply control the heater curl with 5V, include a load resistance, and associate the output to an ADC. The standard reference strategy for the estimation of carbon monoxide concentration in air depends on the ingestion of infrared radiation by the gas in a no dispersive photometer. This technique is reasonable for stable establishments at fixed site monitoring stations. All the more as of late, convenient carbon monoxide analyzers with data logging have turned out to be accessible for individual presentation observing. These estimations depend on the electrochemical responses between carbon monoxide and deionized water, which are detected by exceptionally planned sensors. These days the determination, strength and affectability of the electrochemical analyzers are inside the details of the reference technique and, together with the data logging systems, they fit into a little rucksack or even a pocket.

F.LDR Light-Dependent Resistor

Fig 5: LDR

Light intensity is measured using an LDR. An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This lets them to be used in light sensing circuits. A light dependent resistor (LDR) is a light-controlled inconstant resistor. The resistance of this decreases with increasing incident light intensity; in other words, it exhibits photoconductivity.

Application Architecture:

The proposed embedded device is for monitoring Temperature, Humidity, light intensity and in the atmosphere to make the environment intelligent or interactive with the objects through wireless communication. The proposed model is more adaptable and distributive in nature to monitor the environmental parameters.

The implemented system consists of ESP8266 as a main processing unit for the entire system and all the sensor and devices can be connected with the microcontroller. The sensors can be operated by the microcontroller to

retrieve the data from them and it processes the analysis with the sensor data and updates it to the internet through Wi-Fi.

STAGES INVOLVED IN THE SYSTEM:

1) Sensing:

Various parameters are measured with the help of appropriate sensors; GPS is interfaced with ESP8266 module for gathering location information whose values are transferred to cloud (Ubidots).

2) Data processing and transferring:

- ESP8266 module is connected to internet though Wi-Fi module .

- Reading sensor values, uploading / transferring sensor values to web page for storing in database and for Real time remote monitoring.

3) Data Display (Options available on Web Server):

Transferred data to database. Continuous display of weather parameters on web page and app includes below. Humidity Temperature Light intensity Air pressure Precipitation -Display of readings using graphs for prediction analysis.

4) Power Supply:

5V as input to ESP8266. Energy can be conserve by using solar panel.