Design and Analysis of Wind Turbine Diffuser Shroud

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***Abstract*—** Nowadays people are very concerned about the environment because of the rapid changes around the world, which may harm to human health. Hence, it is necessary to monitor environment where people spend more time like Home, Office, College or any workstation in real time and long-term manner. Using internet of things, we can control system as well as we can access system remotely using IoT. Which will take the data with the help of different sensors and transfer the values to cloud and then to an application, from which the data can be accessed at any time anywhere.

Keywords: Environment Monitoring, Sensors, IoT, Arduino, Thinkspeak, DHT11, MQ135, MQ2

I. INTRODUCTION

There are many embedded devices, which are designed for interacting with environment by connecting internet. The increment of these types of object is achieving the development of microcontroller-based system, which are helping to replace old complicated electronic circuits. By using IoT, we can control any electronic modules in homes and colleges. Besides, we can read data from any sensor and analyse it graphically from anywhere in the world. Arduino is a platform to develop and interact with required programming software. Arduino UNO is a microcontroller device, which is used for fetching data like temperature-humidity, Air quality, Smoke from the sensors DHT11, MQ135, MQ2 respectively, to the Wi-Fi module ESP8266. In this paper, we have different sections to trace all the parameters that are mentioned above.

II. ARDUINO

Arduino is a new open source hardware and software system it is extremely accessible and very flexible to be customize and extended. It offers a variety of digital and analog inputs, SPI (Serial Peripheral Interface) and digital and PWM (Pulse Width Modulation) outputs. It is easy to use and also connects to computers via USB and communicates using standard serial protocol, runs in standalone mode as interface connected to PC/Macintosh computers. Arduino is a great tool for developing interactive objects, taking inputs from a variety of switches or sensors and controlling a variety of lights, motors and other inputs. This is a microcontroller board, which is a small circuit (the board)that contains a whole computer on a small chip (the microcontroller). There are different versions of the Arduino board based on the requirement of the project or device we can select the Arduino.

Fig. 1: Arduino UNO

III. SENSORS

A. DHT11

This module features a humidity and temperature complex with a calibrated digital signal output means DHT11 sensor module is a combined module for sensing humidity and temperature, which gives a calibrated digital output signal. DHT11 gives us very precise value of humidity and temperature and ensures high reliability and long-term stability. This sensor has a resistive type humidity measurement component and NTC type measurement component with an 8-bit microcontroller inbuilt, which has a fast response, and cost effective and available in 4-pin single rowpackage.

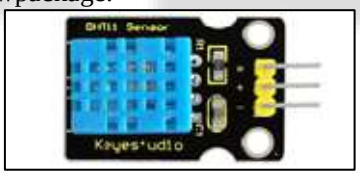

Fig. 2: DHT11 Temperature sensor

B. MQ135

This is an air quality-monitoring sensor for detecting a wide range of gases, including NH3, NOx, alcohol, benzene, smoke and CO2. Ideal for use in office or factory. This sensor has high sensitivity to Ammonia, Sulphide and Benzene steam sensitive to smoke and other harmful gases.MQ135 consistsof a small sensing material whose conductivity is lower in clean air and higher inpolluted air, thus making the sensor very useful while detecting dangerous gases. The sensor ionizes the gases, which come in its contact, making changes in the resistance of the sensing material.

Fig. 3: MQ135 sensor

C. MQ2

MQ2 is a gas sensor, which is used for detecting the combustible gasses and smoke. This module is useful for gas leakage detection in home and industries. This is a metal oxide semiconductor type gas sensor; concentration of gas in the released gasses is measured using a voltage divider network available in the sensor. This sensor works on 5V DC voltage. It can detect gases in the concentration of range 200 to 10000 ppm.

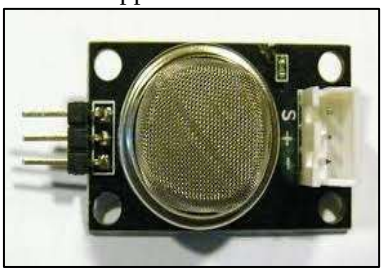

Fig. 4: MQ2 gas sensor

IV. EXISTING SYSTEM

In general, the environmental parameters are monitored using low power sensors connected to internet, which sends their data to central servers. In addition, many of the existing systems have only one or two sensors depending upon the conditions, which mainly consists of either temperature or humidity or smoke sensors.

V. PROPOSED SYSTEM

Themainobjectiveofourprojectistoprovideenvironmentalparametersatanyselectedlocation-using internet. In this system, we will deploy different types of sensors for monitoring various parameters. All the data collected from these sensors is transferred to cloud using Wi-Fi module. The obtained values can be monitored through either a Mobile Application or Website.

VI. SOFTWARE REQUIREMENTS

1) Arduino Software
2) Thing Speak

VII. HARDWARE REQUIREMENTS

1) Arduino UNO
2) Sensors
3) Wi-Fi Module
4) Resistors
5) Wires

VIII. SYSTEM ARCHITECTURE

The system design consists of Sensors, Power Supply, Arduino, Wi-Fi Module, ThingSpeak. The sensors will collect the data and send it to Arduino to store and the collected data is sent to Wi-Fi module, which will send the data to cloud using internet. Here we are using ThingSpeak API (Application Programmable Interface) which will perform both the operations such as collecting, storing and display of data. User through a Mobile Application or Web Application can monitor the data.

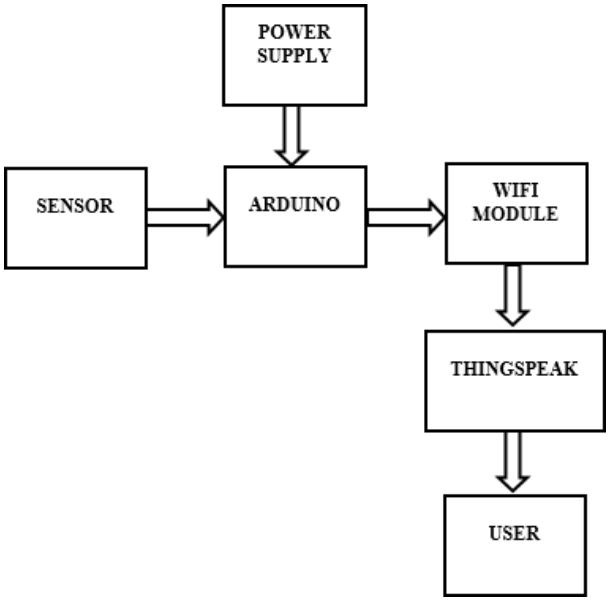

Fig. 5: Architecture Diagram

IX. RESULTS

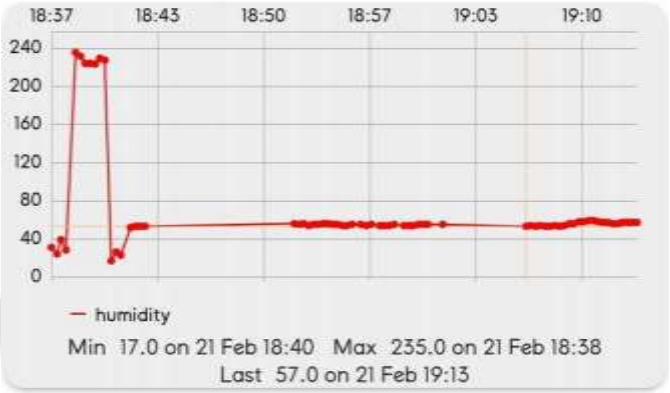

Fig. 7: Temperature Reading

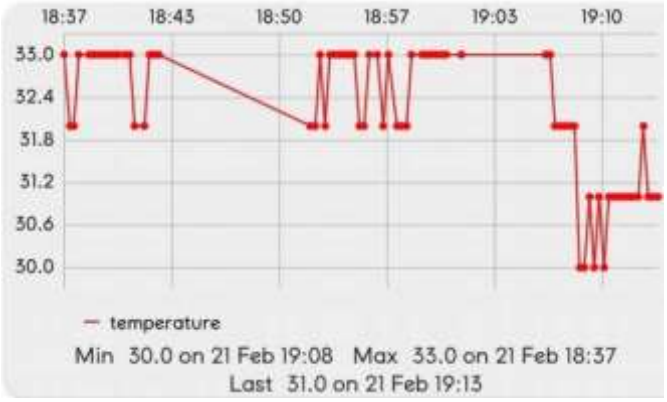

Fig. 8: Humidity Reading

Fig. 9: MQ135 sensor reading

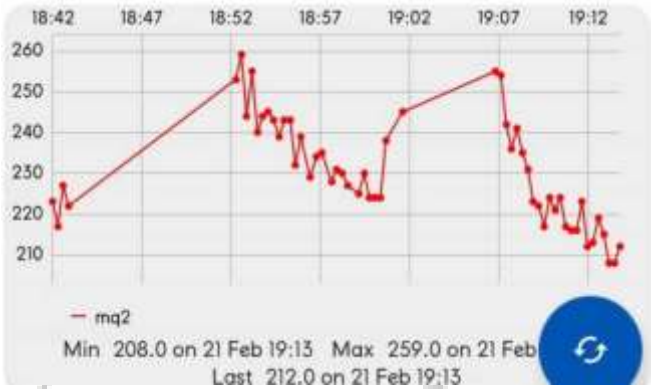

Fig. 10: MQ2 sensor reading

X. Conclusion

Theproposedsystemisaconvenientmethodofmonitoringthe requiredparameterswiththehelpofthe application provided. In future with the help of this module we can prevent occurring of a hazardous chemical accident or a gas leakage in home and can also be used for monitoring temperature and humidity.

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