Cloud Based Temperature Control System using IoT

[1]A.Haritha, [2]N.KiranKumar
[1]PG Scholar (ES), Department of ECE, VEMU Institute of Technology, P.Kothakota,
[2]Associate Professor, Department of ECE, VEMU Institute of Technology, P. Kothakota.

Abstract:*The Internet of Things alludes to the networking of physical substances using embedded actuators, sensors, and different devices that can gather or transmit data about the substances. The information amassed from these devices can then be examined to improve commodities, administrations, and operations. The "Internet of Things" is detonating. It is comprised of billions of "wise" devices. Inside the limitless Industrials segment, the IoT shows an architectural change analogous to industrial innovation. Equipment is turning out to be more digitized and more associated, setting up remote innovation between machines, people, and the internet and making new ecosystems. The present work aims to contribute to the development of a platform for IoT based integrated model for and environment monitoring. The technique presents the idea of sensor hubs, low-control systems, and IoT Gateways utilized as a part of atmosphere. The sensor node monitors the quantity of inventories and environmental parameters. IoT gateway transfers and standardize the information and can remotely control the operations of sensor node. The major thought of suggested technique is to accelerating information aggregation and stock administration, enhances remote monitoring, effectiveness, and control of physical resources, and efficiency.*

***.IndexTerms*:Cloud Computing, Internet of Things (IoT),BMP180 Sensor etc,.**

1. INTRODUCTION

The Internet of Things (IoT) is a collection of electronic, mechanical and non-electronic devices that have the ability to be self-configurable, operated and controlled remotely over communication networks. The user can control local and external devices and can also, for example, switch ON/OFF devices, switch trip circuits between several devices, access devices and remote controls, etc [1].

A fairly useful application can be used when a person feels very uncomfortable due to the outside weather when the individual goes home. The user could turn on the air conditioning to cool the room depending on the position where the user is in relation to his house and the ambient temperatureof his house. Another example is when the user can notprepare something to eat immediately after arriving home [2][3]. Therefore, before the person arrives home, an oven orcoffee maker can be turned on and controlled depending onthe position of the user and the temperature of the appliance.

Then via the IoT can configure and control the operation ofelectrical or electronic devices through actuators [4].There are several IoT issues, which should be mentioned:

1) In many cases, multiple controllers are required, one for each device that need to be controlled,]
2) the need to implement a gateway that can control all devices and sensor systems, these being of different brands and with different communicationprotocols [5],
3) the debate about placing the system processing in the Gateway, in the sensor/device itself or in thecloud [6].

All devices in IoT technology work synchronously to produce accurate and reliable results in the absence of the user.The main goal of this work is to develop a solutionbased on the IoT via a mechanical actuator ON/OFF control
system within the parameters of temperature and position. Theproposed system integrates the advances of the Raspberry Pithat works as a configurable computer, a cloud service, atemperature sensor and a mobile device with a GPS-basedapplication. Therefore, it is a low cost solution based on opensource hardware and software. The IoT architecture was usedduring its development and this gives the system, being part ofa Smart Home, a high level of modularization while enablingit for future improvements. The solution was validated througha case study carried out at the University of Chile.

This paper is organized in five sections. After this introduction, in Section II, motivation discussed of the paper, Section III about Implementation of the project explained, as well as the novel feature of the proposed method. Finally, Sections IV and V provide the experimental results and the conclusions, respectively.

2. MOTIVATION

A. Problem Statement

In existing methods used based on ZIGBEE technology is proven that not able to detect the pollutants properly. This problem can be overcome by Wi-Fi technology in proposed method

B. Solution Statement

This paper proposed an embedded system using wireless sensor network that provides a framework for collecting the sensor data at anyplace using IoT.The proposed systems also assure the existence of wireless sensors for vehicle pollution system that specialize in a straight forward accessibility of real time data through internet using IoT.

C. Objectives

The objectives of this research are to implement, design and realize a low cost the microcontroller (Arduino) based system technology for monitoring and controlling temperature, and implement prototype hardware in a real time environment.

D. Methodology

In order to achieve the objective of the scope few tasks need to be done for the hardware of the system and the GUI application software. For the hardware of the system there are three parts which have to be considered. They are the

microcontroller board (Arduino) based system, the transmitted and the received frame and software of the system. First of all, in this system, the microcontroller has to be test and check for its functionality. Secondly, transmitter and the receiver need to be test for its functionality. It can be done by sending a bit of data from the transmitter to the receiver. The push button and the LED can be used as the representation of data sending and receiving. Or displaying the transition frame in virtual terminal.

Finally, the software of the system, for that there are two parts which have to be considered. They are the software for the programming and the thing speak/ubidots for GUI application. The Arduino sketch software used to make a connection to the remote monitoring using GUI application and also used to record data that have been received through the serial connection.

3.IMPLEMENTATION OF PROJECT

A. Block Diagram

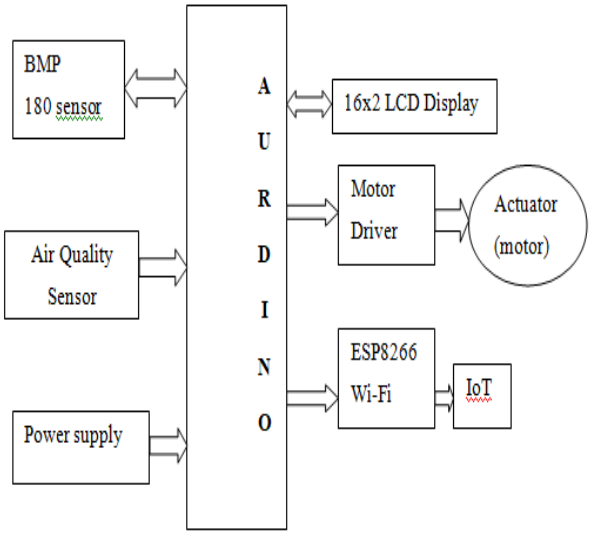

Fig. 1.Architecture of the proposed system

B. Hardware Components

1) Arduino

Arduino is an open-source microcontroller board based on ATmega 328P.It has 16 MHZ clock, 14 pins for an inputoutput purpose, USB connection, reset button and power jack. It contains everything which is required to implement or design the microcontroller based embedded system applications. In order to process the analog data given by analog sensors it also contains 10 bit ADC (Analog to Digital converter). Moreover, Arduino has inbuilt libraries for almost every application.

Fig.2 Arduino Micro Controller

2) BMP180 - Atmospheric Pressure Sensor

Fig 3. BMP180 Sensor

The BMP180 is the new digital barometric pressure sensor of Bosch Sensortec, with a very high performance, which enables applications in advanced mobile devices, such as smart phones, tablet PCs and sports devices. About Barometric Pressure Sensors

Barometric pressure sensors measure fluctuations in the pressure exerted by the atmosphere. The sensors require protection from condensing humidity, precipitation, and water ingress. They are typically housed with the data logger inside an environmental enclosure.

BMP180 Sensor is an extremely precise low cost sensor from Bosch for measuring barometric pressure and temperature. Because pressure changes with altitude you can also use it as an altimeter! The sensor is soldered onto a

PCB with a 3.3V regulator, I2C level shifter and pull-up resistors on the I2C pins. It is completely identical to the BMP085 in terms of firmware/software.

3) Wi-fi ESP8266

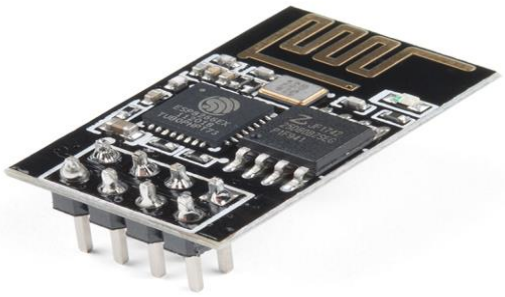

Fig.4. *Wi-Fi ESP8266*

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

4. Air Quality Sensor (MQ 135 Sensors)

Fig. 5: MQ 135 Sensor

The MQ 135 Air Quality Detector Sensor Module for Arduino has lower conductivity in clean air. When the target combustible gas exists, the conductivity of the sensor is higher along with the gas concentration rising. Convert change of conductivity to the corresponding output signal of gas concentration. The MQ135 gas sensor has high sensitivity to Ammonia, Sulphide and Benzene steam, also sensitive to smoke and other harmful gases. It is with low cost and suitable for different applications such as harmful gases/smoke detection.

C. Software Components

Think Speak Cloud/Ubi dots software can be used to display the data in cloud.

4.EXPERIMENTAL RESULTS

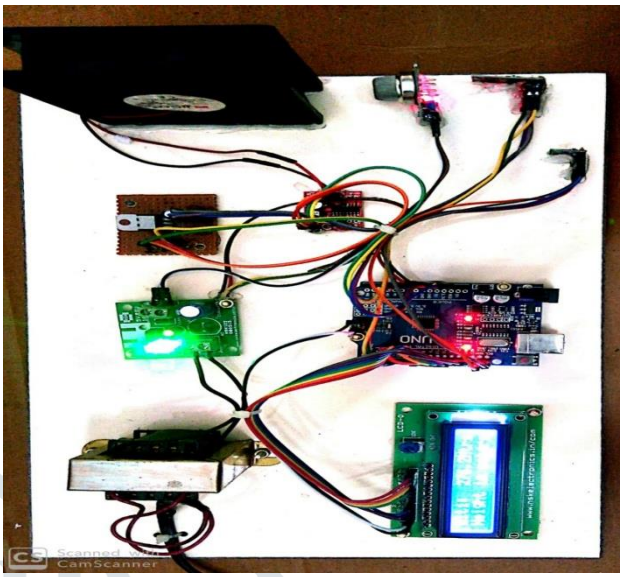

Fig 6: Experimental set up

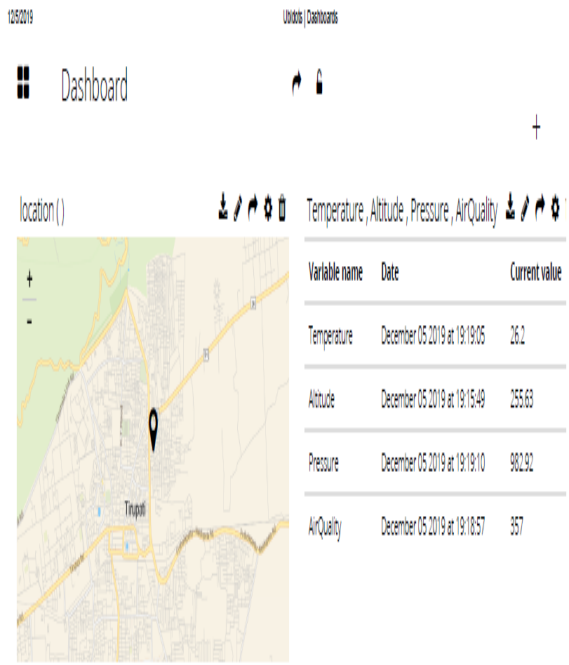

Fig 7: showing the values of Temperature, Altitude, Pressure, Air quality of the environment in cloud

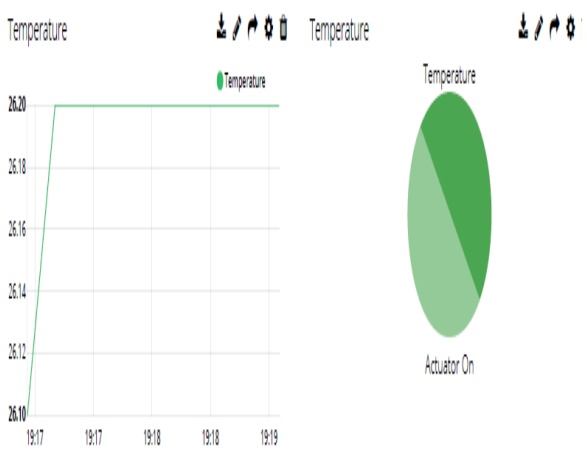

Fig 8: Temperature Graph

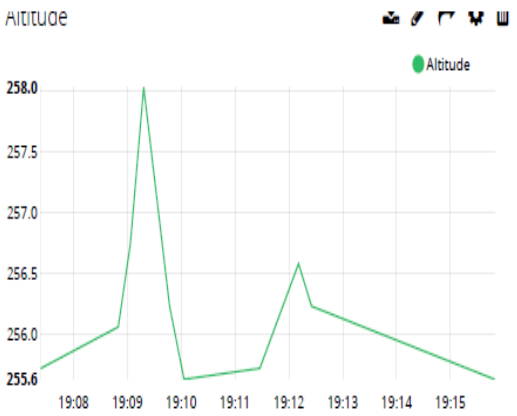

Fig 9: Altitude Graph

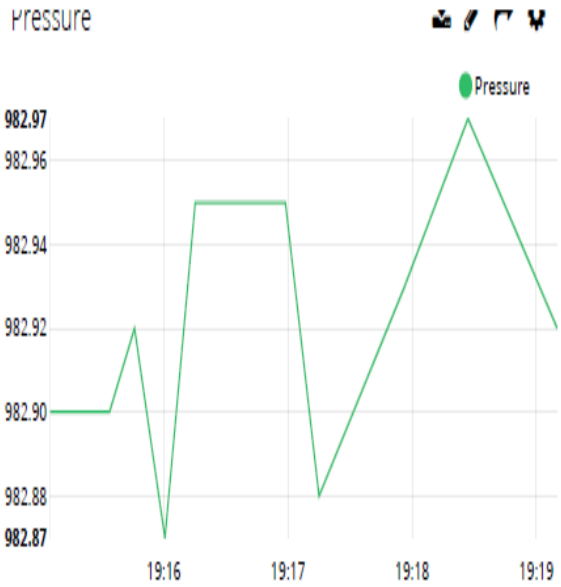

Fig10: Pressure Response

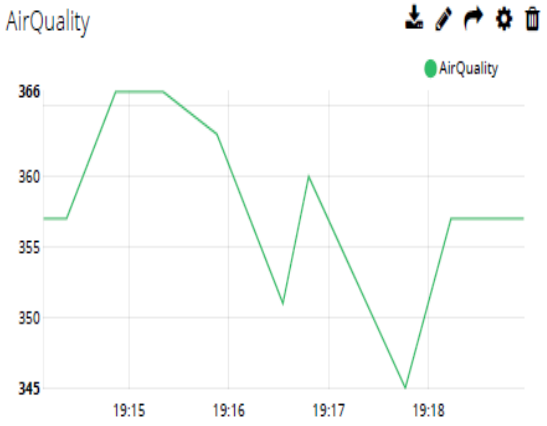

Fig 11: Air Quality Response

5. CONCLUSION

The proposed system is very much easy to implement. The concept is much new and we detect pressure ,air quality, temperature values at a time. The arduino and sensors are very less expensive so we can implement this system in high pollution areas. In future this type of systems have to be implemented because with help of this sytem we can actually detect and monitor the pollution of air and sound. In big cities this system is very much useful because implementation cost is very much less thes the big systems. So we have to think about future and make world pollution free

6.FUTURE SCOPE

This system is monitoring only three parameters and hence can be expanded by considering more parameters that cause the pollution especially by the vehicles. This system gives availability of viewing the sensor outputs through internet. It can be made to control the emissions by giving commands from distance. Many pollutants do not have sensors that sense them if available they are very expensive and hence building sensors for different parameters might be a future and very challenging task.

REFERENCESS

[1]D.Patrnabis.”Sensors and transducers”, Second edition.

[2]CunoPfister”Getting Started with the Internet of Things “ First edition -17 May 2011

[3] MQ-7 Data Sheet

[4] MQ-2 Data Sheet

[5] MQ- 135 Data Sheet

.[6] Olsthoorn X. “CO2 emissions from international aviation: 1950–2050”, Journal of Air Transportation Management , vol. 7, pp. 87–93, 2001.

[7] Michael McRoberts, Beginning Arduino,22 dec,2010.

[8]Simon Monk, Programming Arduino,8 nov,2011.

[8] Agarwal, Anil, and Sunita Narain. Global Warming in an UnequalWorld. New Delhi: Centre for Science and Environment, 1991.

[9] UNWTO and UNEP and WMO. Climate Change and Tourism:Responding to Global Challenges (prepared by Scott, D., Amelung, B.,Becken, S., Ceron, JP., Dubois, G., Gössling, S., Peeters, P. andSimpson, M.C.). Paris: UNWTO, Madrid, and UNEP, 2008.

[10] Camelia Monica Tepelus, Rolando Castro Cordoba. “Recognitionschemes in tourismfrom ‘eco’ to ‘sustainability’?”, Journal of CleanerProduction, vol. 13 , pp. 135–140, 2005.

[11] Jones, R.N. "Managing uncertainty in climate change projections issuesfor impact assessment". Climatic Change, Vol. 45, pp.403-419, 2000.

[12] Norgaard, K.M. "'We Don't Really Want to Know' - EnvironmentalJustice and Socially Organized Denial of Global Warming in Norway',Organization & Environment, Vol. 19, pp.347-370, 2006.

[13] Hall, C.M. & Williams, A.M. Tourism and Innovation. London:Routledge2008.

[14] Simpson, M.C. "Community Benefit Tourism Initiatives: A ConceptualOxymoron?", Tourism Management, Vol. 29, pp.1-18, 2008.

[15] Simpson, M.C., Gössling, S., Scott, D., Hall, C.M. and Gladin, E.Climate Change Adaptation and Mitigation in the Tourism Sector: Frameworks, Tools and Practices. UNEP, University of Oxford,UNWTO, WMO: Paris, France, 2008, pp.65-100.

[16] Gössling, S., Hall, C.M., Lane, B. Weaver, D. "The HelsingborgStatement on Sustainable Tourism", Journal of Sustainable Tourism,Vol.16, pp.122-124, 2008.

[17] UNEP. Switched on: Renewable Energy Opportunities for the TourismIndustry. Paris: UNEP, 2003.

[18] Cavallaro, F. & Ciraolo, L. "A multicriteria approach to evaluate windenergy plants on an Italian island". Energy Policy, Vol.33, pp.235-244