



IOT Based Smart Weather Monitoring System

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Abstract — In recent decades, the science and engineering professions have been heavily influenced by their responsibilities to the society. This responsibility has been directed towards the protection of public health and welfare. In devising controls for emission of pollutants, scientists and engineers have developed strategies for monitoring the environmental pollution problems. Environmental monitoring IT describes the processes and activities that need to take place to monitor the quality of the environment. All monitoring strategies and techniques have reasons and justifications which are often designed to establish the current status of an environment or to establish trends in environmental parameters. In this paper, we have proposed an idea to monitor pollution using IOT Techniques.

Keywords- IOT, Internet, Arduino, transducer, air, etc.

I. INTRODUCTION

Environment affects verity of industries including agriculture, airline, shipping, tourist and energy. Millions of dollars are lost due to environment through shipment delays or loses, business closing, flight cancellations, and power outages. Automating environment monitoring and storage of the climatic parameters helps directly or indirectly to the various fields. Automation is process control of industrial machinery and processes, thereby replacing human operators. People can take better decision by being aware of environment conditions by which precious lives & millions of dollars can be saved. In the long term, it could be about developing a research strategy on climate change. In the short term, it could be a decision of what to plant during the agricultural season. The IOT has a large role to play in future smart cities. The IOT can be used in practically all scenarios for public services by governments. Sensor-enabled devices can help monitor the environmental impact of cities, collect details about sewers, air quality, and garbage. Such devices can also help monitor woods, rivers, lakes, and oceans. Many environmental trends are so complex, that they are difficult to conceptualize. The Internet of Things (IOT) is a recent communication paradigm that envisions a near future, in which the objects of everyday life will be equipped with microcontrollers, transceivers for digital communication and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the Internet. An urban IOT can provide means to monitor the quality of the air in crowded areas, parks, or fitness trails. The realization of such a service requires that air quality and pollution sensors be deployed across the city and that the sensor data be made publicly available to citizens.

Air quality eggs can be found across Western Europe, America. It also plays a major role in developing countries. This is a community-led air quality sensing network that allows anyone to collect very high resolution readings of NO₂ and CO concentrations outside of their home. Sensor networks are also being deployed in tunnels to monitor air flow, visibility, and a range of gases (CO, CO₂, NO₂, O₂,...). Other sensor networks measure temperature, humidity and similar parameters on highways to qualify them as 'smart roads'. Due to the vast technological developments in the field of wireless communication technology it has led to the emergence of many Pollution monitoring sensors and wireless networks for monitoring and reporting pollution.

II. LITERATURE SURVEY

It is the future technology of connecting the entire world at one place. All the objects, things and sensors can be connected to share the data obtained in various locations and process/analyses that data for coordinating the applications like traffic signaling, mobile health monitoring in medical applications and industrial safety ensuring methods, etc. As per the estimation of technological experts, 50 billion objects will be connected in IOT by 2020. IOT offers a wide range of connectivity of devices with various protocols and various properties of applications for obtaining the complete machine to machine interaction.

The traditional technologies like home automation, wireless sensor networks and control systems will become more efficient and smarter due to involvement of IOT. IOT is having a wide range of application areas. Such as Medical applications for monitoring the health of a patient and sends the information wireless. The present developing Wearable instrumentation is also based on IOT. The example wearable instrumentation is Smart wrist bands, navigation pills, etc. All this methods require an internet interface to update the health info or to control the device with a smart phone. The

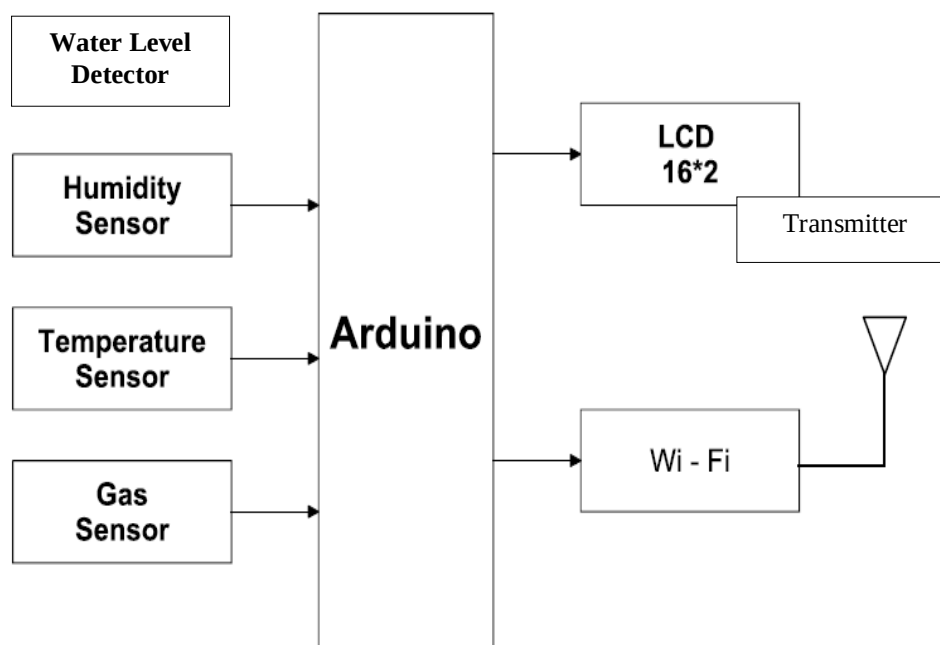
IOT also plays a vital role in media applications for advertising and exchanging the information worldwide. The manufacturing processes also requires IOT for supply chain management, digital control systems for monitoring the manufacturing processes. The space requirements of IOT technology, the geographical specifications are always important in case of tracking applications. The geographical dimensions of objects is also important while obtaining the data from the objects. IOT in automobile applications and traffic maintenance became a most using area of automation. The automated devices in a vehicle should be connected to a cloud to update the car health within a period of time. By connecting the vehicles and traffic signaling systems to the internet, people can easily find the shortest path for their destination from the traffic monitoring systems and can navigate automatically by checking all other directions.

III. PROPOSED SYSTEM AND METHODOLOGY

The proposed system is an embedded system which will closely monitor and stores the microclimatic parameters of environment on regular basis. People can make better decisions by being aware of environment conditions. Receiving relevant and real-time environment information allows organizations and individuals to effectively make their plans. As a solution to this, technology like “A SMART ENVIRONMENTAL MONITORING SYSTEM USING INTERNET OF THINGS” should be implemented. The system works with a series of sensors, connected to a Arduino, Wi-fi, Analog to Digital Converter.

The proposed system senses the room temperature and humidity after some intervals and communicates it to the IOT analytics platform service. This information can be accessed via android app. As a further part, one can control to switch the A.C. on/off. It takes information about the surrounding environment through sensors and uploads it directly to the internet, where it can be accessed anytime and anywhere through internet. People who suffer from asthma need temperature and humidity on certain range. The new born or old age people also preferred to have temperature and humidity in particular range for those can always monitor whether their place is in the specific range of temperature and humidity or not.

3.1.1 Block Diagram of the Proposed System



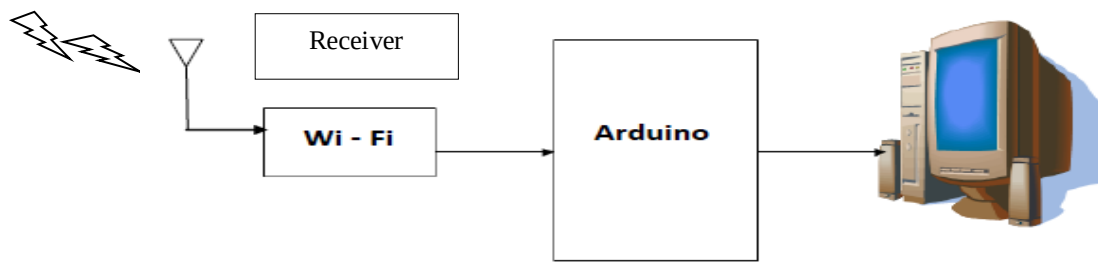


Fig: 3.1.1 - Block diagram of the Proposed System

Fig 3.1 shows the block diagram of sensor station of the system which will be placed at remote location. Parameters like temperature, humidity and gas are measured and sent through the SMS to from sensor station to a central station which is shown in fig 3.1. All sensors to measure parameters are connected to the

Arduino and intern the output is interfaced to the Arduino which will perform the whole operation of measuring. There are 3 sensors blocks along with amplifier i.e. the temperature sensor, gas sensor. The function of this block is to sense the changes in the temperature, humidity and rainfall respectively and give the output, which is then amplified by the amplifier. The amplified output is then given to the Arduino for analog to digital conversion.

IV. WORKING PRINCIPLE

The objective of “ SMART ENVIRONMENTAL MONITORING SYSTEM USING IOT “ is to monitor the various environmental conditions such as the different hazardous gases, The level of water, the level of temperature, The level of humidity. In this project we monitor environmental conditions using “Internet Of Things” (IOT). our project is based on IOT so that in this we are using Wi-Fi module ESP8266.

The proposed system is based on IOT and it is used to control the different environmental conditions. In this we are using the Arduino UNO kit ,the four different sensors as gas sensor , humidity sensor, temperature sensor and ultrasaonic sensors .In this we are using ARDUINO (ATMEGA 328/P microcontroller) The Atmel® picoPower® ATmega328/P is a low-power CMOS 8-bit microcontroller based on the AVR® enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega328/P achieves throughputs close to 1MIPS per MHz. This empowers system designed to optimize the device for power consumption versus processing speed.

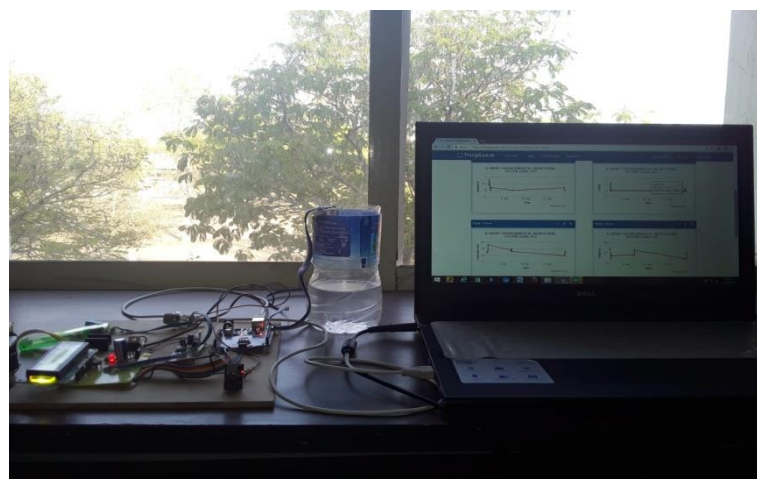


Fig: 3.2 Proposed System Module

As to our project, we are providing 230V AC power supply given to step down transformer convert to 15V which is connected to main kit which converts AC to DC by using full wave rectifier. In our project main kit two IC'S 7805 and 7812. IC 7812 converts 15V to 12V which is given for the operation of arduino kit and IC 7805 converts 15V to 5V which is given to 16*2 LCD display and all 4 sensors. The 15V power supply given to the preset kit in which 7805

& LM 317 which converts 5V to 3.3V given to ESP8266 Wi-Fi module. The different sensors sense levels of gases (LPG), temperature, humidity & water level which shows the values on LCD display and of course we can monitor all these things on PC and can measure the different values on the graph having four fields using Thingspeak.

3.1 Features of the system

- Provide environment condition from a remote place
- System is much more user friendly
- Works anywhere in the world (with web services)
- Humidity sensor with high & low memory
- Temperature range from -55 to 150 Degree Celsius
- Data stored on PC can further be used for analysis.

V. CONCLUSAION

A step-by-step designing Development of an automated environment monitoring system which is more reliable and accurate way of monitoring the Environment parameters such as Temperature, Humidity, Gases of any remote area compared to existing manual systems is described in this paper. The system is particularly useful in remote areas where the manual supervision of environment parameters is not convenient. This presents an alternative system of monitoring environment conditions of different locations with the use of real time system. So this project will be the best alternative to collect whether report from distant locations and then link to the central logging device center to display on mass communication media for benefit of farmers in particular and society at large with cost efficiency and high accuracy.

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