

INTERNET OF THINGS BASED REMOTE SERVER AIR QUALITY INFORMATION SYSTEM

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Abstract: This paper describes the proposed system, which is capable to monitor and gives warning about the Air Quality information particularly, the carbon monoxide (CO) and LPG levels in the environment. Here, temperature and humidity are added as additional functions to monitor in the environment. The Wi-Fi module is connected with the microcontroller, to transmit the data and communicates with the web based server in real time. The Bluetooth module is attached to microcontroller, to sends data to Android application. User can get a notification in Android application. The user can sets the threshold level to CO and LPG. When these parameters are crossed the threshold level, then the user can get the indication. This proposed system has advantages, which can monitor the sensors value in both hardware and software system. The results showed that the system works properly and can show the CO, LPG, temperature and humidity values in real time.

IndexTerms - Internet of Things (IOT), Carbon Monoxide (CO), Liquid Petroleum Gas (LPG), Android Application.

I. INTRODUCTION

The every nation is facing the problem on air pollution. It creates the unnecessary, situation in the world. Because of the air pollution, people facing the many problems in their daily lives. Rate of the health issues are increased, especially in main cities of developed and developing countries due to population, industrialization and also number of vehicles are increased. These are release, large amount of unwanted gaseous and chemical pollutant products. Nowadays, the pollution is considered as, it can create the quality of the air in surroundings is reduced, it is not possible to control by a human.

The air pollution is also created by, inadequate burning process. These can produce the unwanted smoke and also it occurs in vehicles engines and it produces the carbon monoxide (CO). When the carbon monoxide gas is mix with the blood then it can be a cause for the death of a person. The smoking is very harmful to human, the large amount of smoke is mixed with the air, and then it can also cause for the pollution is increased in the environment. The huge amount of carbon monoxide in human blood it will be a very dangerous to the body. So considering all these kinds of problems, an indication or warning process is required in different places. Where the CO (carbon monoxide) gas is occurs more. To monitor and detect the CO, the carbon monoxide sensor is used in the system.

The LPG gas is a highly combustibile and it can cause damage to life and property. To avoid such circumstances, a considerable amount of effort has been dedicated to the development of reliable techniques for detecting gas leakage in air, through setup the threshold value for LPG. The leakages of any gases in the environment can also mix with the air, it is also a reason for increased the pollution in air. The Liquid petroleum gas (LPG) is monitoring and detected by using a gas sensor. The level of temperature and humidity is monitored in real time. An Android application is developed in this system. Through this application the user can get the notification when the CO and LPG level crossed the limit in the environment. Then the people can understand the conditions of the atmosphere.

By using a web-based service in the world, the air quality information is developed. To protect atmosphere and everyone health in the society in various conditions, the air quality monitoring system is provided. According to this facility, the information is delivered through email notification and phones, to alert the user. This method is used by EPA (U.S. environmental protection agency). By using wireless sensor networks, to increase the healthy conditions, the enhanced air quality monitoring system is needed in the existing system. The communication broadcasting or any Medias are used to send information about the air quality via wireless transmitter and receiver application from the space.

The motivation of this paper is to provide a platform that monitors the CO, LPG, Temperature and Humidity level in the environment in real time, both in the hardware and software systems to create a better and pollution free future life with low cost. The objective is to design an IOT based systems that makes easy avoidance of Air pollution in environment and also easily monitor the air quality to get information in real time about CO, LPG, Temperature and Humidity in the environment. The level of CO and LPG are shown by a graph in the web server, with the time, date and location.

The rest of this paper is described as follows. The section II describes about the Literature survey. The section III describes about the Design methodology of the system. The section IV describes the result of the proposed method. The last section V describes the conclusions.

II. LITERATURE SURVEY

In the developing portable instrument based on internet of things for air quality information system [1] explains about Air Quality information, which has capability to monitor record and provide indication related to air quality information particularly about carbon monoxide level in atmosphere. By using web-based android applications, the system can works in real time. Here, moveable gas finder is introduced by using microcontroller for monitor. To identify CO and temperature values in air is used TGS2600 and thermal sensor respectively. Moreover, Wi-Fi module fixed with microcontroller. It sends records and communicates to webserver. Then, threshold value is set by the user for parameters used. This process is tested by using black box method to check its functions and result is shown in TFT. Because of using TFT, it can cost for the system design.

In the IOT based air pollution monitoring system using arduino [2] describes about the air pollution using Internet of things. In order to monitor, the IOT based framework is used. It is designed by the internet of things and using arduino platform. In which, it can

monitor the air quality through the webserver by using an internet. Then the alarm makes sound, when air quality reaches below out there an assured level. That consider enough volume of risky gases remain in surroundings, are carbon dioxide, NH_3 , alcohol, smoke, and benzene. So it shows air quality in parts per millions (ppm) on LCD, also in webpage. This can certainly monitor. In this system, by using mobile or computer anybody can detect the Pollution level by anyplace.

In this research the air quality monitoring system based on arduino microcontroller [3] explains about the level of pollution has increased in the air. In order to monitor, the WSN founded new structure is applied. This is created on the records attainment and broadcast. Parameters are chosen for monitor as, temperature, amount of carbon monoxide and dioxide, humidity, finding of leak of gases - alcohol, LPG and smoke. These parameter's details are transferred through zigbee to web station. The values of high temperature and moisture are transfer via Bluetooth. Then nearby people can used to check it in their phones and laptops or a system. The CO an unsafe factor is observed by additional protection by using GSM. The SMS is referred to a mobile network via GSM module. It crossed a limit when the level for specific safety planned for a certain use.

From the above survey papers, the main disadvantage is that they monitoring the air condition by using in hardware, and in some papers they showed by software only. In this proposed system, this is able to monitor the air condition by using both hardware and software in real time.

III. DESIGN METHODOLOGY

The proposed method is planned with the process of design and develops the work. It have a capacity to Monitor and provide warning to user about Carbon monoxide and Liquid petroleum gas (LPG) values, and also monitor the temperature and humidity in the environment. In this proposed system the microcontroller and web based android applications are used. Here, all the sensors are categorized as input devices, which are connected to microcontroller and these, are monitor the value of parameters which are used in the system. The monitor values are shown in LCD display in the hardware part. The Web based server and Android applications are considered as software's output, these are used for show the sensors level in environment. The Wi-Fi module is connected with microcontroller for transmit data and communicate with the webserver. In web server monitored results of CO and LPG are shows by as a graph in real time. The Bluetooth module is fixed with microcontroller to send the data to Android application.

3.1 System Architecture

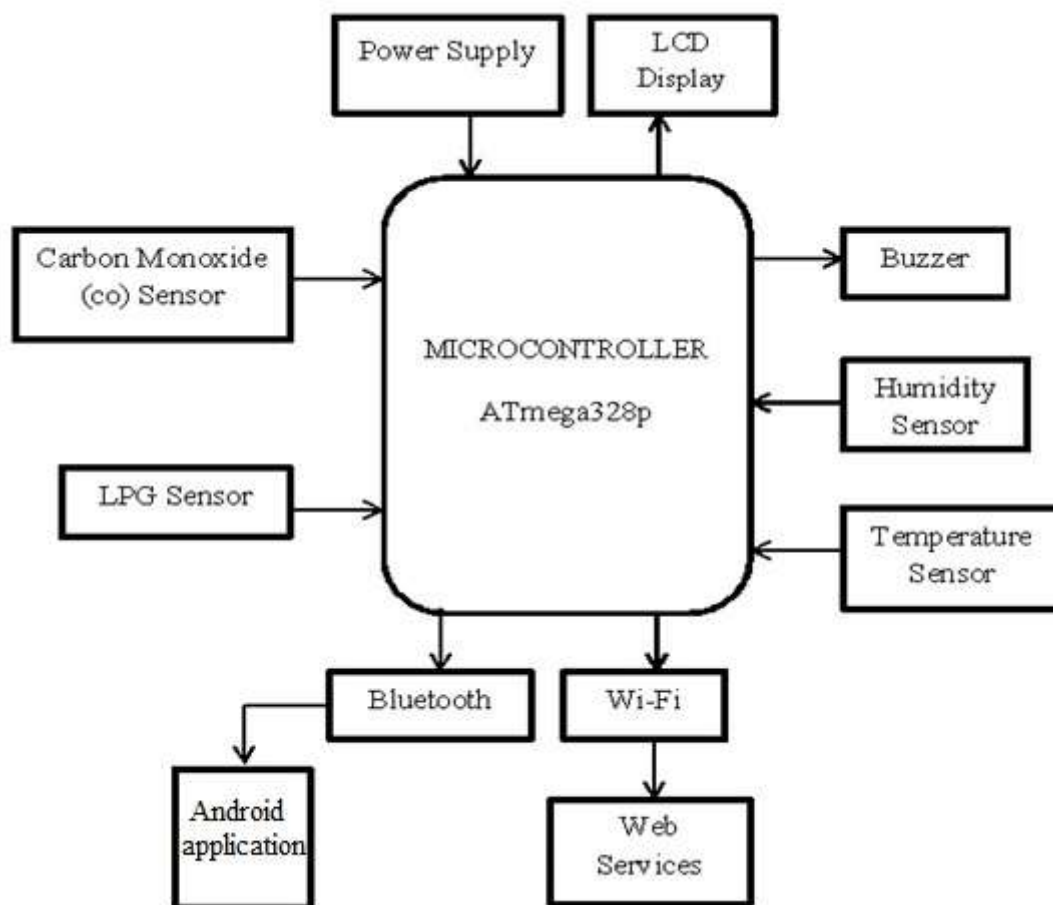


Figure 1: Proposed system

Firstly user has to setup the threshold value for CO and LPG. Here the MQ-2 gas sensor and Grove-gas MQ-3 sensors are used to monitor the CO and LPG in the system respectively. When the Carbon monoxide (CO) and LPG level crossed the threshold value in the environment then the Buzzer gives the warning to user by a sound in the hardware system. The temperature and humidity values are monitored by using a LM35 and HR202 sensors respectively, will also displayed on 16x2 LCD display.

In order to provide the real time information to the user, web services are developed. Here, the Wi-Fi module, here ESP8266 is used; is attached to microcontroller, and it sends the data to web server. Especially, about Carbon monoxide and LPG. Hence, the Web based System can display received information with specific date, location and time in the form of graph of LPG and carbon monoxide. By using a

web server user can get the information about atmosphere. Likewise, the advantage of the system is that can monitor and give information about the value of sensors in both Hardware and Software System.

The Android application is developed in the system. The Bluetooth device, here HC-05 is used; is connected with the microcontroller and sends the data to Android application, then all the values of parameters, which are used in the system will be shows in the android application. Then the every person present in the range can get the air quality information in the surrounding area. The user can also get the notification about CO and LPG, when they crossed the threshold level in the environment, that information will displays continuously in the Android Application.

IV. RESULT AND DISCUSSION

The microcontroller is interfaced with Arduino and the system is implemented by using Arduino IDE software. The values of parameters, which are used to monitor in the system is shown in LCD display. It is also shows that, when the CO and LPG values are crossed the threshold level in the air, as shown in Figure 2.



Figure 2: Results on LCD display

The Figure 3 shows that the Results outcome of the parameters, which are used in the system. This results are displayed in Android application. It is also shows that the notification about CO and LPG value, when it's crossed the threshold value in the environment.

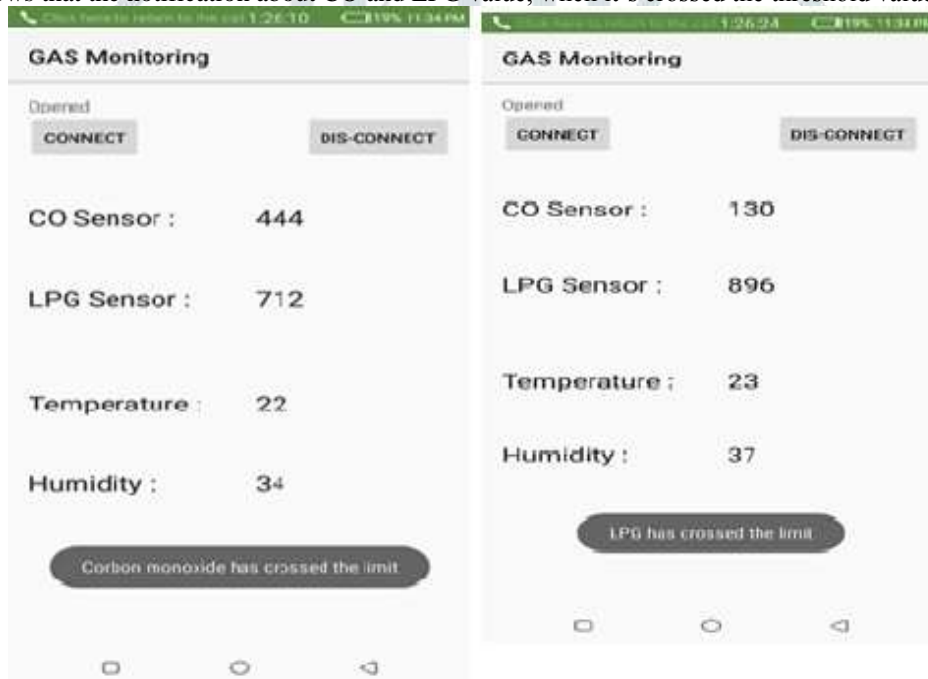


Figure 3: Results outcome of Android application

The Figure 4 shows that the result outcome of CO monitoring, LPG monitoring, data logging function and location function in the web server.

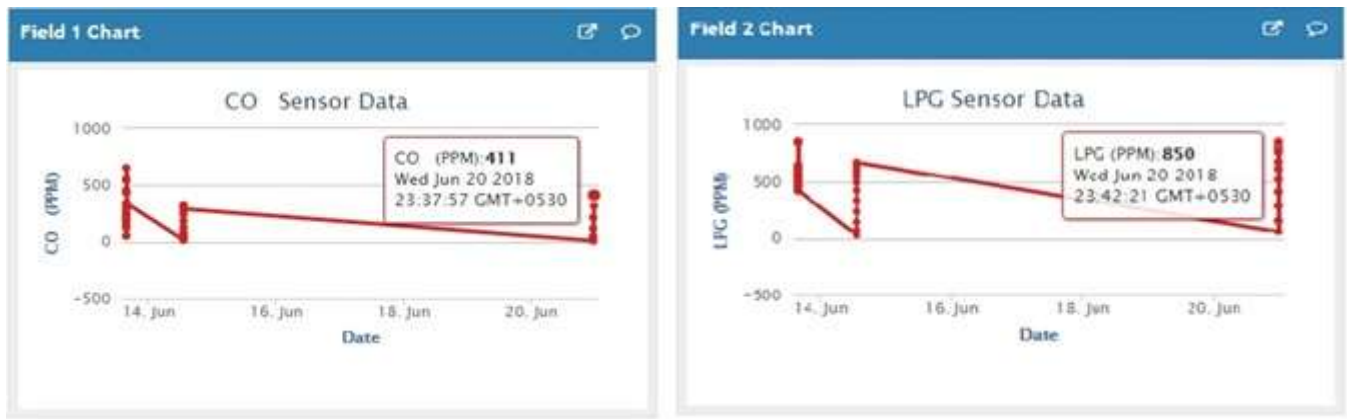


Figure 4: The result outcome of CO and LPG monitoring in web server

V. CONCLUSION

In this paper, the system is proposed about the Air quality Information system in real time. Its purposes are to monitor and provide an indication to a user, about carbon monoxide and LPG values. This can be concluded, that the system works properly. The process is done, with using by both hardware and software. The obtained results show that working of a system is reliable and proved.

In the future enhancement, to store the values from sensor, it is connected with microcontroller by the addition of wireless network card to detect more gas sensors. We can also improve the system in traffic lights crossing places.

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