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A Health Monitoring System Based on IOT for Persons in Quarantine

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ABSTRACT

Since the pandemic of the novel coronavirus (COVID-19) disease began in 2019, social isolation and quarantining have become universally accepted procedures. Frequent hospital contact visits are avoided as a result of the full acceptance of the aforementioned control methods. However, some patients still need routine monitoring for their physiological needs in order to live healthier lives. However, due to the risk of contracting the illness, doctors and nurses are unable to physically monitor the patients. Many people who are arriving in their respective hometowns from various locations are being confined at home due to the ongoing COVID-19 problem in order to protect other people. Interestingly, contact-based monitoring is now viewed as optional due to recent technological advancements in the fields of Internet of Things (IOT) technology and healthcare systems. In order to accomplish this, a home-based IOT-based health monitoring system for quarantined individuals is suggested. Being an infectious and contagious disease, coronavirus disease (COVID-19) is. As a result, we should regularly assess their state of health. The major purpose of this system is to monitor the health metrics like heartbeat, temperature, and presence of harmful gas in the environment by using Internet of Things (IOT) (IOT). On Embedded C, we create a piece of code that defines the threshold value. By gathering the raw values from the sensors, Arduino UNO processes these characteristics. The sensors that we suggested are the blood pressure, body temperature, and respiration sensors. The patient's current health condition will be continuously tracked and updated on the web server. A buzzer alert will be generated if any of the parameters exceeds the defined threshold levels, and it will use GSM technology to send an SMS to the recommended doctor and emergency contacts.

Keywords- Internet of Things (IOT), Coronavirus (COVID-19), Global system for mobile communication (GSM)

I. INTRODUCTION

Many newcomers to Goa are sequestered at home because of the ongoing COVID-19 situation. Therefore, to continuously check on their health, we authors have proposed an Internet of Things-based electronic wireless communication system that uses biosensors like a respiration sensor, body temperature sensor, heart rate sensor, and oxygen sensor to continuously monitor health parameters[1]. The received values will be wirelessly transmitted to the COVID Hospital or the nearby medical facility. On the Adafruit server, the same will be seen. Additionally, messages pertaining to people under quarantine and government authorities are sent through server or GSM modem to doctors' mobile devices. When a health parameter, such as the body's temperature, heart rate, or respiration rate deviates from its usual range or when a health parameter, such as oxygen level or respiration rate, does so, an alarm buzzer sounds, signalling the need for immediate action by receiving authorities. Fuzzy logic, a soft computing method, has been used to analyse the aforementioned health monitoring system proposal. The description of a transportable medical monitoring system for hospitals. To collect, store, and process continuous data regarding a patient's health, telemetry devices are attached to them. Medical personnel can look at current graphical data and compare it to earlier records. If a patient needs immediate

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observation, parameters could be programmed to automatically inform staff members' portable devices. The system makes use of intranet and Internet technologies to provide remote monitoring and consulting. To show real-time data gathering, wireless transmission/reception, and connectivity to the World Wide Web, a hardware/software prototype has been built. The software system's real-time, supervisory, and remote-teaching components are now being built and put into use. The RHM system is based on an Arduino UNO board, which also has additional microcontrollers and sensors, along with IOT Gecko. It is further constructed so that doctors may check their patients' vital sign readings in real-time, regardless of where they are located in the world. The device sounds an alarm when these bodily vital indicators deviate from or exceed normal ranges, providing doctors with the chance to quickly and individually intervene on patients who are in need. The results of the study were compared with those of the RHM system using two distinct devices (the Omron digital Temperature monitor and the ChoiceMMed heart rate monitor). The system's accuracy was assessed, and it was discovered to be +/-0.5 degrees. Therefore, it is clear that RHM offers precise reading together with superior functionality. The data that was previously saved in the systems is uploaded to the cloud in Web-based mobile monitoring systems[2][9], so that patient progress may be compared. It is employed to save the data for later usage. The parameters of health, however, are not monitored by such a device. Focused attention on patients' requirements is made possible by decentralised supervisory control and centralised data storage. Patients can walk around freely with a data gathering system using mobile transducers and transceiver connection, so there is minimal intrusion. Where necessary, this technology will add constant monitoring to the care of patients. Setting alerting criteria can help medical professionals provide care more efficiently if a patient's condition changes. Unexpected deterioration of previously recorded media. Several transducers on a single patient track a variety of medical parameters, including respiration, temperature, blood pressure, and heart rate. A microcontroller with a memory buffer processes the data. Using a transceiver that the patient carries, the data are sent out in bursts. Microcontrollers that are attached to personal computers' parallel ports receive and process data from numerous patients (PCs). In order to accommodate the system's various connection rates, data buffering in local memory at the receiver is necessary. In order to connect to the World Wide Web, all computers are connected by a Local Area Network and communicate with one another and a central database server utilising both Intranet and Internet protocols. The PCs serve as decentralised supervisory controllers and have local storage for the collected data as well as applications. Doctors and nurses can enter data regarding patient monitoring parameters in addition to the automatic monitoring features. Additionally, they can confer with one another regarding medications, diets, and other instructions that might be saved on the nearby computers. These computers are linked to transceivers that provide information to mobile phones, pagers, and Personal Digital Assistants (PDAs). The condition of patients can be remotely monitored using these portable wireless gadgets. Automatic alerting of odd changes in the monitored data is another option. Alert messages might be sent from the PCs to the appropriate medical staff if specific parameter trigger levels are exceeded.

The cloud is being used in IOT-based monitoring systems to track patient vitals. However, it does not inform the worried members via alert messages. The suggested system is made to connect users, healthcare providers/hospitals, ambulatory care, and GPS technology into a whole. The physical components of the system include an Arduino board with the relevant hardware nodes, components, and sensors. It aims to combine many vital sign monitoring sensors into a single unit and connect the system to the internet so the doctor may access it in real time. The section below provides an explanation of system development. The system design categorization focuses on the structures, behaviours, and viewpoints of the system as well as the relationships and interactions between its various components. It also shows the system's input, data flow, and output flow. It displays how people communicate with the system and how it reacts to both regular and abnormal vital signs. shows the proposed architecture, actors and their connections, the tasks that users must complete, how a user's node interacts with other corresponding nodes after authentication, and how these node networks are linked to the hospital in real time. Each vital sign is displayed locally on the LCD panel after the user's node has been registered on the network and given a unique ID. The reading is then forwarded to the hospital's database so that healthcare professionals can view it in real time. The system is built so that if an abnormal reading is reached, an alarm is set off to notify the user (locally) and healthcare providers remotely for immediate action, such as dispatching an emergency team or ambulance to save the patient, admitting the patient to the hospital on an emergency basis, placing the patient in bed rest at home, etc. The technology has an online GPS tracker that the emergency team might use to find and save patients who are in trouble.

The current system has some flaws that have been generally noted. However, the current methodology is not an accurate method.Data uploading to the server is not used.Less effective The following section will discuss some of the current approaches, including the Health Care System for Home Quarantine People, the Web-Based Mobile Monitoring System, and the IOT-based Remote Health Monitoring Systems[3] Using Arduino, from which the shortcomings of the aforementioned approaches were analysed.

II. PROPOSED METHOD:

Multiple sensors that are attached to a patient make up a health monitoring system, and they exchange data through a processing unit. The Arduino Uno is employed in the project as both a CPU and a data aggregator. As a monitoring system, the doctor's computer or smartphone is used with the patient. The project's Remote Health Monitoring (RHM)

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technology is able to detect specific bodily functions like body temperature, heartbeat, and the presence of harmful gases[6]. The RHM system is based on an Arduino Uno board, which also houses other micro controllers and sensors. It is further constructed so that the designated emergency contacts can view the patient's vital sign reading in real-time, regardless of where they are located in the world. As a monitoring system, the doctor's computer or smartphone is used with the patient[5]. This work uses a gas sensor, heartbeat sensor, and temperature sensor to integrate several sensors into a single unit[10].

As shown in the image, the sensors system is utilised to collect data from the patient and transform the read readings into signals. These signals are provided for processing to Arduino, GPRS is utilised to deliver the data to server. Following that, the fig shows the data on a monitor and an LCD while simultaneously storing it in the cloud. The doctor can access this information on his phone or PC and obtain it through GSM. The flow chart involves reading sensor values, displaying them on a monitor and an LCD, and storing them in the cloud for later use. If any sensor output is beyond there threshold an alert message is sent to the consult doctor and buzzer will ring.

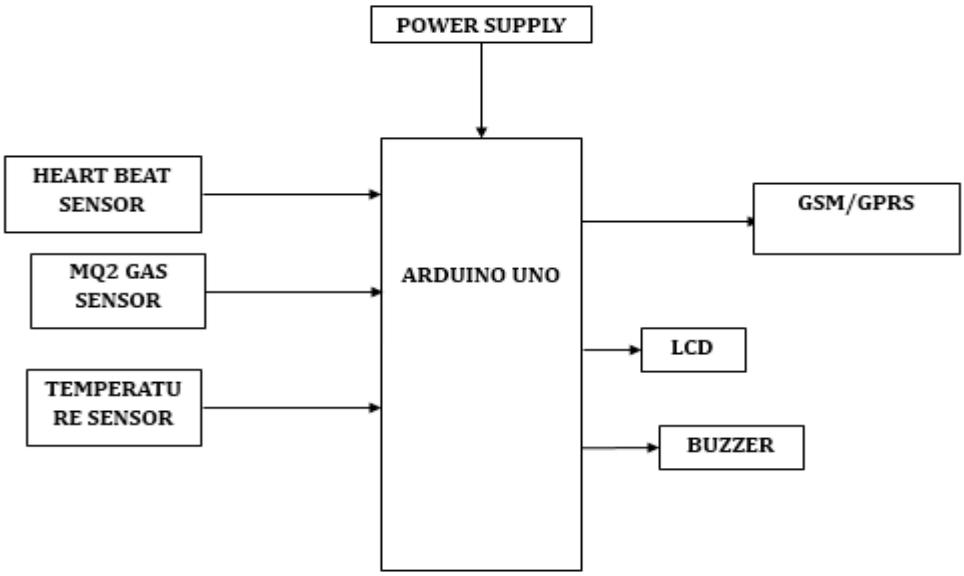

Figure1 Block diagram of the prototype

Installing LCD and temperature sensor libraries, a serial library to interface with a heartbeat sensor, and the Arduino IDE are all necessary software requirements. GPRS is also utilised to upload data to a server.

The system uses DHT11 hardware modules to measure the temperature and humidity. Gas sensor to find gas leaks, a pulse sensor to measure heart rate, and an LCD module to monitor.

When the power is turned on, the LCD displays the project's work. When the temperature rises above 34 degrees Celsius, a buzzer will sound, sending data to the server and an alarm message to a smartphone. imilar to this, other sensors' data crossed their respective thresholds and underwent the same action. The schematic for the system is shown in the following figures.

The hardware used for the real-time health monitoring system is covered in this section. According to its functions and specifications, a brief description of each component's specifics was given. The system's structure and operation are shown in the flow chart and block diagram, which covers the implementation aspect, gives a description of the aforementioned hardware and design strategy.

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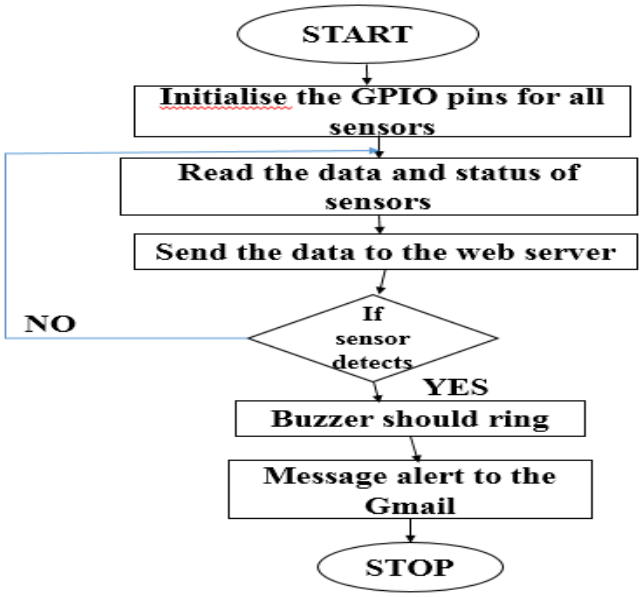

Figure 2 Flow Chart

We developed a solution in response to the issues and limitations with the current approaches. In this section, we presented an IOT-based system for quarantined individuals' health monitoring. We also analysed the methodology, block diagram, and operation of the system.

III.RESULTS & IMPLEMENTATION

The parameters are shown via this system on the LCD. The technology will be useful for hospital patients who are unconscious. When sensor values exceed the threshold level, an alarm is set off. Uploaded data is stored on the server.

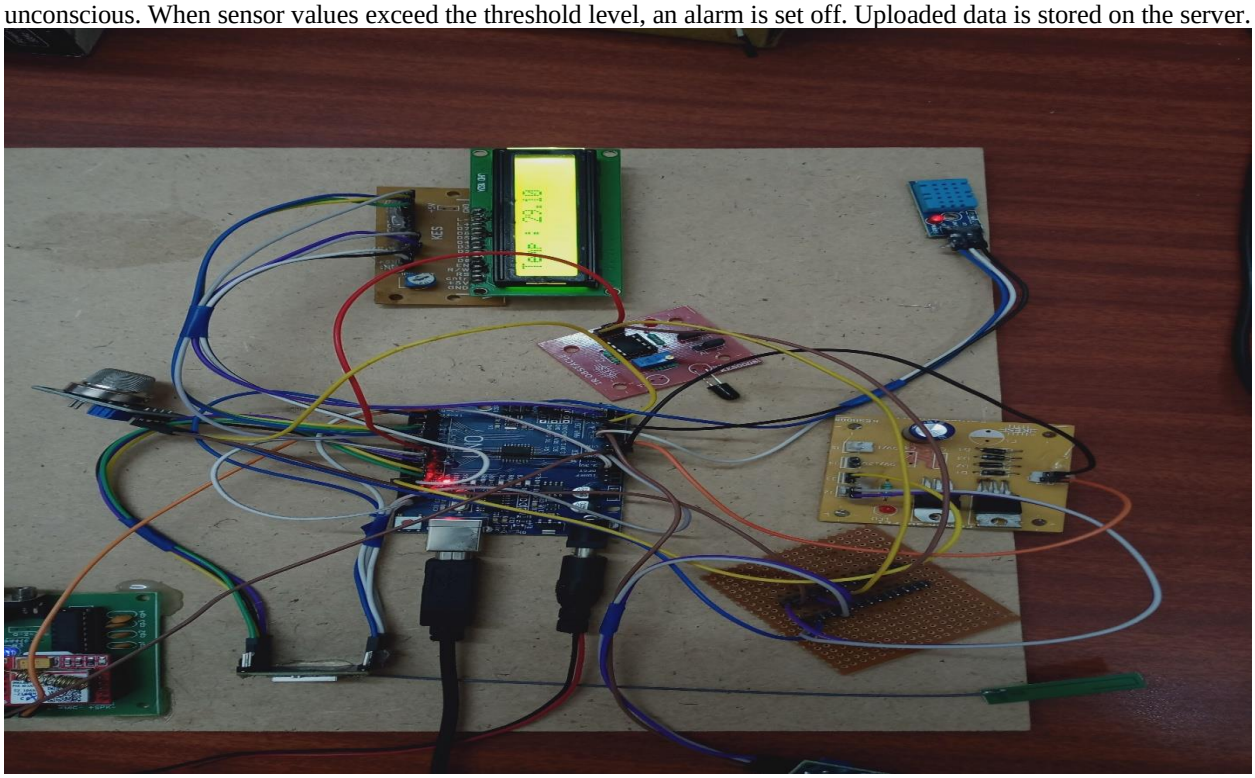

Figure 3 implementation set up

Arduino measures factors including body temperature, heart rate, and the presence of gases in the immediate vicinity of the person[8]. The findings are displayed on the LCD once the data has been read and each time the Arduino is reset using the

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kit's red button. Using the specific API key that is generated for the channel that we have set up in ThingSpeak, it not only displays the data but also transfers it to the server. It is created so that it must send the SMS to the pre-registered cellphone number when these parameters exceed the pre-defined threshold levels. While programming is being shown on the LCD, we are displaying the message that is pushed into the Arduino here.

Figure 4 Displaying the result on LCD.

Let's look at the results for the identifications of the presence of the gas present around the person in the enclosed space before we get to the gas levels. Therefore, based on actual events, we determined and specified the level of gas that the MQ2 sensor is allowed to detect.
Next, for the pulse measurements, we will count them constantly and average them into a minute, which is BPM. As a result, we will establish the threshold as the standard for a healthy heart, which is 120/80 BPM for an adult. We programmed this and uploaded it to the Arduino after taking this into account. When the health metrics exceed the pre-defined levels, GPRS uses a SIM that has been correctly installed in the device to send an SMS to the pre-registered mobile number. Below is a screen image of the message.

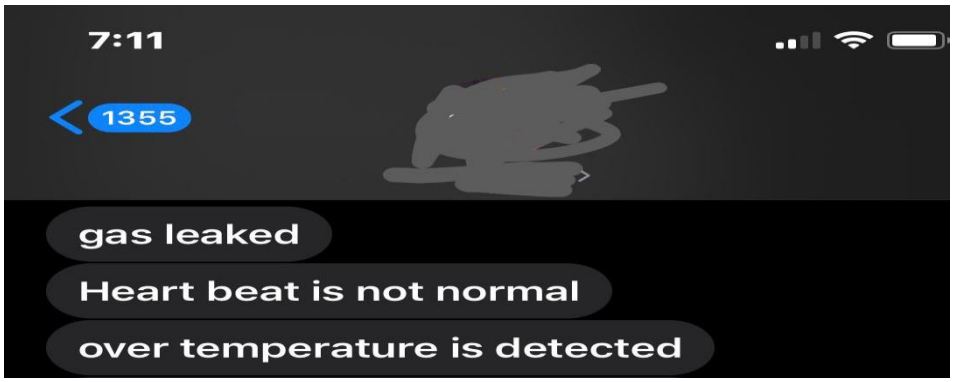

Figure 4 Screen shot of received SMS to the Pre – Registered Mobile Number.

Thing Speak does not upload data that Arduino has read. When an Arduino is reset, data is uploaded into Thing Speak using the channel's API key. For the Thing Speak display of the findings, we used three fields. Each field measures BPM, temperature, and the presence of gas. The number of entries in the channel is counted and shown. This screenshot of the channel is displayed.

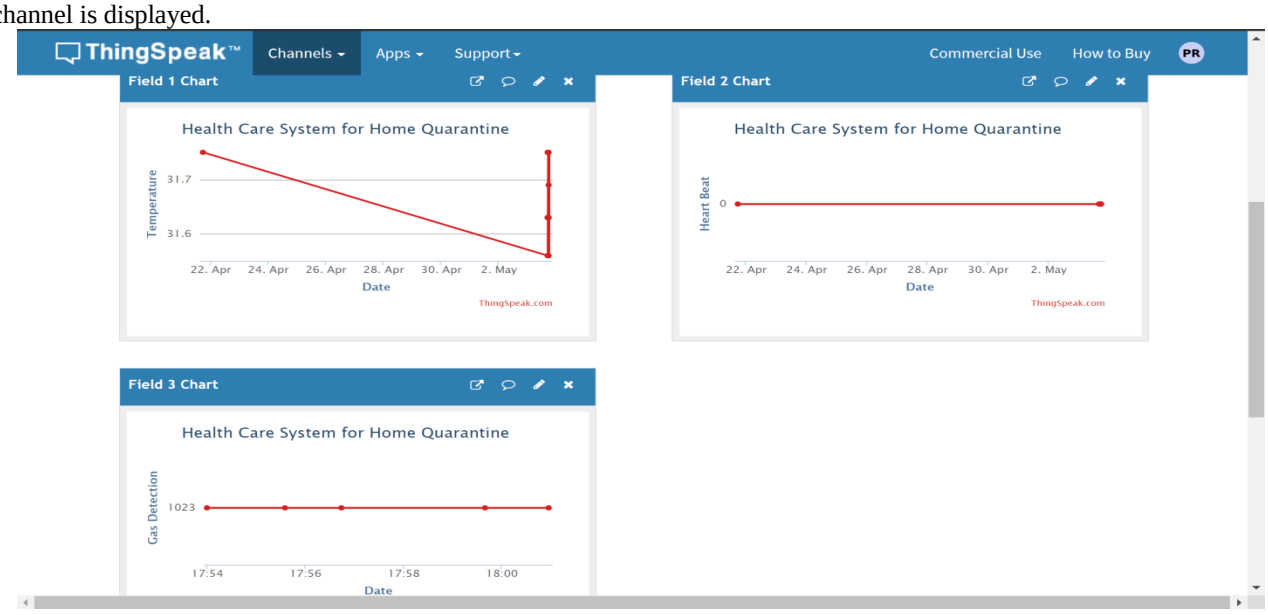

Figure 5 Screen shot of the data updated into the Thing Speak server.

IV. CONCLUSION

Long lines of people standing in an uninteresting waiting area, eager to see the doctor as quickly as possible. And on the other hand, sad faces of the patients there with their anguished cries.
Well, a few years ago, hospitals were in this circumstance. Things are now changing quickly thanks to technology. Modern healthcare facilities, healthcare mobile applications, and a brand-new idea called IOT are changing the healthcare industry as a whole.
After taking hold in a number of industries, including business, retail, government, and industry, IOT is now now thriving in the healthcare sector. Perhaps no industry has benefited from the Internet of Things [4] more than healthcare.
IOT is a powerful force in the healthcare industry, benefiting everyone from doctors to researchers to patients to insurance. Patients can now easily communicate with their doctors and be continuously monitored using IOT, while doctors can now continuously track patients' health and improvement. Specialists and researchers have the chance to consult with one another regarding complex medical issues from all around the world. Even though technology cannot reverse population ageing or end chronic diseases[7], it can at least make access to healthcare more convenient. Due to this A real time monitoring system is designed to provide crisper and more point to point perspective of the underground mine. The parameters are shown by this system on the monitoring device. To save their lives before there are any casualties will be beneficial to all miners present inside the mine. When sensor values exceed the threshold level, an alarm is set off. Additionally, this method saves all the data to the computer for later review.

REFERENCES

[1] J. Colaco and R. B. Lohani, "Health Care System for Home Quarantine People," 2020 IEEE 1st International Conference for Convergence in Engineering (ICCE), Kolkata, India, 2020, pp. 147-151, doi: 10.1109/ICCE50343.2020.9290557 pp.. 5-6 Sept. 2020.

[2] J. K. Pollard, S. Rohman and M. E. Fry, "A Web-based mobile medical monitoring system," Proceedings of the International Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications. IDAACS'2001 (Cat. No.01EX510), Crimea, Ukraine, 2001, pp. 32-35, doi: 10.1109/IDAACS.2001.941973 pp. 4-4 July 2001

[3] A. Nduka, J. Samual, S. Elango, S. Divakaran, U. Umar and R. SenthilPrabha, "Internet of Things Based Remote Health Monitoring System Using Arduino," 2019 Third International conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC), Palladam, India,

[4] Y.I.N. Yuehong, Y. Zeng, X. Chen and Y. Fan, The internet of things in healthcare: An overview. Journal of Industrial Information Integration, 1, 2016, pp.3-13.

[5] R. Jayswal, R. Gupta and K.K. Gupta, Patient health monitoring system based on Internet of Things. In 2017 Fourth International Conference on Image Information Processing (ICIIP), IEEE, December 2017, pp. 1-4.

[6] P. Gupta, D. Agrawal, J. Chhabra and P.K. Dhir, IoT based smart healthcare kit. In Computational Techniques in Information and Communication Technologies (ICCTICT), 2016 International Conference, IEEE, March 2016, pp. 237-242.

[7] A. Raji, P.G. Jeyasheeli, and T. Jenitha, IoT based classification of vital signs data for chronic disease monitoring. In 2016 10th International Conference on Intelligent Systems and Control (ISCO), 2016, pp. 1-5

[8] N.AshokKumar, Krishnagandhi P, B Kannan, Y David Solomon Raju," Smart Farming FieldObservation Using Embedded Systems" International Journal of Electrical Engineering andTechnology (IJEET), Volume 11, Issue 4, June 2020, pp. 241-245.

[9] P. Vijayakumar, P. D. Selvam, N. Ashokkumar, Sharmila , R. Raj Priyadarshini , M. Tamilselvi,Rajashree. R, Xiao-Zhi Gao , "IOT Based Wireless Smart Shoe and Energy Harvesting System"International Journal of Innovative Technology and Exploring Engineering (IJITEE) ,Volume-8Issue-7 May, 2019.

[10] Dharani, M., and B. Lalitha. "Automatic vehicle control using sensors, International Journal ofInnovative Research and Development (ISSN 2278–0211) 2.3 (2013): 744-750.