Recent Developments in Electronics and Communication Systems
KVS Ramachandra Murthy et al. (Eds.)

doi:10.3233/ATDE221299

Alive Human Detection and Health Monitoring Using IOT Based Robot

Dr. Y. Amar Babu[1], A. Reshma[2], P.V.N.S. Tejeswar[2], R. Vinay Kumar[2], M. D. Sri Vastav[2]
[1] *Professor, Department of Electronics and Communication Engineering, Lakireddy Bali Reddy College of Engineering, Mylavaram, India*
[2]*Students, Department of Electronics and Communication Engineering, Lakireddy Bali Reddy College of Engineering, Mylavaram, India*
reshmaalla4202@gmail.com

Abstract. Every year number of deaths due to wars and some natural and manmade disasters are increasing. Due to this many people will get stuck and it is very time-consuming for the emergency rescue operators should come there and start the rescue operation till this process a person may lose their precious lives. In order to solve this problem firstly the ground robot moves in the open field in the affected area to find out the affected human being. Ultrasonic sensor is used to guide the robot if in case there are obstacles in the path. The low-cost camera sends live video continuously. The PIR sensor is used to finds motion in human beings. If there is any motion detected then the affected person then the robot asks victim to place their finger on the sensors so that the health parameters can be monitored. GPS sends the location of the corresponding victim. This information is sent through Wi-Fi transceiver to the Thing-speak app in the smartphone through IoT.

Keywords. Arduino At mega 2560 micro controller, Esp8266 Wi-fi module, Thing-speak App.

1. INTRODUCTION

Around the world, there will be many disasters every year, such as bomb explosions and collapsing of coal mines and even in the bore wells etc. They will disturb the ecological and social balance. Consequently, people will get trapped under the debris and emergency rescue workers will spend hours getting to the scene, this process could result in the loss of victims' life. The chances of rescuing a person is quite high in the first 48 of incident also as the time increases the chance of saving life decay significantly as per the reports of Urban Research and rescue.

To solve this problem, we are with an objective that is

1.Proposing a design for the robot to detect the objects and move away from the objects without colliding the objects.

2.To design a robot which will detect the alive human beings and send their GPS coordinates and health condition readings to the user.

3.To provide video proctoring to designed robot for the confirmation of detection of the human beings.

4.To create a channel in the cloud to observe the health condition of the detected person.

This robot is capable of moving through a small closed way which is impossible for humans to go through the way and look for the humans still alive. The proposed robot can move through such closed parts easily. There is a camera which is continuously transmitted live images, and a motion detector (PIR)determines whether or not people are moving. During this movement of the robot if at all there is some obstacle in the path there is an alternative setup by using ultrasonic sensor, we can identify the obstacle and take path accordingly. After an alive human being has been detected the victim index finger is rested on the sensor as per the guidance of the rescue Robo, which then measures the affected person's pulse rate and body temperature. This information is then sent to the microcontroller to produce a digital output. This proposed system has a GPS receiver that transmits the live GPS coordinates of a human being to the thing speak Account. All this data is sent by using a Wi-Fi module that is connected to the microcontroller. Finally, an ultrasonic sensor is utilised to identify the blockers and find a way into the disaster zone.

2. RELATED WORK

Here a hasty information about the ground work done to implement this proposed robot, which is mainly about the previously used approaches and its advantages and disadvantages.

The authors proposed an IOT-based rescue Robo for alive human detection and health monitoring system the proposed system has a potential to find out a human and send the information about the location and vitals of the human being to the rescue team Usage of IR sensor is a drawback[1]. Farooq, Naeem; Ilyas, Umar; Adeel, Muhammad; Jabbar, Sohail presented a paper on "Ground Robot for Alive Human Detection in Rescue Operations" Here they focussed mainly on the surroundings not on the victim suffering. It sends the information related to the temperature of the surroundings and gas content present in the surroundings.[2] The presentation by Purnima G and Assistant Professor Aravind S was entitled "Alive Human Body Detection Using an Autonomous PC Controlled Rescue Robot", here the project used a Bluetooth and a GSM module for the communication which has a potential drawback because the Bluetooth module has a limited range and the services required for GSM is quite high compare to IOT.[3] A "Alive Human Body Detection System Using an Autonomous Mobile Rescue Robot" was presented by Sandeep Bhatia, Hardeep Singh, Nitin Kumar, in this paper they used image processing technique for identifying human and ultrasonic sensor for obstacle avoidance but there no health monitoring.[4] Machaiah M.D, Akshay S presented a IOT Based Robot using Swarm Robotics" In this paper they used ultrasonic sensor for obstacle avoidance movement which is an advantage. On the other hand node-MCU for the processing of the data, which can be considered as major drawback.[5] Another work is carried out to detect alive human and monitor their health parameters. They had used a microcontroller with pin configuration PIC16f877a to process the results and they has an disadvantage with usage of Bluetooth module.[6]

3. EXISTING SYSTEM

It will be a time-consuming task due to the usage of the trained dogs and humans for identification of humans and rescuing them. Till the time they found they victim the person may lose his/her precious life.

4. PROPOSED SYSTEM ARCHITECTURE

The schematic drawing of the suggested module is as illustrated in the below figure 1, components used on this gadget are Arduino Mega 2560, WIFI-camera, coronary heart beat, pulse fee, temperature sensor, PIR movement sensor, Ultrasonic obstacle sensor, power supply, motor driver, motor, GPS module, cell phone, voice module, speaker.

A. Arduino Mega 2560: It uses Atmega 2560 microcontroller (8-bit controller). So, it is called microcontroller-based board. It has more than 5 pins for VCC and Gnd. . So, it is more advantageous compared with Arduino uno and node MCU because it has a total number of 70 I/O pins which helps to operate more sensors moreover it has 128kb of flash memory
B. B. Ultrasonic Sensor: Ultrasonic sensor is used calculate the distance from a wide variety of objects irrespective of their shape, color, texture. It computes the distance based on the time consumed by the echo signal to travel back to the source. Its sensing range varies from 20cm- 500cm.These sensors are more reliable compared with the IR sensors.
C. C. PIR Motion Sensor: PIR stands for the Passive Infrared sensor. This sensor finds the presence of motion of human beings or animals. This is the key part for identifying the human presence.
D. D. Pulse Oximeter and Heart-Rate Sensor: After the identifying the presence of human by PIR sensor, they are alerted with in-built recorded voice by speaker. If the victim places finger on the sensor their health parameters are monitored and the corresponding data is sent to the Arduino Mega 2560 and further sent to user's mobile through think speak cloud.
E. E. Lcd display: It is a 16*2 display where it shows two lines and each line consist of 16 characters. Each character in this can be built with a 5*8pixel box. Different hex-codes will be there for different purposes.
F. F. Wi-fi Camera: Wi-fi camera is arranged on the top wireless camera ESP32 camera to send live video continuously through a wi-fi transceiver.
G. Motor: it is used to create the motion in the robot either in forward or backward. This rescue robot consists of two Dc motors for the movement of the vehicle. The power supply required for driving the Motors is supplied from the L293 motor driver IC.
H. H.GPS Module: In this proposed module, we are using NEO-6M GPS module. It is further connected with the GPS receivers which will receive the live location coordinates of the victim and this information about victim is sent to the think speak channel through think speak cloud using IOT. So, that the victim can be rescued appropriately.

Fig 1: Arduino mega 2560

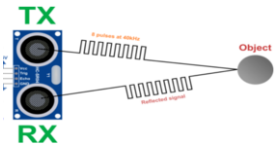

Fig 2: Ultrasonic sensor

Fig 3: PIR sensor

Fig 4: pulse, Heart-beat and temperature sensor

Fig 5: LCD display

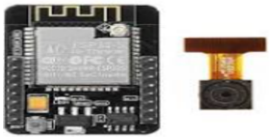

Fig 6: Wi-fi camera

Fig 7: Motor

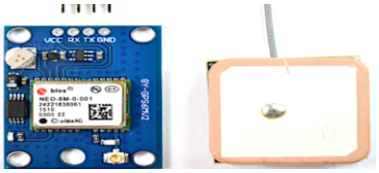

Fig 8: GPS Module

I. Voice module: We used a voice module (ISD 1820) to record the voice recordings and process it, and get output through a speaker. Here it is used to alert the victim and to guide the victim .

J. WI-FI module: Wi-fi module used is ESP8266.This wi-fi framework uses a 32-bit processor and ram with nearly 512 KB memory. It transfers data in serial way i.e., bit by bit. Baud-rates are in the range of 9600 to 921600bps.This wi-fi module enables serial communication.

Fig 9: Voice Module

Fig 10: Voice Module

The below block diagram Fig No:11 demonstrates the principal parts of the proposed rescue robot. The Left-hand side devices (Ultrasonic sensor, PIR sensor, MAX30102, Power supply) are considered as inputs to microcontroller. And Right-hand devices (GPS, Speaker, Lcd display, Motors) are considered as outputs from microcontroller.

BLOCK DIAGRAM

The below figure No 12 depicts the top view of the proposed robot.

Fig 11: Block Diagram of proposed robot

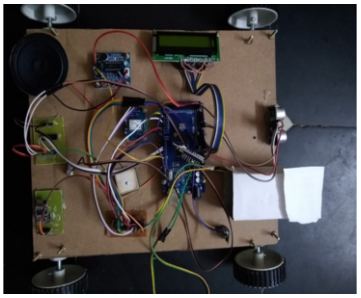

Fig 12: Top view of our suggested model

5. IMPLEMENTATION & WORKING

The proposed robot has the ability to detect humans and monitor their health and send the status about the victim to the rescue team monitoring remotely. The working of the robot starts once the robot is given the power supply. The gear motor fixed to the wheels of robot takes the power supply from the power bank using driver IC and starts moving to search for humans. The continuous live feed of the visuals around the robot are obtained using ESP32 camera. The live feed can be watched using an electronic device like mobile phone, laptop etc. An IP address is generated using coding to watch the live visuals around the robot. The robot uses ultrasonic sensor to escape the collision with the static objects which comes in the path of the robot.

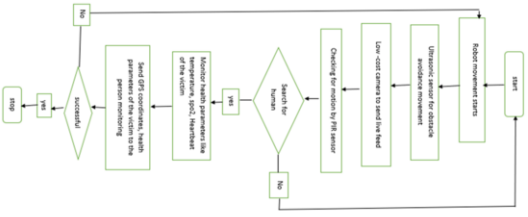

Fig 13: Flow Chart

6. RESULT

Fig 14: Heart-Beat

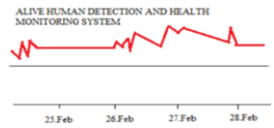

Fig 15: Temperature

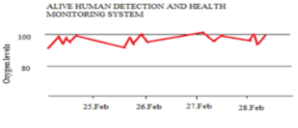

Fig 16: Oxygen levels

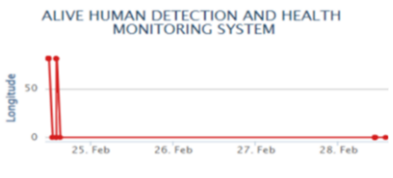

Fig 17: Longitude

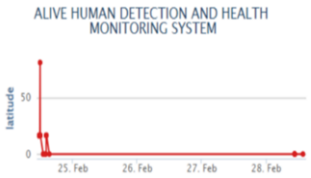

Fig 18: Latitude

The above figures 17,18 depicts the Longitude, Latitude location of the victim

7. ADVANTAGES, DISADVANTAGES AND APPLICATIONS OF THE PROPOSED MODEL:

Advantages

1.This robot can be widely used in village areas where the reach of rescue team is time consuming.
2.This rescue bot will reduce the time delay for treating the victim, as it already provides the health parameters and by observing the live camera feed, the doctor can react quickly.
3.Health parameters like heart-beat, pulse-rate, temperature are calculated and sent through internet to the user operating it.
4.Easy to handle because of its automatic movement by identifying obstacles.

Disadvantages

1.Battery requirement is quite problematic, because of continuous use of the robot the battery may discharge fast.
Applications
1. To detect the presence of human beings in military rescue operations.
2. When human reach is impossible in rescue operations.
3.In borewell Accidents for supporting.
4.In forest areas to prevent smuggling.
5.In identifying alive human in contaminated regions

8. CONCLUSION

In this paper we are going to design and implement an IOT based rescue robot. In which we are using some set of sensors namely, ultrasonic sensor, PIR sensor, pulse heart-beat and temperature sensor (MAX30102). Ultrasonic sensor is responsible for obstacle avoidance path. And another one PIR sensor is used for identification of motion. Once, victim places the finger on the pulse, heart-beat and temperature sensor, his health parameters like heart-beat, pulse, temperature are calculated. And through GPS receiver the victim latitude and longitude coordinates are received Finally, this received information is sent through think speak server to our predefined channel in our think speak account. Because of the usage of wi-fi module data can be transmitted in the range of wi-fi capacity, and we can increase the range by keeping more routers.

10. REFERENCES

[1] Aiman Neha and Baswaraj Gadgay published a paper on IOT Based Rescue Robot for Alive Human Detection and Health Monitoring System in The International journal of analytical and experimental modal analysis Volume XII, Issue VI, June/2020 ISSN NO:0886-9367

[2] Farooq, Naeem; Ilyas, Umar; Adeel, Muhammad; Jabbar, Sohail." Ground Robot for Alive Human Detection in Rescue missions" in IEEE 2018 International Conference on Intelligent Informatics and Biomedical Sciences (ICIIBMS) - Bangkok, Thailand (2018.10.21-2018.10.24) DOI:10.1109/ICIIBMS.2018.8550003

[3] Purnima G and Assistant Professor Aravind S. "Alive Human Body Detection System Using Autonomous Rescue Robot", published in International Journal of Emerging Technology and Advanced Engineering on December [2014].

[4] Sandeep Bhatia, Hardeep singh, Nitin kumar prepare and issue a paper on the topic "Alive Human Detection Using an Autonomous Mobile Rescue Robot", 2011 Annual IEEE India Conference on 16-18 December, DOI: 10.1109/INDCON.2011.6139388.

[5] Machaiah M.D, Akshay S." IOT Based Human Search and Rescue Robot using Swarm Robotics". International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249-8958, Volume-8 Issue-5, June 2019.

[6] P. K. Ranveer, A. Kulkarni, S. Vaste and N. Tarte, "Alive Human Detection Robot Using Wifi", *International Engineering Research Journal (IERJ)*, vol. 2, no. 1, pp. 370-372, 2016.

[7] Digambar Jadhav, S. V. Chobe, M. Vaibhav, Laxman Khandare . "Missing Person Detection System in IoT" 2017 International Conference on Computing, Communication, Control and Automation (ICCUBEA) **DOI:** 10.1109/ICCUBEA.2017.8463857

[8] E. Guizzo, "Japan Earthquake: Robots Help Search For Survivors", *IEEE*, March 2011, [online] Available: http://spectrum.ieee.org.

[9] P. K. Ranveer, A. Kulkarni, S. Vaste and N. Tarte, "Alive Human Detection Robot Using Wifi", *International Engineering Research Journal (IERJ)*, vol. 2, no. 1, pp. 370-372, 2016.

[10] Ko and H. Y. K. Lau, "Intelligent Robot-assisted Humanitarian Search and Rescue System", *International Journal of Advanced Robotic Systems*, vol. 6, no. 2, pp. 121-128, 2009.

[11] N. Gupta, D. Panchal Dangi, D. Desai and M. V. Patel, "Live Human Detection Robot", *International Journal for Innovative Research in Science & Technology*, vol. 1, no. 6, pp. 293-297, 2014.

[12] S. Jabbar et al., "Heuristic Approach for Stagnation Free Energy Aware Routing in Wireless Sensor Networks" in AHSWN, Old City Publishing, Inc. Switzerland, vol. 31, pp. 21-45, 2016.