DETECTION OF ALIVE HUMAN IN DISASTER SUSCEPTIBLE AREAS USING RENESAS BASED ROBOT

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Abstract: In this paper, for detecting alive humans in disaster susceptible areas using an mobile robot is proposed. The soldiers are sent to save the victims who are struck in disaster. This causes risk to the soldiers lives also. Therefore, this mobile robot is developed. It consists of RFID to identify soldiers who are present in rescue operation.

The unknown Human is detected using Passive-Infrared Sensor. The notification about the soldiers and other people in the disaster can be sent to control room through GSM module. The movement of the robot can be controlled from control room itself. The live video of surrondings is also sent to the control room through wireless camera.

Keywords: RFID,Mobile Robot,PIR sensor,Wireless Camera.

I. INTRODUCTION

Disasters causes a social and economic imbalance in the society. It causes a mass destruction in the society. Once the disaster occurs lives of many people is affected. There will be many people who are struck in the society. In such a situation the humans must be treated as soon as possible. There is more likely to save the lives of the people within the intial hours of rescue operation.

Therefore, identification of humans in disaster becomes very much important. So soldiers are sent to help the victims. But the problem is sending soldiers in disaster affected areas causes risk to their lives also. Therefore, it is important to develop a robot that helps in rescue operation and reduce risk of the lives of many people.

The robot consists of different sensors in order to identify the humans in disaster affected areas. It is designed in such a way that it can be controlled from far place. It is equipped with GSM module in order to establish communication between robot and control room. With the help of this GSM module the information about identified soldier and other people in the affected area is sent to the android. The direction of the robot is also controlled through GSM module. The presence of wireless camera provides the live visuals of surroundings to android.

II. OBJECTIVE

➢ Identification of soldier in rescue operation using RFID.
➢ Detection of unknown people who are struck in disaster.
➢ To send a obtained details about soldier and other person to android using GSM technology.
➢ To provide a video of surrounding disaster affected area through wireless camera.

III. LITERATURE SURVEY

In paper[1] they have designed the android controlled robot to detect the human and send the SMS alert to Android mobile with the help of GSM module. Here the soldier is identified through RFID reader and tag. The unknown Humans are detected through PIR sensor. PIR sensor detects the motion of the human. The motion of the robot is controlled in all direction with the help of android application.

In paper[2] they have designed the robot to detect the people with PIR sensor. The motor start rotating in forward direction untill it detects human. Once the PIR sensor detects human then LED starts glowing and the motor rotates in backward

direction. There is a buzzer that rings when a person is identified. The LCD is also used to display some information.

In paper[3] they have used Ultrasonic sensor to detect the people. If ultrasonic sensor detects the obstacle then buzzer start ringing and the camera starts capturing the image and sends the image to the Raspberry Pi. There is a presence of fire sensor to sense the surrounding temperature. The LCD is used to display the detected temperature and motion of a human.
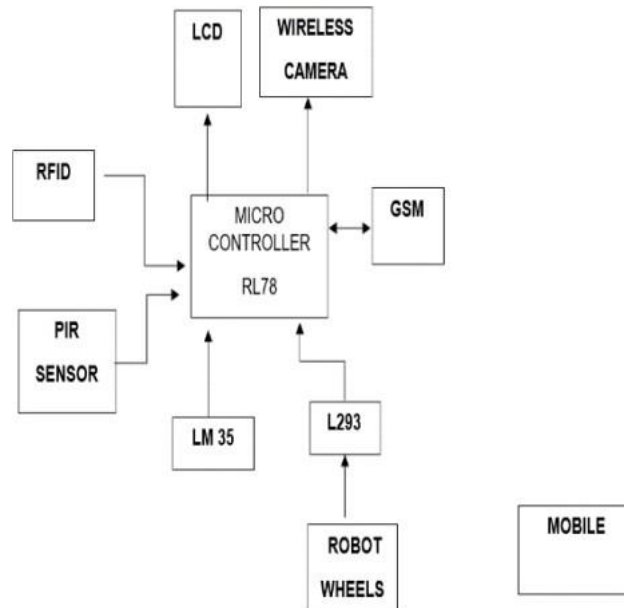
IV.   BLOCK DIAGRAM AND WORKING OF THE SYSTEM

Fig.1:The block diagram of the system.

The Renesas RL78 is a 16 bit microcontroller.It has 64kb RAM and 512kb ROM. The RFID is used to identify the soldier in rescue operation. Here each soldier has got a RFID tag which has a ten unique numbers. When the soldier enters the range of RFID reader it will read the unique number and name the soldier. The identified information about the soldier is sent to the android through GSM module. The PIR sensor is used to detect the motion of the unknown people. When the motion of a human is detected the system notifies us by sending SMS alert to the android. Temperature sensor(LM35) is used to measure the temperature of the human body so that we get to know whether the detected person is alive or dead. Wireless camera is also used to provide the live visuals of the surroundings. The motion of the robot is controlled in all the direction with the help of android application. Android studio is used to design the application.

V.   COMPONENTS USED FOR HARDWARE

1.   Renesas RL78:

Fig.2: Renesas RL78 Microcontroller

It has eight 8-bit registers or four 16-bit register pairs.It has a 64kb RAM and 512kb ROM.It has 3 UART ports and inbuilt

power supply. It also offers a features like integrated flash memory, communication interfaces, timers, ADCs, and PWM channels. It consumes less power makes it ideal for use in various applications.

2. LCD:

Fig.3:LCD

The liquid crystal display(LCD) is used display a information onto a screen. It includes a liquid crystal layer a backlight for displaying purpose. Here LCD is used to display temperature and other information.
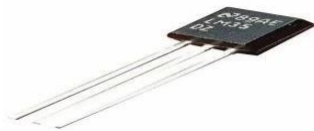
3. LM35 Temperature Sensor:

Fig.4: LM35 Temperature Sensor

It is used to measure the temperature between -55˚C to 150˚C with a accuracy of 0.5˚C. This sensor operates in the range of 4 -30 volts. The output provided by the sensor is an analog voltage which is proportional to temperature in celsius. In this project it is used to measure the body temperature.

4. PIR sensor:
The principle behind these sensors is every living body with a temperature emits infrared radiation.These sensors measure the infrared radiation emitting from a particular body. In this project it is used to detect the unknown human.

Fig.5:PIR sensor

5. RFID:

Fig.6:RFID

Radio Frequency Identification(RFID) is a technology that helps in identification of data.It requires a cooperation between RFID reader and RFID tag. In this project it is used for soldier identification. The soldier is given a RFID tag which consists of 10 unique numbers which is detected by the RFID reader.

6. L293 Motor driver:

Fig.7: L293 Motor driver

It is used to drive a DC motors or any other motor. It operates in a voltage range between 4.5-36V. It can control 2 DC motors or a single stepper motor. Both the direction and speed of the motors can be controlled with the help of L293 motor driver.

7. DC Motor:

Fig.8:DC Motor

DC motor is a device that converts electrical energy into mechanical energy. It rotates in both clock-wise and anti-clockwise direction. Its direction can be controlled as per user requirement. It is also possible to control speed of the DC motor. In our project the wheel is connected to the DC motor so when it starts rotating it provides motion to the robot so that it can move in different direction.

8.   GSM Module:

Fig.9:GSM Module

A GSM module is device that uses GSM mobile technology to provide a wireless data link to a network.GSM module uses SIM card to communicate with other device.

9. Wireless Camera:

Fig.10:Wireless Camera

In this project it is used to provide the live visuals of surroundings through wifi connection.

VI.   SOFTWARE REQUIREMENTS

1. Cube suite: It is a software or IDE where we can develop a code for Renesas based Microcontroller.
2. Android Studio:This application is used to develop our own application through Java.The direction of the robot by sending messages to the GSM module through the designed application.

VII.   RESULTS

The designed robot consists of two wheels. The motion of the wheels is controlled by the android studio application. It communicates with the robot through GSM module. If soldier is identified in the process it will send notification to the mobile through GSM module. If the motion of unknown human is detected it is also notified through GSM module. The live recording is also sent to the mobile through wi-fi connection. The motion of the robot is controlled by the designed app. The direction in which the robot should move is given as input to the robot. It is done by pressing the button in the application. The pressed direction is sent as input through GSM module. Based on this input the robot moves to a particular direction.
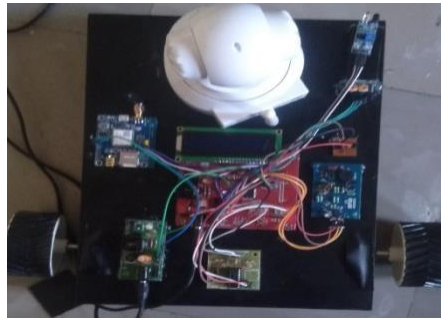

Fig.11:The prototype of the proposed system.
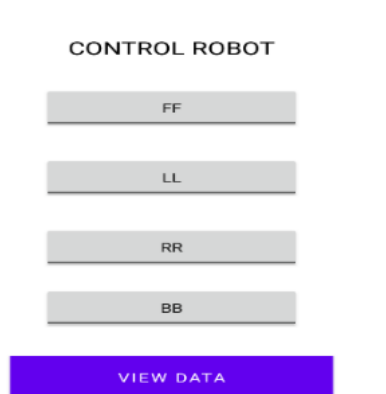

Fig.12:The notification sent to the mobile.

Fig.13:The designed app through which the movement of the robot is controlled.

VIII. CONCLUSION

Simulated Low cost Robot is developed to detect the unknown person and soldier in rescue process during disasters. The Robot is equipped with PIR sensor to detect the motion of the unknown person. It also consists of RFID to detect the soldier. The notification of detected human or soldier is sent to the android through GSM module. The surrounding visuals of disaster affected area is provided through wireless camera.

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