SOZON: A RESCUE ASSISTANT ROBOT

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Abstract—This system intercepts the need of the hour to efficiently pose a path of saving lives and precious time during an earthquake, fire accidents, land slide, etc. Earthquake and land slide are accompanied by huge hue and loss, along with accumulation of debris leading to make search operation difficult .This system suggests the use of rescue robot car for such rescue operation, to determine the people stuck in a particular region. This rescue robot is compact and hence can move in the debris freely and thus can locate the position of people stuck under the debris. Thus, it helps in easy identification of the regions where most people are stuck up. Components used in this system are raspberry pi, Ultrasonic sensor, Wifi module, Camera in the robot. The movement of robot is controlled by transmission of signals through Wifi module to the robot. Adding fire resistant feature to this, so it can use in fire accidents. Camera provides live video streaming and detects the presence of alive humanbeings stucked in the debris. The Android Application control the movements and provides live video streaming. The latitude and longitude given by the GPS Module is given to Google Map to get the path by sending a text message.

I. INTRODUCTION

Internet of things is an idea from computer science: connecting ordinary things like lights and doors to a computer network to make them "intelligent". An embedded system or a computer connects each thing together in a network and to the internet. Some technologies used for the internet of things are: RFid and meshnets. The connections allow each thing to collect and exchange data, and we can control them remotely or by setting rules or chains of actions. Experts estimate that the IoT will consist of almost 50 billion objects by 2020.Examples where the internet of things has become reality are 1) Many postal companies offer tracking codes that offer customers the ability to check the status of their package in real time. 2) Modern printers offer the option to order new ink cartridges when it runs out. The printer can easily query how much ink or toner is left in a cartridge and order a new one once it starts to run out or becomes empty.

The advent of high speed and fast growing world leads to development in various spheres of life. But along with such large scale development, comes the wary of mishaps, some of which are naturally occurring, such as an earthquake, landslide, fire accidents etc. An earthquake cause agglomeration of piles of huge debris and aggrandizes the loss of lives in this manner. In order to establish fast, efficient and adroit use of the technology in rescue operation, then this might help in saving lot of lives and thus reduce the risk of life during such mishaps. The robot can be controlled wirelessly and its direction of motion will be directed by ultrasonic sensor which will govern the aversion of obstacles from its path. The thermal camera used is to find the alive ones and differentiate them from dead bodies, and hence thus finding the angle at which the body is present. Then, an ultrasonic sensor is used to find the distance of the robot from the alive person. Microcontroller AtMega2560 is used which is interfaced with GPS module to determine the location of the robot, and if the distance and angle of an alive person is known, the co-ordinates of the alive person can be easily generated. Thus, the position of an alive victim can be found and then rescue operations can be directed in that region.

The main objective of the system is to suggests a method to not only find the people stuck under the piles of debris, fire accidents etc but also help in determining the alive people from the rest and finding out their location using GPS technology. Thus, by knowing their location their coordinates can be stored easily and the rescue operations can be directed in those arena of the disaster where humans are trapped. This will not only save life, but also reduce the time of rescue operation and making it more efficient. This project uses thermal camera to operate the rescue robot in determining alive people stuck inside debris. This project also uses an ultrasonic sensor which determines the distance between the robot and the stuck alive people by avoiding obstacles and the thermal camera used determines the position of the alive body with respect to the direction of robot is heading ahead. The GPS module provides the location of the robot, hence we can detect the location of stuck alive people.

This system helps to obtain the exact position of the ailing human and rescue them immediately. As GPS technology is used, the accuracy is very high, which helps to identify the location of alive humans stuck in the debris, fires etc. The system provides efficient operation speed and accurate location. Remote operation is possible even in low light or completely dark areas. Obstacles in the path are avoided leading to fast scanning of entire area. The system is encapsulated in fire resistant covering. Hence we use it in situations like earthquake, land slides, fire accidents etc. Real time detection of live human body is performed for saving lives. Sozon It is used by the firefighters to rescue. It provides the facility to search and rescue in unreachable environment. Also it helps to gathers information about hazardous place.

II.PRINCIPLE OF OPERATION

This project suggests a method to not only find the people stuck under the piles of debris, but also help in determining the alive people from the rest and finding out their location using GPS technology. Thus, by knowing their location their coordinates can be stored easily and the rescue operations can

be directed in those arena of the disaster where humans are trapped. This will not only save life, but also reduce the time of rescue operation and making it more efficient. This project uses camera to operate the rescue robot in determining alive people stuck inside debris. This project also uses an ultrasonic sensor which determines the distance between the robot and the stuck alive people by avoiding obstacles and the camera used determines the position of the alive body with respect to the direction of robot is heading ahead. The position can be seen on the radar display using Processing software. Thus, the location of the bot can be determined using the GPS module bounded with the robot. This GPS coordinates can be transferred to the other GSM device using GSM module interfaced to the microcontroller in the robot. The movement of the robot is controlled by transmission of signals through Wifi module to the robot.
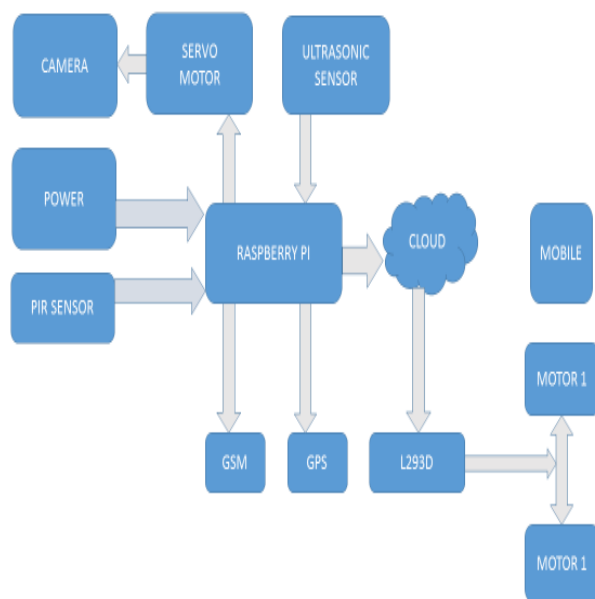
**Fig 1:** Block diagram of rescue assistant robot

The system adds fire resistant feature, so that it can use in heavy fire situation. Using an Android Application we can able to control the movements. Also in this by adding a 180^0 night vision thermal camera we can able to get the night visions.Along with that it also have an additional feature that is achieved by adding human temperature detecting sensor to detect humans under the debris.The latitude and longitude given by the GPS Module is given to Google Map to get the path.Edge detection Algorithm is added to the system ,when an obstacle is find and the robot has to change tha direction.In this by replacing Arduino –UNO with Raspberry pi, so we can add more features and port facilities. In this   text messages are used for sharing latitude and longitude from GSM module with GPS.

Robot can be controlled wirelessly and its direction of motion will be directed by ultrasonic sensor which will govern the aversion of obstacles from its path. The thermal camera used is to find the alive ones and differentiate them from dead bodies, and hence thus finding the angle at which the body is present. An ultrasonic sensor is used to find the distance of the robot from the alive person.

Raspberry pi iis used which is interfaced with GPS module to determine the location of the robot, and if the distance and angle of an alive person is known, the co-ordinates of the alive person can be generated.Adding fire resistant feature to

this, so it can use in fire accidents. Using an Android Application to control the movements and a 180^0 night vision thermal camera to get the visuals. Adding human temperature detecting sensor to detect humans under the debris, so the rescue become easy .The latitude and longitude given by the GPS Module is given to Google Map to get the path by sending a text message using the GPS module.

The Raspberry pi is used for movement control of robot. Robotic vehicle that navigates into debris caused by earthquake detects the alive human bodies system associated with it which detects the objects in its path and displays the output on the computer screen. The alive body is and the robot is remotely guided for its motion. An ultrasonic sensor is used to detect any obstacle ahead of it and sends a command to the Raspberry pi. The ultrasonic sensor is installed on the top of a servo motor using pins and connecting gear. The motion of servo motor is restricted to 180 degrees of motion across its horizontal axis. The servo motor enabled rotation across the horizontal axis allows the ultrasonic sensor to span the region to create virtual radar where the red lines indicate the obstacles in its path. The green light indicating the path for the motion. The motion of the robot is controlled by providing input to Raspberry pi through the Wifi module connected to it. The microcontroller is programmed to control the motion using an android application.The ultrasonic sensors are continuously watched while the robot is moving. If an obstacle is spotted, it will create a signal in the processing software which is produced on a computer screen.This also provides the angle of the obstacle and thus guides the motion of robot from obstacle. Thus, remote control the robot car is performed using a Wifi module and the Ultrasonic sensor, which enable the robot to detour obstacle.
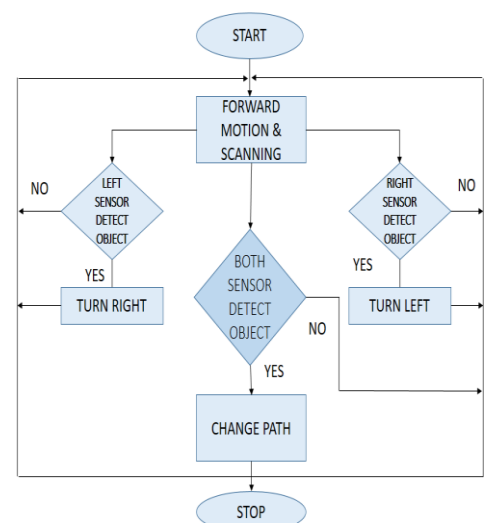
Fig 1.1: Principle of motion of robot car

III CONCLUSION

The system is low-power, economical, semiautonomous and efficient device which involves the search and rescue robot system that can navigate into avoids in debris, avoid obstacles, detect living human body temperature, determine the position of alive bodies and transmits the coordinates over GSM network to specific devices. Situations like earthquake, landslides, fire accidents, etc. normally rescue is difficult. The system can find obstacles and choose better path by using

edge detecting algorithm.Camera helps to detect alive human victim. Fire resistant covering provided for each components and whole systems provides the facility to use it in fire accidents. The android app provides facility to view the videos obtained from the device and to control the system. The device is practically possible to implement. This system is better suitable for finding location of alive people during any disaster. This concept can be implemented over large scale allowing the robots to be deployed in mass quantity to increase the chance of finding survivors. Lighter, smaller and more powerful battery is also an important constituent of effective search and rescue robots. Emergency wireless network for communication is also important for coordinating actions between robots, collecting visual image from the robots, and to communicate with the rescue team when the robot finds one.