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IoT Based Post Disaster Recovery System using Smartphone

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Abstract - In recent decade's severe natural or artificial disaster and further geologic processes have occurred with catastrophic consequences. Timely it should be detected and make it recovery. So, in this paper, we had proposed a multi-terrain robot and other software systems to ease the detection. As the demand for multi-terrain robot applications are increasing significantly. This robot can be deployed for the use of assured future surveillance and extricate purposes in the isolated areas. In isolated areas robot stability will be challenging task due to varied terrain. A new design is propounded for the mobile robot which aims to execute monitoring performances while travelling on terrain types in balanced way. A chain-wheeled multi-terrain robot has been evolved which has ability to run in rough and unmanned surfaces.

Keywords- geologic processes; multi-terrain robot; chain-wheeled; unmanned surfaces;

I. INTRODUCTION

In recent years, serious natural or artificial disasters such as earthquakes, floods, tsunamis, hurricanes and further geologic processes have appeared with catastrophic consequences. To diminish the destruction after fallout from the disaster, it is significant those defenders are competent to track the confined victims and achieve synchronized assistance efforts instantly. In these circumstances, it is difficult to manage with disaster only by human activities. Therefore, In this paper we represent a crisis zone data storage system because the acceptance of the Smartphone that offer a alternative featured computing facility and connectivity, helps the people to utilize their phone to upload images and so on, demands the info of location by a designed multi-terrain vehicle which can even travel under unmanned surface and reports.

A telepresence robot is a remote-controlled device with camera placed in isolated area to capture the image of visual environment. The visuals captured are displayed on the user's Android Smartphone [1]. Thereby it establishes a seamless connectivity between the devices.

II. RELATED WORK

Earthquakes are one of the major natural disasters which makes difficulties for the people under go through it so, this should be detected and by that helping the peoples who are struggling so here they introduced Smartphone's to which able to find those earthquakes and thereby helps to the people. [3] Natural disasters are those which cannot be predicted whenever or in whatever satiations it may happen so this may affect instantly to the human beings or any other livings those who will be under such conditions must have to predict and resolve the problem issued over there. Here they are using an artificial neural network by the search and rescue team. Thereby they find those conditions and help out the struck beings. [2] In our propounded paper, we proposed a new catastrophe data storage structure through phone with the help of some software applications like Android studio and PuTTy thus uses phones to upload catastrophic location data like metaphors, imagery, or content combined with GPRS. The multi terrain cart is built using some of the hardware components like raspberry pi, motor drivers sensors and infrared cameras for vision etc. The backend server is liable for getting the info, attaching them on Google maps, analyzing the uploaded info and connecting with related disaster.

III. MATERIALS USED

Hardware requirements:

1) Raspberry Pi

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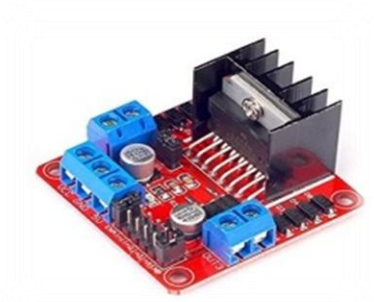
It is a sequence of tiny single-board computer. It is used as the base mother computer to support and run all other external devices connected to it. It controls the hardware mentioned below.

2) DC Motors

They are used for the movement of the cart. They're connected to wheels which are linked by a belt. They're placed with the right front wheel and the rear left wheel for the control flow.

3) Motor Drivers



It is a device which controls the DC Motors. It is attached to the Raspberry Pi and the motors. It is programmed in such a way that the motors are controlled to move in every possible way.

4) IR Cameras

It is the camera used to monitor the cart and find the objects. It has additional IR lights to enable advanced IR processing.

Software requirements:

1) PuTTy

It is developed by Simon Tatham, PuTTY is a client program to the SSH, Telnet, and rlogin network protocols—letting you run a remote session on a computer over a network. It is meant that one can control another computer without actual physical using it. Thus, PuTTY is also considered a serial console and network file transfer program. It is a terminal to program the Raspberry pi , alter its applications and network communication through SSH(Secure Shell).

2) Android studio

It is the official integrated development environment (IDE) used for Google's Android OS, built on Jet Brains' IntelliJ IDEA software and intended especially for Android development. This will be available to download on Windows, macOS and Linux based OS. This is alternate for the Eclipse Android Development Tools (ADT) because the prime IDE for subject Android application development. This software will be employed to style an application for an android device. We use it to develop an application to regulate and monitor the movements of the cart.

IV. METHODOLOGY

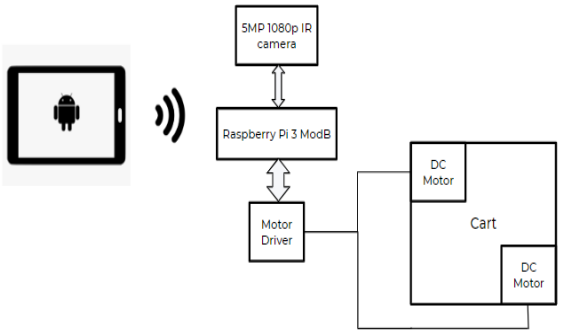


Figure.1- Connection pattern which represents the methodology of the project.

In the above figure.1 base operating motherboard Raspberry Pi is connected to the motor driver and the camera where the motor driver controls the movement of the cart through motors. The video recorded from the camera is streamed on the android device through Wi-Fi. The robot built here is proficient of navigating the tough terrain of a catastrophic site. The goal of this project is to find out a victim in a civic catastrophic environment. Circumstances during a catastrophic area are intense with many mysterious parameters. Victims could also be enclosed in debris, attentive in void, or entombed, building it complex to seek out them and resolve their position of health it is often why it'll be essential for settle on the group of various sensors those are balancing and ready to activate in such situations. So, this multi-terrain vehicle is employed.

V. DESIGN AND RESULTS

In this part, we talk about the design and results of catastrophic location data storage structure; this can be separated as two sub categories namely first is multi-terrain robot (fig.2) and second category is backend server Smartphone. This second category will be installed on Smartphone's and is reliable for receiving, analysis, and publicizing the uploaded data from the IR cameras in the multi-terrain robot.

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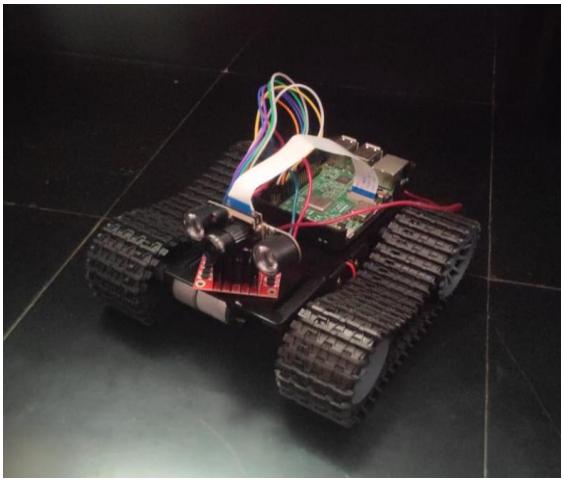

Figure.2-Multi-terrain robot

This above figure2 cart is an assembly of a Raspberry Pi 3 as the main controlling component which is directly connected to a motor driver and an Infra-red camera. The motor driver is connected to two 9V DC motors which help in the movement of the cart. The chained wheels are implied here to have the movement of the cart in multiple terrains.

VI. CONCLUSIONS

In this paper, we introduced a IoT based remote controlled multi-terrain vehicle to detect people who are stuck under the debris formed after a natural calamities and other geological processes using raspberry pi and data will be sent to the smart phones by the IR cameras placed at the robot. The proposed system provides telepresence with semi-autonomous control and interaction in order to establish the user's ability to remotely communicate, navigate and feel present in a remote environment this kind of robots can be deployed.

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