SURFACE EXPLORATION ROVER

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Introduction:

Exploration of the unknown and survival have always been generic instincts of human nature. A rover is a planetary surface exploration device designed to move across a solid surface. They are partially or fully autonomous. They have a lot of features that can help in many areas of research and rescue operations. Our project can help with inspection, detecting objects, collecting samples, handling materials, and supplying resources. once the technology is available, rovers are likely to be used in applications where the remote control is at least possible, but monitoring mobile robots is much more attractive. Removing the overhead of human operators and maintaining a constant communication link is desirable as long as the continued function ability and survivability of the remote vehicle can be sure. These rovers will be usable for performing tasks in an environment that is hostile to humans. Some examples are geological and petrological investigations in deserts and polar areas. Rover technology will be extended in the future to machines of greater sophistication. This is used for more everyday applications in environments of greater complexity.

Objectives:

(a) To aid in rescue operations.
(b) To detect hazardous gas which are harmful to human health.
(c) To help in inspection of unknown areas.
(d) To help in monitoring and surveillance.

Methodology:

       It includes information regarding the setup of the experiment which we have done in this project. The user sends the rover to a location where a person cannot go. It has the Rocker-buggy mechanism to overcome obstacles and move on all types of terrain. The six Wheels are attached to the rover and run by 6 Johnson geared motors of 300 RPM. These are operated via L298N motor drivers, these motor drivers give appropriate voltage and current to run the motors when the user gives the commands. These motor drivers are connected to Arduino. After reaching the location, the rover collects the data using the sensors connected to the rover. There are many sensors connected to the rover. All these

sensors and motors are connected to the analog and digital pins of the Arduino Mega 2560 R3 and Node MCU. The ESP8266 is the Wi-Fi module is connected to the Arduino that helps form communication between the rover and the user. The LM2596 which is a step-down buck converter that converts 11.1V to 6.2 Volts which is fed to all servo motors of the rover with the help of a Lithium-ion battery. The 2 Solar Panels of size 70x70mm help in generating electricity from sunlight which charges the battery whenever the battery is low and sends the indications to the user through the BLYNK server. The data collected with the help of various sensors are sent to the server that updates all the values on the user's device in the BLYNK application. The delay between all the communications to the rover is between 10-40 milliseconds. At the users end all the data is displayed on the BLYNK app, which also helps in the movement of the rover and the Robotic-Arm. The communication takes place through the Blynk local server.
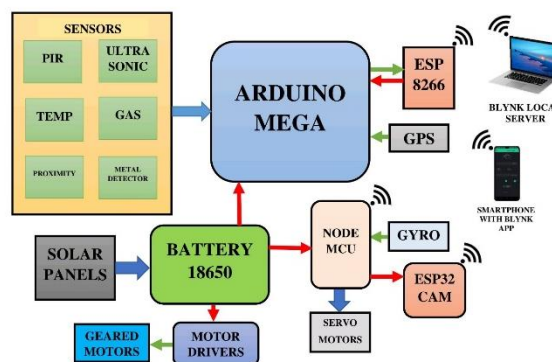

Fig. 1: Block Diagram

Result and Conclusion:

Results are obtained using Rover and Blink server app. The Rover collects information of located area using various type of the sensors and send the data to the Arduino Atmega328 controller. This is connected to Wi-Fi module for wireless communication which is takes place through the BLYNK local server. Using this server blink app helps to monitor the rover. Below figures shows outputs of our project.

Fig. 2: Surface Exploration Rover

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Conclusion: The surveillance robot serves as a security monitoring device which replaces the human security at less critical areas where humans are really not necessary without compromising security. In this proposed system the rover can helps in exploration of areas like tunnels, places affected by calamities and dense forests. It can travel multiple terrains

at a long range. With the advent of Internet of Things (IoT) we can easily control this device from any computer with a simple Internet Connection. We can use this device to can serve a great deal in sectors like Defence, Non-Governmental Organizations which help people in time of crisis, Security, Research for understanding deep forests, volcanic eruptions and other environmental sites and Exploration like Wildlife Photography, Nature Exploration, etc.

Scope for future work:

In Future work, this system will be improved using the different type of high-quality circuits and components, which gives high performance with accurate output. We can use this rover to inspect tunnels and damaged buildings to understand the situation and minimize the impact or risk of any catastrophe.