



# Department of Information Science and Engineering

## Final Year Project Phase 2 Poster Presentation (UG - B.Tech)

### Title: DAR – DEFENCE ADVANCE ROVER

A Rover is a IOT based robot that is basically designed to detect Landmines, Smoke, Fire, Alignment, Obstacles, Radar to detect Movement. In this research we prepare a Rover as a prototype of multi-functional robot and the purpose of it is to go to dangerous areas like collapsed places, areas attacked by terrorists to collect every possible data of the situation and send it via wireless communication system (Remotely), as well as manually for the further actions. The main phenomenon of this Rover is to help army by providing various information which usually is difficult and risky for a person to collect and send it to the control center. The whole system operates wirelessly and send each and every data to the control center through signals, and shows live video footage directly to the control center, even if the camera is damage the remaining sensors keeps providing the data.

### Introduction

Rover may be a moving platform or vehicle equipped with totally different electro-mechanical gadgets. it's a hybrid product of natural philosophy and mechanics. Rovers square measure principally used for assembling knowledge or materials from places wherever accessibility is poor or dangerous. Rovers contain totally different variety of sensors and even mechanical facilities for varied applications. Sensors square measure usually meant for detection physical conditions of the realm like heat, electrical shock, smoke or perhaps detection the presence of live physical body. fashionable rovers square measure equipped with computer code and small controllers for swish and correct functioning. The aim of the Rover is to drift around and provide video knowledge from the given atmosphere and to send that obtained knowledge to the user. With the obtained live streamed video output, the action of investigating is performed.

Scientists and engineers have come together to create dynamic and diverse changes in the field of automation and robotics to make the daily humane tasks easier and faster. The use of robots in development and automation fields is increasing day by day and there is no doubt about the future being largely controlled by robots and artificial intelligence (AI).The Surveillance System closely observes and analyzes the surrounding and get instant information about the conditions. It is mainly required in areas of high risk, borders, public places, and prison or in industries which is mainly used for monitoring behavior and activities of a group or any individual.

To achieve this aim, an IoT based monitoring system is also included with the robot which can be used to monitor by the user through their device. The main applications include:

1. Record video visuals and broadcast it to the user
2. Send data from sensors to the IoT channel
3. Can explore areas that are dangerous for human
4. Used for the inspection of border areas

### Literature Survey

1. **Author :-** Md. Nahidul Alam<sup>1</sup>, Md. Saiam<sup>2</sup>, Abdullah Al Mamun<sup>3</sup>, Md. Musfique Rahman<sup>4</sup>, and Umma Hany<sup>5</sup>  
**Topic Name :-** A Prototype of Multi Functional Rescue Robot Using Wireless Communication  
**Introduction :-** The main issue of a disaster place is that the delay to rescue the victims. In a disaster place, it became impossible to find the victim as soon as possible. The major reasons are the small number of technical rescuer teams. It's also difficult for the rescuers to go inside the rubble because of toxic gas, hazardous material, high temperature. Rescue mechanical technology has been recognized by the National Research Council's ponder "Making the Nation More secure."  
**Method :-** A. Mapping and Detecting Human B. Rover System & Workflow Mechanism C. Nanobot Workflow Operation  
**Result :-** The main aim achieved from this design is that all sensors are providing data accurately. Nanobot is also giving proper thermal imaging. While any sensors got logic '1' then all sensors start providing data. In this paper, we have divided the robot into three parts, which collect data from three perspective points & provide data to the rescuer team.

2. **Author :-** James H. Lever  
**Topic Name :-** AUTONOMOUS ROVER FOR POLAR SCIENCE SUPPORT AND REMOTE SENSING  
**Introduction :-** This paper reports outcomes of recent field deployments of the solar-powered CoolRobot, which was developed as an autonomous platform for towing or carrying scientific instruments in Greenland and Antarctica. The Cool Robot is an autonomous solar-powered mobile robot designed to serve as a roving platform for measuring spatial-temporal phenomena in polar regions.  
**Method :-** An aerosol instrument package was developed by the Univ. of New Hampshire and includes an optical particle counter and an aethalometer integrated into an environmental enclosure with GPS, data logger, and battery pack. The interface to the package is comprised of a laptop that is programmed through a GUI to specify sampling protocols for the payload.  
**Result :-** The Cool Robot supports long duration, autonomous science campaigns in polar regions through a unique low-profile solar-powered design coupled with simple navigation software and a user interface that allows flexible selection of sampling protocols.

3. **Author:-** Prof. Kalpana R. Bodke  
**Topic Name:-** Surveillance Robot controlled using an Android app.  
**Introduction:-** The advent of new high-speed technology and the growing computer Capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drivers and advanced control algorithms. This project describes a new economical solution of robot control systems. In general, the robots are controlled through a wired network. To make a robot user-friendly and to get the multimedia tone in the control of the robot, they are designed to make user-commanded work. The modern technology has to be implemented to do this.  
**Method:-** The project is designed to control a robotic vehicle using an android application. Bluetooth device is interfaced to the control unit on the robot for sensing the signals transmitted by the android application. This data is conveyed to the control unit which moves the robot as desired.  
**Result:-** We have two results i.e. the hardware and the software result. The hardware includes the robot which runs on DC motors. The input to the motors is provided by the L293D motor driver shield. The input to the driver shield is provided by the Arduino board. The navigational inputs are given by the user to the Arduino board using the android application via Bluetooth. The Arduino board, on receiving the signal, processes it and produces the appropriate output. The communication between the android application and the Arduino board takes place using the Bluetooth module which is interfaced with the Arduino board. It provides serial communication between the application and the Arduino.

### Tool Description

This project describes a security alarm system that can monitor a farm. When animals come near to the PIR sensor and it detects the animal movement. After getting the initial input signal, it is passed for further processing. Then the sensor node which detects the animal movement sends the information to the master node through the shortest path. The shortest path is found using Dijkstra's Shortest Path Algorithm. The sensor nodes will be given a unique id number. The id number will contain farmers phone number on which the alert messages are supposed to be sent. The master node will read the node id from which the information is received and on the same number an alert message will be sent using the GSM module embedded in the master node. System will be activated, immediately a buzzer will be on, at the same time it sends an SMS to the owner. An LCD is connected to display the path of the intruder.

### Features

- The main Features of the proposed system are:
  - Development of light security mechanisms.
  - Security and privacy must be maintained from the information source (sensors in or on the body, nanoscale communications system, etc.) to the final destination.
  - Wireless communication system.
  - These systems mainly consist of high quality cameras, multiple computers for monitoring, servers for storing.
  - Advance knowledge in the area of intelligent wireless networks

### System Architecture

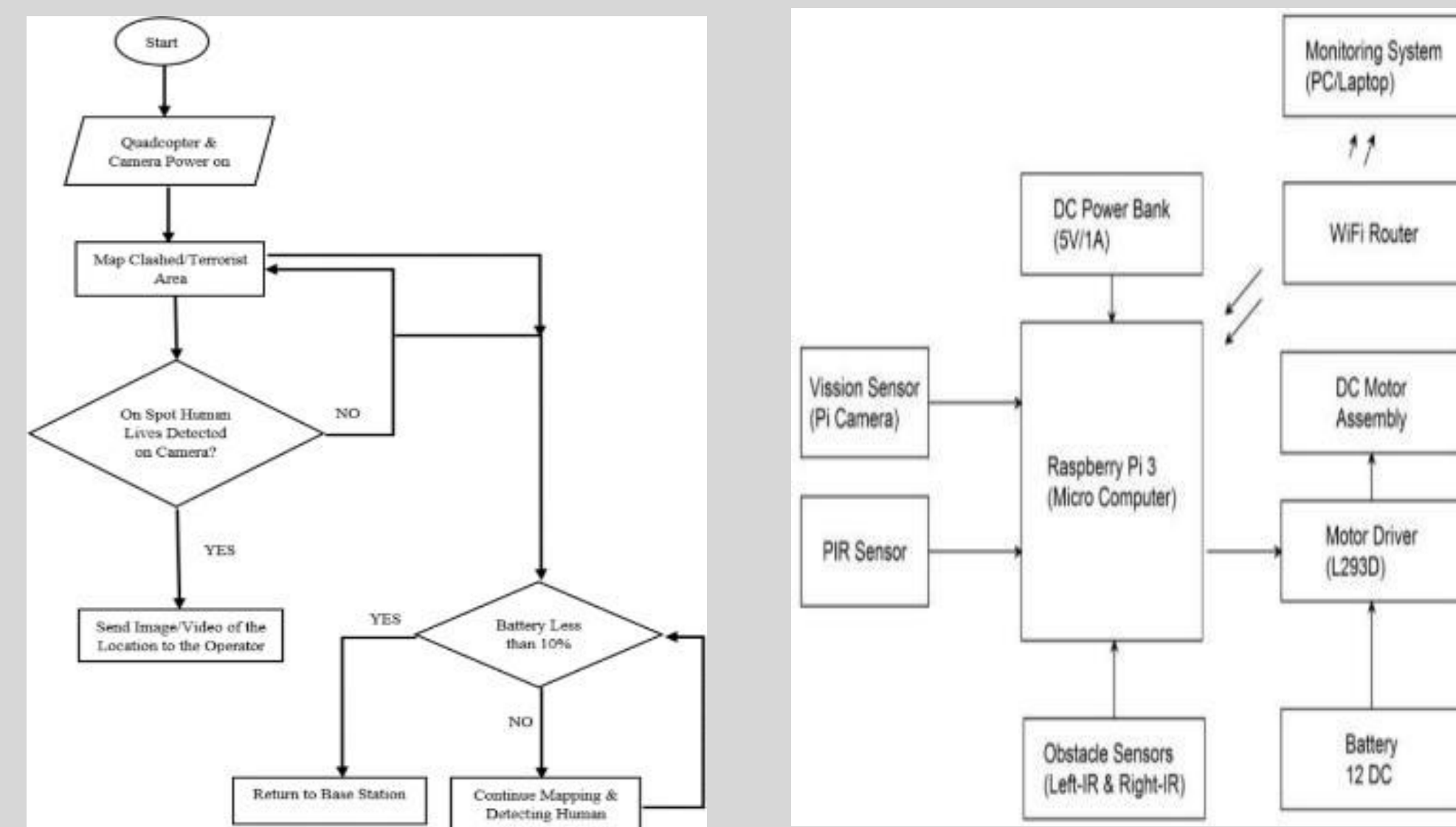


Fig 4 - System Architecture of the Platform

### Design And Implementation

Camera got power and turn on. Then quadcopter start mapping the area for 30 min. If any human live or smoke is detected while mapping it gives the location of that place immediately to the operator by sending an image. While quadcopter mapping the place, the rover also works simultaneously. To control sensors, Arduino microcontroller is used. To control four-wheels of rover, BTS7960 motor driver is used. To control servo motors of mechanical claw & camera, we have used servo motor driver module. Rover can't be accessed until the RFID is not matched. If RFID matched, then the rover follows the path provided by the operator. While surveying the area, if any sensor gets logic 1, then the microcontroller activates all the sensors. If any human or smoke is detected by these sensors, then immediately alert the authorities. Among all these, if battery is less than 10%, then the operator gets a red light blinking and has to take back the rover to the base station immediately.

Adding to it, this rover framework is also enabled with live streaming of the area, which can be easily seen on any android device or laptop on a webpage which will be enabled when we start the rover. It is also enabled with state-of-the-art ultrasonic sensors which help in collecting trash when any person is near the dustbin in simple terms. If you want to throw garbage manually in the dustbin, you can go near the dustbin and the sensors will detect your presence, and by this, the lid of the top dustbin will open and you can put your trash into it. So our Framework in Simple words not only terms of segregating and collecting garbage but also helps in the surveillance.

This class of robots can be designed by following below mentioned methodologies

1. Choosing a rugged mechanical chassis.
2. Choosing a stable computational core for managing the robot.
3. Sensing physical world parameters for offering services. The above methods can be integrated into a system which serves the purpose of a smart IoT-based Robot.

### Results

Our concept is to help Indian Army to run smooth operations without losing man power. The concept of our rover is to go in such an area where no human can possibly go and collect the data. Human life is too precious to risk it, so here our rover comes in the play. Where, this rover with the help of sensors and advance technology, can go in the area which is under attack or where it is too risky for a human to possibly go, our rover with Node MCU / UNO (NodeMCU is a low-cost open source IoT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which was based on the ESP-12, Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins.

### Conclusion

- Capable of going places where neither humans nor normal rovers can go.
- Can be used in combat situation (not intense).
- Can perform actions in stealth.
- Self-operated by AI with an option of manual operation.
- Can be easily camouflaged.
- Has an multipurpose mount that can be used to mount cameras semi and fully automatic gas and tear gas ejectors.
- Is able to perform all the functions of CBRN mini UGB.

### Publication Details

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