

Developing and Using an IOT-Powered Adaptive Device for the Military

Dr. Priyanka R^{1*}; Dr. Yashaswini S²

¹Department of Information Science and Engineering, Cambridge Institute of Technology Bangalore, Affiliated to Visveswaraya Technological University, Belagavi (Karnataka), India

²Department of Computer Science and Engineering, Cambridge Institute of Technology, Bangalore.

Corresponding Author:- **Dr. Priyanka R^{1*}**

Abstract:- In this digital era, huge amount of money is spent for military purpose in order to protect the country's economy and resources. Some of the military organizations make use of robots in the defence sector instead of humans. The robots are strong when compared to humans. Camouflage Robot plays important role in saving human life and the loss that occur during the calamity. The robot changes its colour according to the surrounding hence camouflaged from the outside environment. It is the advanced technology used in military operations and has a greater scope in future. The robot is a vehicle attached with camera and it moves in all the direction controlled by a smart phone. It is also fixed with many sensors which sends the response to the user via message. The main objective of the paper is to provide a multifunctional robot, which saves human lives and also provides prerequisite information about the war field to reduce damages and deaths by keeping nation safe and secure from enemies.

Keywords:- Camouflage, Adaptable, Robot, Sensors.

I. INTRODUCTION

Robots are the automated devices, that are capable to execute the tasks with little human help or sometimes automatically. The Results given by the robots are accurate and fast when compared to humans. The robots are controlled through commands via smart phones or PCs. Robots are replaced by humans as they are efficient when compared to humans, it is safe to send robots to dangerous places to avoid human loss.

The main concern of any country is to secure the country's wealth, economy, lives of people. Military robots are considered to be a bridge for bringing Innovative technological change in defence field as it is cost effective when compared to soldiers. The main objective of the paper is to implement a Camouflage Based Wireless Multifunctional military robot controlled by smart phone via Wi-Fi to reduce human losses in the war fields and defence field. Robots acts as a spy and can send messages and capture images of trespassers.

The paper is organized in 4 sections as follows: Section II presents the literature review. Section III presents the Existing system and Section IV presents the proposed methodology which includes both Software and Hardware requirements. In section V results are discussed.

II. LITERATURE REVIEW

Prem Kumar et.al [1] proposed a unmanned multi-functional robot based on the zigbee adaptor technology. The proposed system is focusing on the welfare infantry to minimize person killed or injured in the war to a great extent. Akash et.al [2] developed a Camouflage technology based on the communication by Bluetooth module that is interfaced with UART protocol where the control of robot is done through android phone. Gopika et.al [3] proposed a paper Surveillance alive human detection. It provides a prototype of practical design to build a simplified version of a Human detection robot to provide a simple, efficient solution for helping and rescue workers in disaster. Hymavathi et al. [4] designed a Surveillance alive human detection based on the X-bee technology. The robot is controlled through the computer, based on commands provided robot navigates through the defence area and find the enemies.

III. EXISTING SYSTEM

The existing system consist of the gas sensor used for detecting the harmful gases present in the surrounding, PIR sensor used for detecting the human moment and the robot is operated through Wifi module. The robot is mounted as a vehicle consisting of wheels attached with motors operated through commands. It can be easily be seen from the outside environment and get caught by enemies.

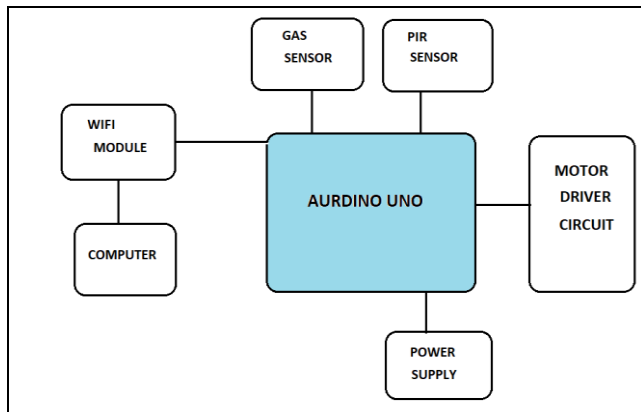


Fig 1. Existing System Block Diagram

IV. PROPOSED METHODOLOGY

The main objective of the project is to design a multifunctional Camouflaged Robot including multiple sensors. The system consists of color sensor to detect the surrounding color and can changes the color of the robot according, it senses mainly three colors Red, Green and Blue[RGB] using LED module. Using camouflage principle, the robot can hide from enemies. The whole robot is controlled through a smart phone using commands. There are many other sensors that are also included in the robot such as metal sensor, gas sensor, PIR sensor, IR sensor. Robot also comprise of a camera to capture the video and images of surrounding.

➤ *Proposed Architecture of the Robot*

The system consists of Arduino uno, LED Module, Blynk app, Wifi Module ,Sensors ,DC Motors, PIR Sensor, IR Sensor, Metal Detector ,Gas Sensor. PIR sensor is electronic device where it can detect the changes in the surrounding , movement of any devices. Metal detector will detect metals that are found in the surrounding. Robot sends message to the user through a smart phone.

Arduino uno is a low- cost programmable board which is used in many IOT projects in order to interface with sensors, power supply. It consists of digital and analog pins with USB cable port, 14 digital input/output pins, 6 analog input/output pins Embedded C programming is used for programming Arduino board.

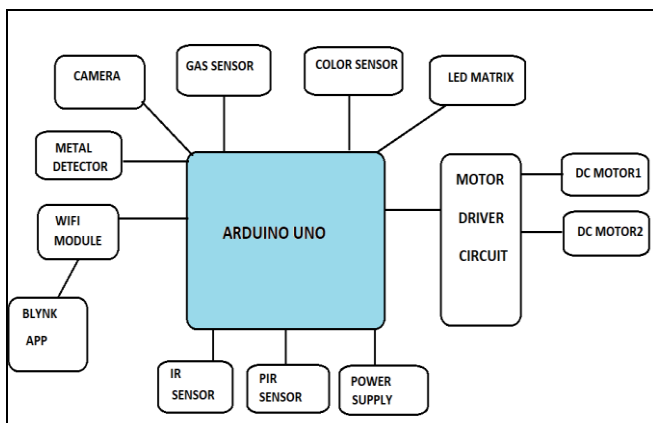


Fig 2. Proposed System Block Diagram.

The following are the components

A. Metal Detector

Metal detector is a proximity sensor used to detect the harmful metals and objects that are present in the surroundings, which could cause harm and immediately sends the message via blynk app to the smart phone as metal is detected.

B. Gas Sensor

Gas sensor is used to detect the toxic gases that are present in the surroundings. Toxic gases consists of harmful chemicals and also detect the smoke present in the surroundings.

C. IR Sensor

IR sensor is used for obstacle detection. It works the principle of heat radiated from objects. Based on the heat radiated it detects the obstacle.

D. PIR Sensor

PIR sensor is used for movement of humans and animals. It is a passive infrared sensor, works based on heat radiated from objects.

➤ *Color sensor*

Color sensor is used for detecting the color of the surroundings and based on surroundings color it changes its color to red, blue and green using LED module.

➤ *Wifi Module*

Wifi module is a wireless connection connected between robot and smart phone.

➤ *Motor Driver Circuit*

Motor driver circuit is used for controlling DC motors.

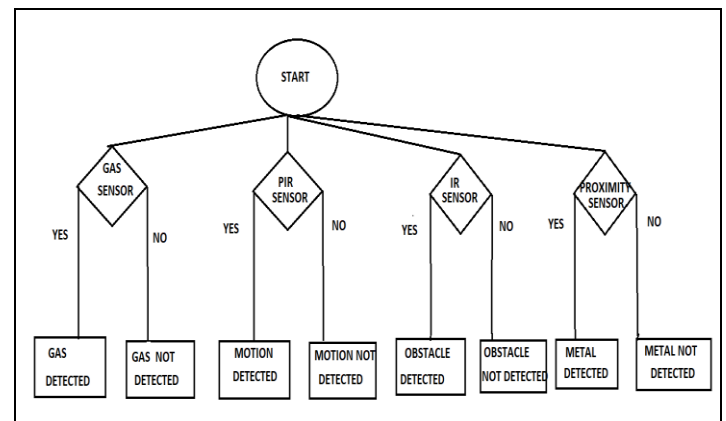


Fig 3 Motor Driver Circuit

V. RESULTS AND DISCUSSION

The proposed system is comprising of robot controlled through smart phone via blynk app. The function of blynk app is to control the movements of robot that is forward, backward, left and right using on and off switches. To receive the information about the sensors for example (Metal detected, Motion detected, Gas detected). Programming

language used is embedded C to code for controlling movements of robot and sensors in Arduino IDE software. Then the code is dumped inside Arduino Uno and WIFI module.

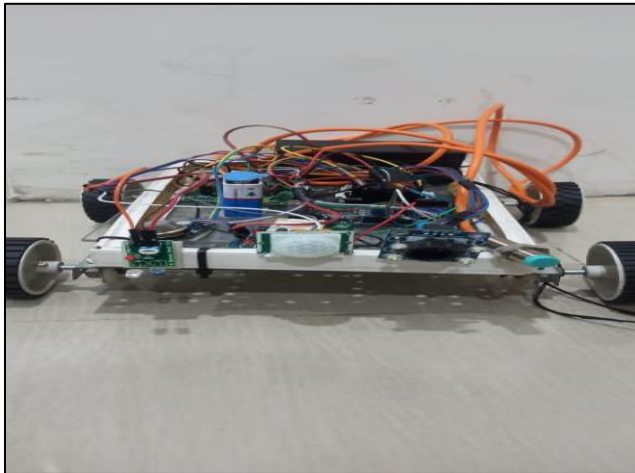


Fig 4. Hardware Setup



Fig 5. Color Sensor

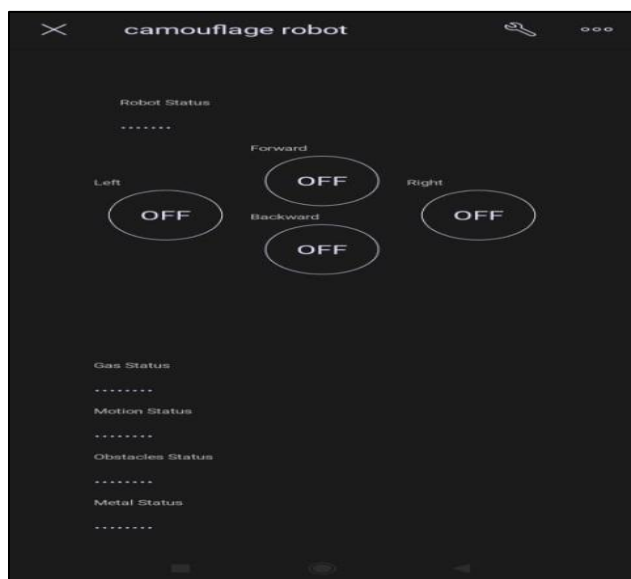


Fig 6. Blynk App Interface

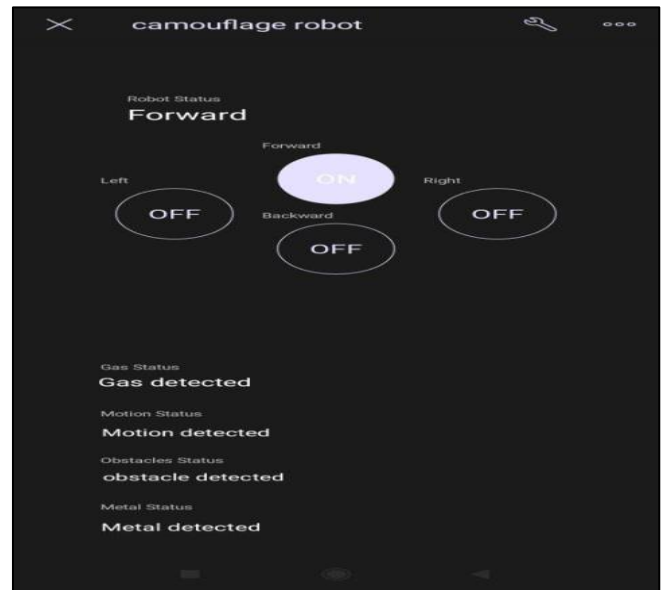


Fig 6. Sensors Detected

The camera is used for video surveillance purpose. It is placed on the top of the robot. The user can record videos, capture images which can be viewed in smart phone.

VI. VI CONCLUSION

This work aims at designing and implementing a Camouflage Robot that can move in all directions by changing its color according to the surrounding. It also detects the gases, obstacles, metals and captures images that are present in surrounding. We use Blynk cloud app which gives commands and sends the information to the user.

FUTURE SCOPE

In coming years, the robot can be improved by including extra features such as adding more sensors so that robot have better sensing capability. If the robot operator is not in a position to control the robot it has to protect itself this can be achieved by adding artificial intelligence.

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