

DESIGN OF IOT BASED CAMOUFLAGE MILITARY ROBOT

Soujanya Kalal¹, Kaveri P Hattikatagi¹, Sukanya Kalal¹, Varsha V¹, Geetha V²

¹UG Scholars, Department of ECE, Sambhram Institute of Technology, Bengaluru

² Assistant Professor, Department of ECE, Sambhram Institute of Technology, Bengaluru

Abstract - Nowadays, many expenses are made in the field of defense in adopting primitive security measures to protect the border from the trespassers. Military Robot plays a vital role in saving human loses as well as the damages that occur during disasters. Thus, it will gain more importance in the upcoming era. Some military organizations take the help of robot in the risk prone areas which are not that effective when done by army men. Since human life is always valuable, this robot can be the substitution of soldiers in war areas. These Army robots are confining with the camera, sensors, metal detector and video screen. This project determines to provide Surveillance, Metal Detection and Smoke Detection. This paper has proposed the system using the Arduino, metal detectors, gas sensors which help the robot to do rescue operations.

Keywords- Arduino Uno, Gas detector, IRSensor, Metaldetector, PIRSensor.

1.INTRODUCTION

Science is developing new technologies to ease human life. One such invention of this technology is specialized robots in the field of Artificial Intelligence. The word robot means “A machine capable of carrying out a complex series of actions automatically, especially one programmable by a

computer”. These robots help to make human life much easier especially in dangerous areas & works. One of the concern areas of today is the military. Military robots are specially used to take the risky job which is difficult to be handled manually by humans. These robots act as the assistant of a soldier.

This army robot is more efficient and effective compared to the soldiers in terms of strength, calculations, capacity and capabilities. Excellency of this robot is in being operated wirelessly by a remote which offers no threat to the soldier lives. The Small android robot that can spare the shades where it moves and therefore blend in with the competitive world. The advanced immersed technologies are firmly adapted by the defence services to provide some security systems for our soldiers.

The security of the nation is observed and uninterrupted by the navy, army and air force. The fundamental reason of this project is to fabricate a robot that will help military services by building robots that are not detectable by the enemies. This robot will also serve us to spy on the enemy. A camera is fuse in the robot where in it will show the recordings or depictions taken while travelling onto remote territories.

2. LITERATURE SURVEY

2.1 The paper titled “*A Survey On Autonomous Military Service Robot*” authored by Deepak Patil, Ritesh Bhatlekar, Munsaf Ansari, and Dilisha Tendulka in the year 2020

This paper focus on real-time human-detection and tracking in chaotic and dynamic conditions and also highlighting the significance of incorporating robotics, communications and Information investigation in the field of land mine discovery. Army robots used in military environment can help in reducing cost, save lives and are as of now accessible in the types of self-sufficient automatons like drones, weapons and UAVs. The main thought is to plan and execute a prototype of a proficient ease computerized robot that is suitable for detecting covered mines and permit the user to control it remotely to keep away from human causes. Armed forced robots are apparently effectively already here in the form of autonomous drones, weapons and UAVs, with transport logistics vehicles hot on their heels. But if new age of robots all the more intimately with human partners in a group, they will require the learning capacity to manage circumstances that haven't been pre-modified in a lab. Yet, while robots utilized in military positions can help, lessen costs, empower efficiencies and saves lives when on our side, when in the hands of the enemy, or whenever given a lot of self-sufficiency, they could make fatal new dangers.

2.2 The paper titled “*Military Surveillance Robot*

Implementation Using Robot Operating System” authored by Aditya Prakash, Rahee Walambe in the year 2018

This paper has set a vision that how the model of Military Surveillance Robot developed using Robot Operating System. The map generation based on Kinect sensor is presented and some test case scenarios are discussed with results. The objective of this paper was to build a simple military surveillance robot. The robot prototype is moving with the help of a remote controller. The commands for moving front, back, right, left and stop are being received from the remote controller and accordingly the input is fed to the Raspberry pi 3 which makes the robot setup respond as per the instructions given i.e. moving forward, backward, rotate right or left or stopping the movement. The Kinect sensor, which is mounted on the robot setup, is interfacing with the Raspberry pi 3 as the robot is moving around. The Kinect sensor works like a camera with an additional feature of depth measurement i.e it depicts the distance of object from itself by representing the object in the form of grayscale values ranging from 0 to 255 where 0 amounts to black which implies the object is closer and 255 amounts to white which implies the object farther.

2.3 The paper titled “*Development of Tank-*

Based Military Robot and Object Tracker”
**authored by Widodo Budiharto , Vincent
Andreas , Jarot S. Suroso , Alexander
Agung S. Gunawan and EdyIrwansyah in
the year 2019**

This paper focuses on how the Indonesia has adopted the technology-based robots in their defence. However, Indonesia is a country whose economy is developing very fast. According to World Bank data, Indonesia is the country with the largest economic development in Southeast Asia. Unfortunately, the threat of terrorism in Indonesia is very large, therefore it requires a smart system such as military robots. Today's vision-based robot technology has also been used in the development of autonomous military robots. A sophisticated military robot is a robot that is needed by the military/police because it can be deployed to the battlefield or the eradication of terrorism in a remote or autonomous manner. Their system is needed to reduce the remaining casualties from the army, and this combat robot system can also be operated at any time with more numbers than regular soldiers and with minimal operator needs. They have proposed a prototype of a tank-based military robot with object detection and tracking and turrets for simulation of shooting the enemy target based on the computer vision. The object tracker will detect an upper body of the target using a library in Open CV and the tank will track until it reaches the best position to shoot the target. The methods explained, and experimental results were presented.

The following survey is to show the number of soldiers died in defending their country yearly. The deaths caused due to the non-development of the defence system in India. The survey is completely based on the Information Bureau of Ministry of Defence, Government of India.

YEAR	DEATHS IN ARMY	DEATHS IN AIR FORCE
2014	1084	124
2015	1378	215
2016	2104	319
2017	1474	121

Table 1: Table for Survey of Deaths in Indian Defence System

3.PROPOSED SYSTEM

The principle of the army robot is based on the colour changing technique. The aim of the project is to design, develop and operate the robot via a smart phone, used as remote-control device. Apart from this it can also reproduce the colour accordingly with the ground surface where it will be moving on with the help of colour sensor, hence being camouflaged to the outside world. Hence, in order to achieve these goals, we have used a LED that can diffuse uniform colours, coupled to sensors that can precisely identify colour of the ground. On the other hand, we have also created a system which can receive and implement the information received from the smart phone using IOT to further control motors which in turn drive the robot in any required direction. Here model is redesigned to make the machine perform multitasks so that along with checking for several parameters for monitoring, it also carries out other significant tasks on its own using IOT. Hence this model is design for the making of the multitasks performing along with the

checking to the several parameters for system monitoring for this it requires other significant tasks on its own using the Arduino Uno.

This System consists of Arduino Uno that operates PIR sensor, IR sensor, RFID, Metal detector, Gas detector for detecting any intruders and obstacles and also scanning radio frequency, and dangerous metals and harmful gases respectively to each sensor. It can be operated using a WIFI module. It is the interface between the user and the system. The motor driver circuit drives the Robot as per the commands given by the user using WIFI module. We can only receive the information from the sensors and we can't see or hide using this system.

On the other hand, we also introduced a spy camera to capture the real time data as video and images. It consists of a WIFI connection to get operated according to the necessity. We can rotate the camera according to the information we need. This robot is designed in such a way that it can reproduce the color independently at various areas each area being able to reproduce color with specific spots of the ground surface which allow the robot to mock up as a checkerboard of multiple colors – the various colors it drives over. On the other side we also created a system which can be the receive and implement the information which is received from the smart phone using the Arduino Mega to the further control of the motor drives which can be the drive a robot in the required direction. Hence this model is design for the making of the multitasks performing along with the checking to the several parameters for system monitoring for this it requires other significant tasks on its own using the Arduino Uno.

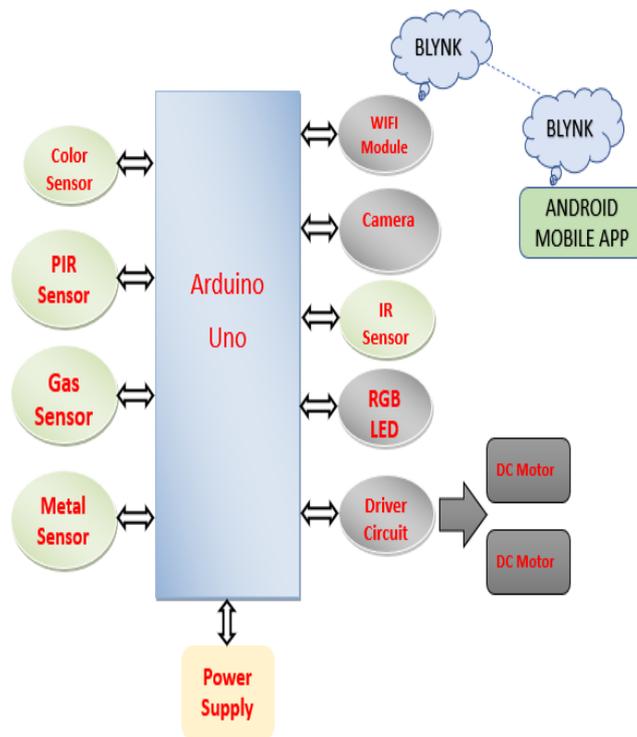


Fig 1: Block Diagram

3.1 . WORKING

The idea of the Military Robot is based on the camouflage techniques. The aim of the project is to design, manufacture and operate via a Smart phone, used as remote-control device can reproduce the color accordingly with the ground surface where it will be moving on, hence being camouflaged to the outside world. On the one hand, in order to achieve these goals, we used a LED matrix (RGB) which can diffuse uniform colors, coupled to sensors that can precisely identify ground colors. This robot is designed in such a way that it can reproduce the color independently at various areas each area being able to reproduce color with specific spots of the ground surface, which allow the robot to mock up as a checkerboard of multiple colours – the various colors it drives over. Furthermore, Camera is attached to show the real time data wireless through RF, Gas sensor to detect toxic

gas, Metal sensor to detect metal arm and weapons if any, PIR sensor to detect human intruders or soldiers beneath the earth, LCD display to display the detected parameter.

The robot is being camouflaged and is controlled from afar an object. So, in the defence sector, such a Robot would allow the vehicles having large size to be camouflaged in fact, Camouflage is essential in the army missions. Besides, in the Intelligence sector, we could use spying robots like drones.

3.2. Block Diagram Description

The system proposed here consists of Arduino, LED, BLYNK cloud, sensors, Wi-Fi module, IR sensor, metal detector, DC motor, gas sensor and they are arranged as shown in figure 1. PIR sensor was high temperature and electronic device for which if any changes are there in the radiation pattern and the device movement and change in the surrounding, it generates the electric charges, Metal detector will detect the metal that was near to the device based on the eddy current losses that are produced on high frequency according to that the signals of output change.

Arduino will provide the commands and it processes the information from the sensor. The colour sensor senses the colour of the surroundings and it changes the body colour of the robot and it moves based on the commands that are provided from the BLYNK cloud tool. The Arduino will provide the commands to the dc motors that are used to drive the robot.

Metal Detector: Metal detectors consist of a coil that transfers the electromagnetic field into ground. If any object or metal or landmines are within the electromagnetic field then the EMF gets activated and send back the same signal. Metal detector is a

device that is used to detect the presence of metal bodies that area nearby the detector, this is used for fetching the devices that are hidden the surroundings or the objects that are underground surface.

PIR Sensor: PIR is also known as passive infrared sensor. It mainly grasps the Infrared radiation coming out from the objects. It works on the radiant heat coming out or absorbed by the objects. PIR sensor is defined as passive infrared sensor is an electronic sensor that is used to measure the infrared rays that are radiating from the objects in the view of the sensor.

Colour Sensor: The colour sensor consists of four filters viz. red filter, blue filter, green filter and clear filter. It works on the principle of chromatic light. Colour sensor is nothing but the colour detector. It has white LEDs that can measure the visible range of colours in the environment.

IR Sensor: Infrared sensor works on the concept of heat radiated from an object. It senses the heat or any radiation that is coming out of an object. IR is defined as the infrared radiation and it is used to detect the heat that was present in the surrounding and based on this it will detects the motion of the object it is also known as passive IR sensor.

Gas Sensor: Gas sensor is a device that is used to detect the gases that are present in that area they are often used for safety purposes in office, banks etc. this is used for detection of leakage of the gases

Wi-Fi Module: Wi-Fi module is device which is based on the IEEE standard i.e., 802.11 it was based on TCP/IP protocol .

3.2. IMPLEMENTATION

We are proposing a system used for controlling the robot using BLYNK application in the android device. The controllers of the BLYNK app are designed for managing the movements of the robot. In the BLYNK application these controllers are defined by embedded C program which is dumped in the Arduino Mega and displayed by using the BLYNK app that was interfaced with the Arduino Uno. Small DC motors can be switched “On” or “Off” by means of switches, relays, transistors or MOSFET circuits with the simplest form of motor control being “Linear” control. The robot sensors and sends the status of sensors where the metal, obstacles and gases are present. The colour sensors detect the surrounding colours and changes its body colour according to the surroundings by the help of the matrix LED, this LED glows and this robot acts as the spy. The other hardware components are used in this are dc motors to moving the robot and sensors are also used in it. Gas sensors are used to the detect the toxic gases, metal detector is used to detect the metal arms and weapons, IR sensor to detect the obstacles, PIR sensor to detect the movement of animals or humans etc, Color sensor to camouflage the robot. Total Hardware build is given below

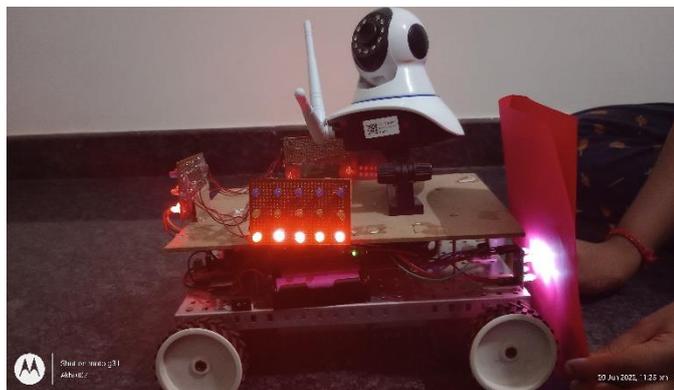


Fig 3: Camouflage output indicating surrounding’s to be Red in colour

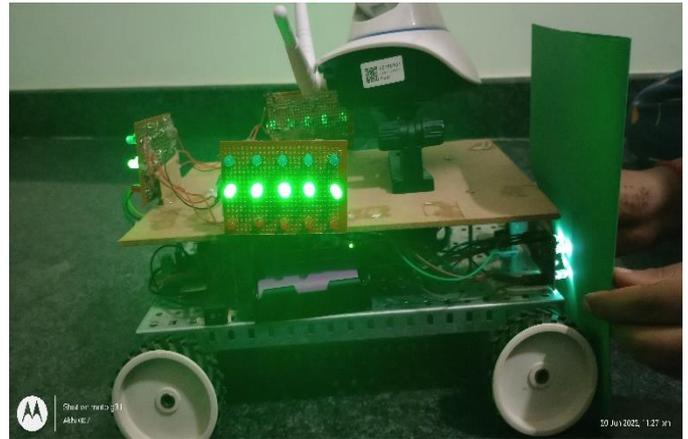


Fig 4: Camouflage output indicating surrounding’s to be Green in colour

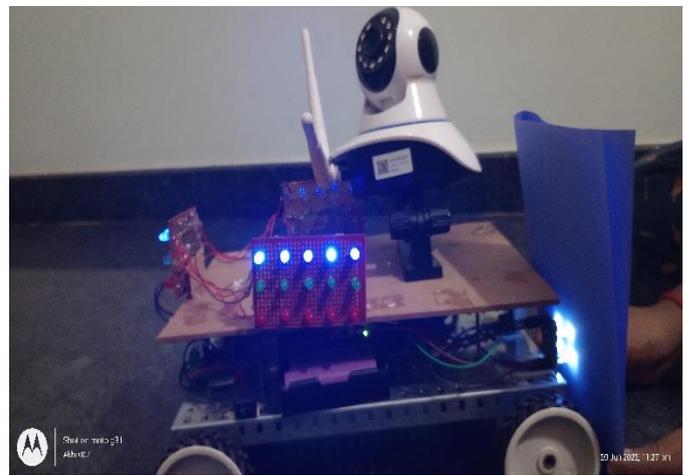


Fig 5: Camouflage output indicating surrounding’s to be Blue in colour

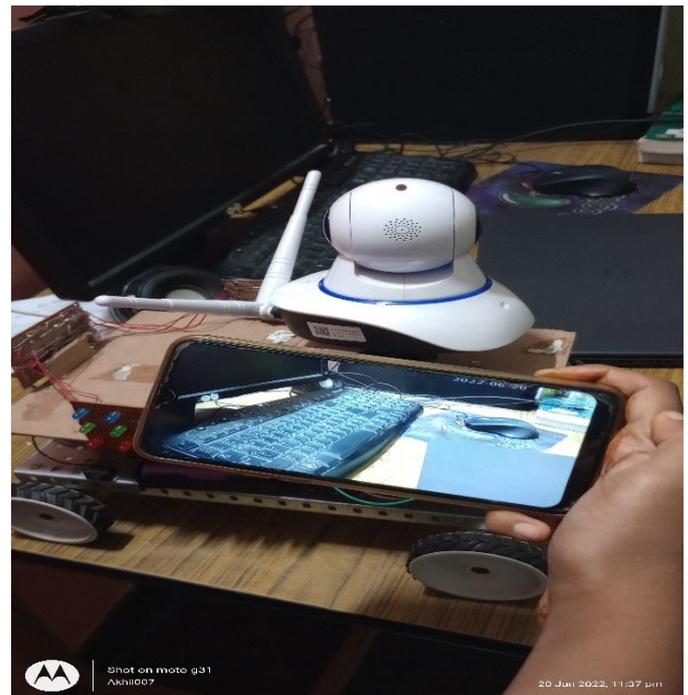


Fig 6: Camera output using V380 pro android App

4. CONCLUSIONS

We are concluding our paper that camouflage robot changes the colour by using the colour sensor and utilizing the usage of chameleon technique it also detects the gases that are present in the surroundings, by the use of BLYNK cloud we can give the commands and then send the information to the nearest camp bases that are recognized. The proposed framework is a substitution to human life. This proposed robot assists with going about as a security framework and furthermore as a lifeline as human life is in every case more organized. It establishes and assumes a significant job in watching out for the fields of war and catching the environmental factors. Since it depends on the changing impact of the Chameleons shading, the robot changes its shading relying upon the general condition and is avoided the knowledge of the adversary. Robot to robot contact makes out of inclusion territory administration.

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