# RED HERRING RECONNAISSANCE ROBOT

## S.VINODHINI[1], P.LOGESH[2], M.AASIR AHMED[3], S.MOHAMED MUAAZ[4]

*[1]Assistant Professor, EIE Department, Bannari Amman Institute of Technology, Tamilnadu, India*
*[2,3,4]BE Student, EIE Department, Bannari Amman Institute of Technology, Tamilnadu, India*

---------------------------------------------------------------------***---------------------------------------------------------------------

**Abstract -** *Camouflaging is the way of concealing the existence of objects with the help of materials which disguise themselves with the environment. In this project, the existing problem of spying robot in lacking the feature of camouflaging is rectified. Initially, an application has been developed using MIT app inventor which is used for transmitting the signal to HC 05 Bluetooth module which is interfaced with the ARDUINO. Then the control signal is transferred from ARDUINO to the DC motor through the Motor Driver Shield. For camouflaging purpose, two mobiles are interconnected using video call and placed beside the robot which helps the robot to blend with the environment. For spying purpose, two mobiles are connected using the same email id and the camera of Mobile 1 is controlled using Mobile 2 which helps to monitor the environment*

***Key Words*:** Spying, Camouflaging, DC motor, Robot, video call, email id.

## 1. INTRODUCTION:

### 1.1 Introduction to Robotics

Robotics is a branch that born due to the combination of science, Technology, Engineering and Mathematics. Robotics deals with the construction, design and working of robots. The main purpose of robots is to reduce the human efforts and time to increase productivity in the fields like Manufacturing, Controlling and Quality checking. The term "ROBOT" is firstly used in a play named R.U.R by a Czech writer. This term is already in use and it is derived from the word "robota" which has a synonym of "forced laborer" in a Slavic language.

### 1.2 Robots in Defense:

Robots play a very important role in the field of defense. They are fully or semi autonomous in nature and used mainly for surveillance, spying, finding & neutralizing the explosive mines. They are used rarely in attacking enemies too but their control will be in the hands of controlling officials to avoid endangering the lives of innocent human targets. In 2005, U.S Military forces used SWORDS (Special Weapons Observation Remote Reconnaissance Direct Action System) machines to observe the grounds of Iraq which marked them as first armed robots used to see action on the grounds.

### 1.2 Robots for Espionage:

Spying plays an important role in gaining information about enemies and devise plan according to them. In old days, humans used to spy on their enemies to know about their strength and weakness. Still today, if people are found guilty they will be hanged to death. This results in downfall of the mission's aim. To avoid that, robots are used for sabotaging, without creating doubts. Robots like radio controlled robot models which are the bio mimics of dolphins help us take footages of underwater animals without creating dubious to those animals. Despite of their shape and size of UAV & UGV, they can be easily spotted by their enemies. To overcome this, we proposed a method to include camouflage feature to these robots which appropriately reduces the probability of being caught.

## 2. HARDWARE COMPONENTS:

### 2.1 Bluetooth Module:

Radio waves are used for communication without using any cables or hard wires. Bluetooth is a similar technology that uses radio waves to communicate over small distances. Radio waves are sent and received using Bluetooth in a band of 79 different frequencies, where they are operated on the frequency of 2.45 GHZ. Bluetooth is far more secure than other wireless technologies as it works under low range. It frequently changes its frequency from one frequency to another frequency to using a technique known as Spread-Spectrum frequency hopping. The devices which are paired in Bluetooth shifts its frequency thousand times a second to avoid interference. Here, Bluetooth module named HC-05 is used as a communication device, which is used to transfer data between microcontrollers and computers or mobile phones. HC 05 can act both as a slave and master. It can work under the range of 10m or 33ft. Data is transferred at a baud rate of 9600. The module communicates with other microcontrollers with the help of USART. The HC 05 which is shown in Fig -1 can operate under two modes as data mode or command mode.
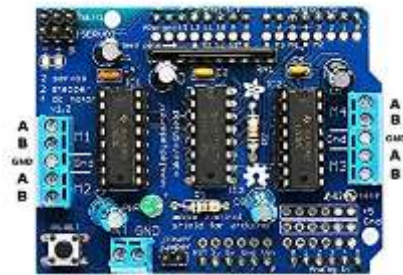
**Fig -1:** Bluetooth Module HC 05

## 2.2 Arduino UNO:

Arduino Uno is an open source platform created by Arduino.cc based on the Atmega 328p microcontroller. It has 14 digital Input/output pins out of which 6 pins are PWM pins. It has 6 analog pins named from A0-A5 to get analog input from the instruments. Language derived from C & C++ can be used to program the software that runs on this board. For that, it has an environment known as Arduino IDE. The Arduino board which is shown in Fig -2 operates under 5v power supply. It also has 16 MHz clock speeded Crystal Oscillator, voltage regulator, Serial communication to support the microcontroller. It has a total of three pins dedicated for power supplies out of which one can provide supply voltage of 3.3v and other two pins having a supply voltage of 5v. It also has three built in ground pins which are connected internally. The microcontroller board can also support communication protocols like UART, I2C,SPI by having pins for them too.



**Fig-2:** Arduino UNO

## 2.3 L293D Motor Driver Shield:

L293D motor driver shield which is based on the chip L293D is used as an expansion board for the Arduino to control the dc motors. So the motor driver expansion board got its name Shield. It can control up to four DC motor or two stepper or two servo motors. It has two built in L293D chips as shown in Fig -3 which helps it to control DC motors at the same time. It has also a inbuilt Shift register named 79HC595 which helps in controlling the direction of motor drivers by expanding the 3 pins of Arduino to 8 pins. It can supply up to 600mA or 0.6A to each DC motor.



**Fig – 3:** L293D Motor Driver Shield

## 2.3 DC Motor:

Battery operated DC motor works based on the principle of converting the electrical energy into a mechanical energy. As shown in Fig-4 gear assembly which helps in reducing the torque by increasing the speed of the shaft. It consists of dual shaft mechanism which helps in fitting the wheels on both the side of the dc motor. It runs under 300 rpm which helps in getting the desired speed.



**Fig - 4:** DC Motors

## 2.4 Lithium Ion Battery:

Lithium ion battery is a kind of rechargeable battery that can employable in the areas like electronics aerospace and military applications. As shown in Fig -5 has dimension of 18mm in length and 6.5mm in width which makes it call by the name 18650 Li-ion battery. It can be recharged within 2 hrs. A charging cycle marks the battery's expected life by tracking the process of charging and discharging. It has around 500 charge cycles.



**Fig – 5:** Lithium Ion Battery

## 3. METHODOLOGY:
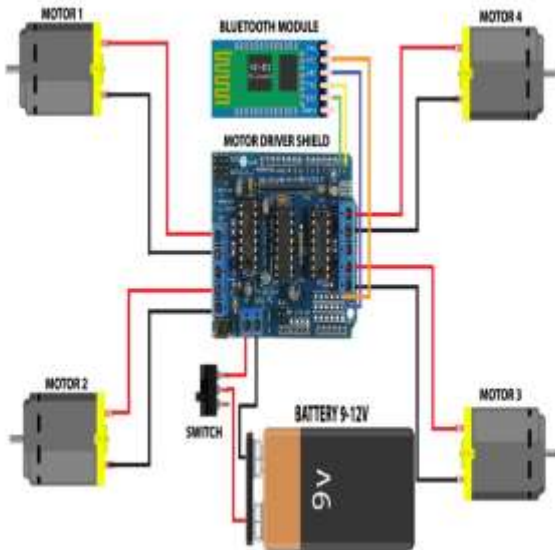
### 3.1 Hardware Implementation:



**Fig – 6:** Circuit Diagram for Movement Of Robot.

As shown in Fig –6 the bluetooth Module HC 05 is interfaced with Atmega 328p microcontroller by connecting the Tx pin of bluetooth module to Rx pin of Arduino Uno and Rx pin of Bluetooth Module to Tx pin of Arduino Uno. The Bluetooth module is powered by connecting its Vcc and Gnd to respective 5v and Gnd pins of Arduino board. The Motor Driver Shield is interfaced with Arduino by placing it on top of the Arduino board.The positive and negative terminals of DC motors are connected to the respective motor terminals of two channels present in it. Likewise , other DC motors are also connected to their respective channel terminals. The circuit is energized by connecting the Lithium ion battery in the External Power Supply terminal through a Toggle Switch which helps in controlling the supply of energy the circuit.

### 3.2 Working Process:

A mobile app is developed for communicating with bluetooth module to control the movement of robot. The Arduino recognizes the sent data to the bluetooth module and take respective actions to the DC motors through Motor Driver Shield.

The camouflage effect for the robot is created by placing two Smartphones beside the robot. Those devices are connected using the live video transmission through internet. The camera of the left smartphone detects the object in the left side of the robot and displays it on the smartphone on the right side of the robot. And the camera of the right Smartphone detects the object in the right side of the robot and displays it on the smartphone placed on the left side of the robot. Thus using the normal video call effect as a concealer to this robot.

For spying purpose, a smartphone is placed in the robot. The camera of that smartphone is controlled by another Smartphone by installing the same application named SeeciTv in that smartphones which uses the same email Id to establish connection between them.

## 4. RESULT AND DISCUSSION:

The existing methods of robots used in espionage cannot be used in live environment and it can only be used in backgrounds with Red, Blue & Green color. So the existing method does not satisfy the feature of camouflage entirely which lags the efficiency of espionage. Thus a robot is designed which blends with the environment according to surrounding surfaces and can be easily be hidden from enemies to keep the information confidential using camouflage technique.



**Fig – 7:** Bluetooth app for controlling robot



**Fig – 8:** Robot with Camouflaging Feature

**Fig – 9:** Monitoring of Espionage

As shown in the Fig -7 an application for controlling the movement of the robot is created using MIT App inventor. The application is scanned for any nearby Bluetooth devices to pair with it. Then the Bluetooth module HC-05 is selected from the list of nearby scanned devices displayed and the message changes from NOT CONNECTED to CONNECTED. Then the application is connected with the HC-05 Bluetooth module. The application has several buttons which are used for determining the movement and direction of the robot. If the robot has to move forward then the FORWARD button is selected in the application and the selected command is displayed in the serial monitor for the user information. Similarly if the robot has to move backward then the BACKWARD button is selected, if the robot has to move left then the LEFT button is selected, if the robot has to move right then the RIGHT button is selected and if the STOP button is selected then the robot becomes motionless. The two camera devices are placed besides the robot for creating the camouflaging effect which helps in blending with the environment as shown in the Fig – 8. The surrounding environment is monitored using the camera device placed on the robot as shown in Fig – 9. Thus it helps in monitoring the enemy areas without any difficulty.

## 5. CONCLUSION:

As per the present scenario human interaction on technology and future trends, robots are going to be used as perfect replacement of human being in armed forces. Modern spy robots are bio inspired and are developed to mimic the wild animals for spying the enemy's premises. Many organizations develop bio inspired robots such as dolphin, vulture, and monkey and also develop micro drones which are designed to look like bugs and beetles commonly called as "Insectothopters". Even though the robots and drones of the current generation are bio inspired, it can be detectable irrespective of their design and shapes. The proposed method comprises the feature of camouflage where the robot creates a distraction to the observer and blend with the environment. This enhances the defense strategies and to perform counterintelligence tasks against the enemies. It can also be used in the field of wildlife photography for capturing and recording the wild animals to reduce the dangerous human –animal conflicts which costs in the loss of human lives. It will be very useful in the areas that prone to human losses like LOC (Line of Control) will be monitored.

**REFERENCES:**

[1] Nelson Rai, Deepak Rasaily (March 2016), "Bluetooth Remote Controlled Car using Arduino " International Journal of Engineering Trends and Technology,vol.33,No.8.

[2] Hitesh Shinde, Kriti Sonawane (2018), "Camouflage Color Changing Robot", International Journal for Research in Applied Science and Engineering Technology,vol.6, Issue 4,pp.3627-3631.

[3] M.K.Keshavarajan, T.Kathiravan (March 2018), "Design and Implementation of Spy Robot with Camouflage Technique", International Journal of Science Technology and Engineering, vol.4,Issue 9,pp.99-1o2.

[4] Deepak Patil, Himali Patil, Abhijeet Patil, Sunil Kalal, (February 2015), "Camouflage Technique Based Multifunctional Army Robot", International Journal of Advance Research in Electronics and Communication Engineering,vol.4,Issue 9,pp.259-261.

[5] Dr.Shantanu K.Dixit, (April 2014) "Design and Implantation of e-surveillance Robot for Video Monitoring and living Body Detection ", International Journal of Scientific and Research Publication,Vol.4,Issue 4,ISSN,pp.2250-3153.