

# Spy Robot Based on IoT

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**Abstract**— Robotics is having the potential to positively transform lives and work and raise efficiency as well as safety levels. It also provides enhanced levels of service. Robotics is set to become the driving technology underpinning a whole new generation of autonomous devices and cognitive artifacts that, through their learning capabilities, interact seamlessly with the world around them, hence they provides the link between the digital and physical world. Robotics is the key driver of competitiveness and flexibility in large scale manufacturing industries. It is use for much application such as in military and video surveillance activities. By creating the webpage we can control this device from anywhere. This paper presents robotic technologies being used in spying. Our major focus is on the uses of robots in military for spying purpose.

**Key words:** Spy Robot, IoT

## I. INTRODUCTION

Many people die today because of natural calamities such as landslide, earthquake building collapse and even in terrorist attack. In case of earthquake or landslide it is not possible for a normal human to search the victims in such hostile conditions. So in order to find the people who are the victims of such calamities, we need to have a robot who can not only search the people affected by these calamities but also have the tendency to survive for long hours in any conditions. This kind of robot can also be used for spying purpose such as in military for detecting enemies. The spying robot is the one used for the purpose of spying on enemy territories. The spy robot can track the locations of the terrorist organizations and then plan attack at a given time. There are also risks of losing personnel in the event of getting caught by the enemy. So with advances in technology over the years, it is possible to remotely monitor areas of importance by using robots in place of humans.

With the aim of satisfying and meeting the changing needs of human from manufacturing unit to household robotics and automation has been a distinct key player throughout. The project focus on building a spy robot which is based on raspberry Pi with spy camera attached on it that can help people in many activities and reduce the human victims. This is composed of raspberry pi acts as server and can be controlled by user on their cell phone via web browser (html). There are 2 servo motors connected which can precisely control the velocity and acceleration of a device.

## II. ROBOT DESIGN PRINCIPLE

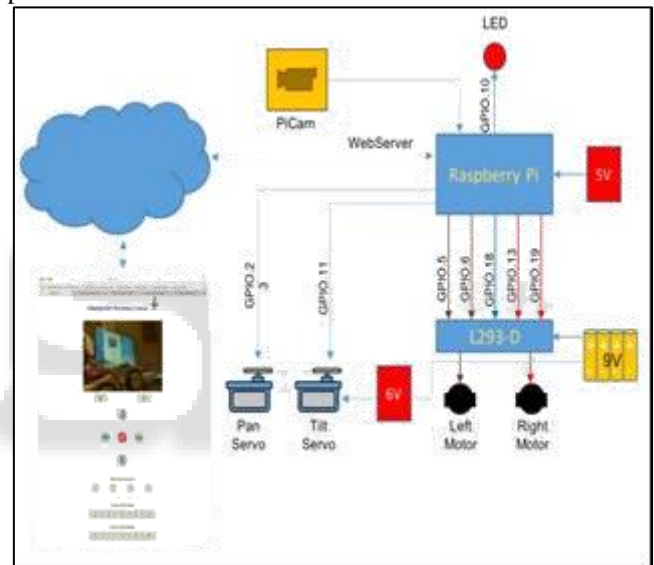
It is based on the raspberry pi robot which has a camera mounted over it, through which we will get live video feed and can control and move this robot from a web browser over the internet.

L293D IC is a 16 pin IC which is used to control two DC motors. It works on principle of H-Bridge. This IC helps DC motor to drive in any direction.

The camera which is mounted on the robot is been controlled by the two servo motors which is responsible for the movement of camera from top to bottom (tilt angle) and from left to right(pan angle).

## III. BLOCK DIAGRAM

The circuit consists of Raspberry Pie, Spy camera, L293-D Bridge, 4xWheels, 2xServo motors and 4xMotors. Here we have connected GPIO pins of raspberry pi with motor driver IC for controlling left and right motors. Pan tilt servo motor connected with pi for movement of camera both horizontally and vertically. And finally pi is connected to internet so that it can communicate with client via html Page on mobile phone.



## IV. MAIN COMPONENTS

### A. Raspberry Pi

Raspberry pi is the commonly used component for building project on robot. It size is small as credit size. It can be programmed using python programming language. It has total of 40 pins which can be use for a number of other application other than robot. Its act as a CPU and we can use it with different operating system as per our need. Ethernet port in the raspberry pi is the way in which other additional devices can communicate.

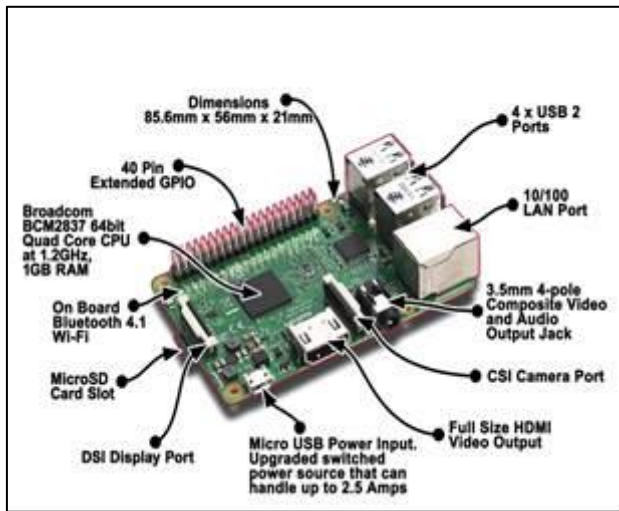


Fig. 1: Raspberry Pi Module

### B. L293-D IC

The L293-D IC is nothing but a bridge between the left motor and right motor. This IC allows the motor to rotate in any direction. As mentioned earlier L293D IC works on the basic principle of H-bridge. The H-Bridge helps the L293D IC for driving a motor. L293D IC consists of two H-Bridge circuits which helps in rotating the two DC motors separately. These circuits are used in robotics because of its small size and can also be used for controlling the DC motors.

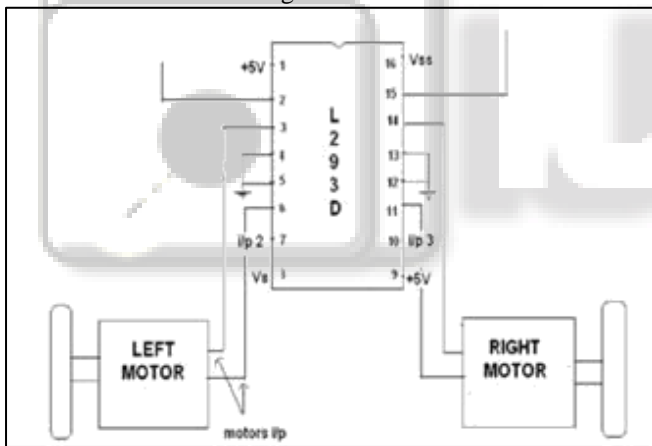


Fig. 2: L293-D Bridge

As seen from the above fig, the L293Db IC acts as a bridge between the left motor and right motor. The input for both these motors are provided by this IC.

#### 1) H-Bridge

The H-Bridge circuit consists of four switches for controlling the motor. If switches S1 and S4 are closed then a positive voltage is applied across the DC motor. Similarly if switch S2 and S3 are closed then negative voltage is applied across the DC motor.

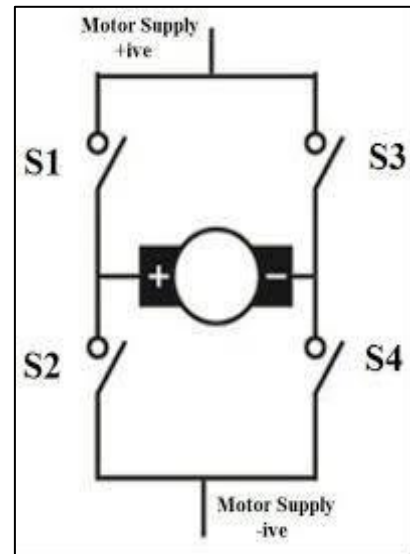


Fig. 3: H-Bridge Operation

As seen from the above fig, the H-Bridge consists of four switches S1,S2,S3,S4. A positive supply is applied across the bridge. Basically the main function of H-Bridge is to reverse the direction of DC motor. This can be done when the switches S2 and S3 are turned off.

### C. Servo Motors

A servo motor is a device used for rotating purpose. Here we are using servo motor for rotating the camera. Basically two servo motors are used, one for tilt and second for pan. Servo motor gives both angular and linear motion to the camera so that the camera can rotate in any direction and hence we don't need to rotate the robot instead.

Both the servo motors consists of three wires. Out of these three wires, two wires are used for supply (positive and negative). Servo motors are made up of DC motors which is controlled by the variable resistor i.e. potentiometer.



Fig. 4: Servo Motor

Type of Connection	Distance of bot from controller (m)	Working (yes/no)
LAN	10	Yes
WLAN	20	Yes
WLAN	50	Yes
DONGLE	$\infty$	Yes

### V. OBSERVATION

Distance of object from camera(cm)	Resolution ( Vertical pixel)
100	100
112	80
125	60
200	36
300	24
400	20
500	13
600	4

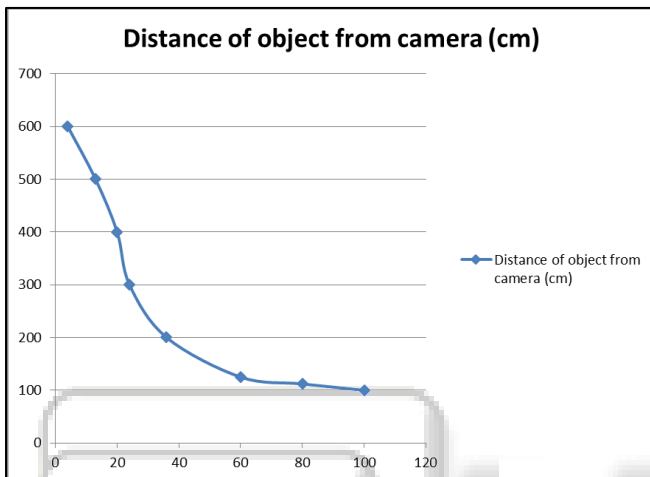


Fig. 5: Graph of distance Vs Vertical pixel

### VI. RESULT

As seen from the above figure as bot goes near to object we get less resolution image. At certain point we get a good quality of image. This point is called threshold point. If we use mobile hotspot or wi-fi module, the bot can work typically up to 20m. And if we use dongle then we can move the bot from more than 20m. But main disadvantage of using a dongle is that bot can work on dongle only if dongle is in range of network. This robot basically use for military for video surveillance. Thus by using dongle we can use this robot in long range for detect enemies.

### VII. CONCLUSION

The main aim of this project is to make it easily controllable by anyone. The robot can move freely, capture images and can show us live stream. Robot will move according to our given instruction with the help of html page. Raspberry pi will act as server and html as client which will make robot move accordingly. The robotics based on internet connected to it and can work without any distance restriction. It can also help to monitor our home in our absence.

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