

## Warfare Robot

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**Abstract:** These robot used in military are usually employed with the integrated system, including video screens, sensors, gripper and cameras. Android application controlled WARFARE ROBOT, built in with Robotic arm mechanism to pick up or place small objects (like explosives), an on board Wireless video camera, Infrared based surface depth and irregularities perception and android application for movement and other controls of the Robot. The robot will serve as an appropriate gadget for the defence sector to reduce the loss of human life.

**Keywords:** Defence robot, Robotic arm, Arduino, Wifi module, Android Application.

### I. Introduction

Majority of the military organization now takes the help of robots to carry out many risky jobs that cannot be done by the soldier. A war results in damage and many a times loss of human life. Hence in order to overcome this, the idea of building a warfare robot took existence. It would perform all the tasks as expected from a fellow human being along with no loss of human life. Basically warfare robot is multi-application arduino control robot operated on ESP8266 wifi module using android application. Speciality of this robot is it can be operated from anywhere using android app on any handset.

Warfare robot is built in with Robotic hand mechanism to pick up or move small objects (like bombs), an on board Wireless video camera, Infrared based surface depth to detect depth. It also contain applications like irregularities detection that is metal detection and android application for movement and other controls of the Robot. It contain PIR sensor for human detection. Thus the proposed system, a wireless Intelligent Defence Robot or Warfare robot saves human live and reduces manual error in defence side. This robot can go through anywhere that is not reachable by humans and can go into gaps and move through small holes that are impossible for humans and even trained dogs.

### II. Block Diagram

The Atmega microcontroller is the main component used in this circuit. The controlling device sends commands to the ESP8266 wifi module. And it will send data serially to the serial communication pins of atmega microcontroller. Robotic motion in different direction can be achieved with the serially obtained data. The output of camera can be viewed on an android device. Instructions for motions of robot are given by android application.

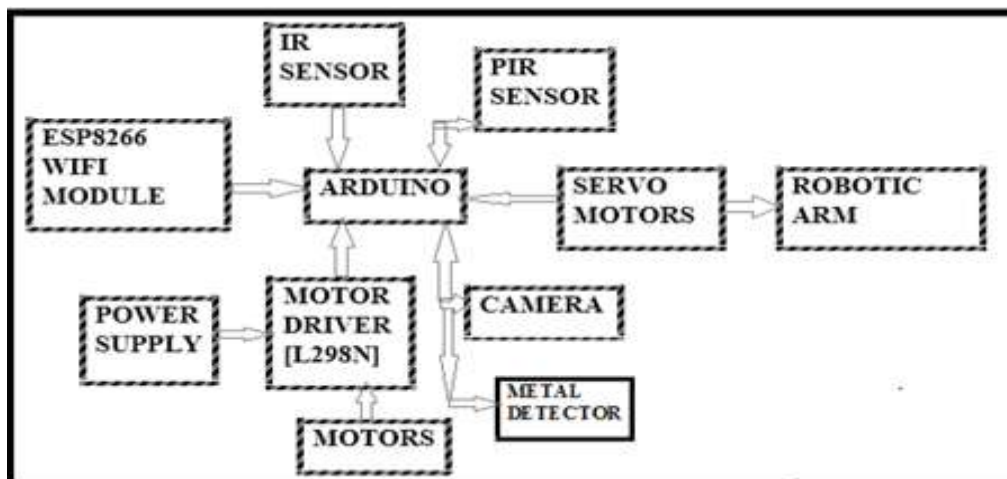


Fig 1: Block Diagram for Warfare Robot

### III. Component Description

#### A. ESP8266 WIFI MODULE:



**Fig 2: ESP8266 Wifi Module**

The ESP8266 is a very user friendly and low cost Wi-Fi module to establish internet Connectivity. The module can work both as a Access point (can create hotspot) and as a station (can connect to Wi-Fi), hence it can easily summon data and upload it to the internet moulding Internet of Things as easy as possible. Another salient feature of this module is that it can be programmed using the Arduino IDE which makes it a lot more genial.

#### B. IR SENSOR:



**Fig 3: IR Sensor**

IR sensor is used for the depth and irregularity detection in the war field. Light emitted from the IR LED, is in the range of Infrared frequency. IR light has wavelength (700nm – 1mm) which is much higher than the visible light range, hence it is invisible to human eye. Light emitting angle of IR is approx. 20-60 degree.

#### C. PIR SENSOR:



**Fig 4: PIR Sensor**

All living objects, whose body temperature is more than 0°C, emits thermal radiation which causes due to Emission of heat in form of infrared radiation through their body. This Radiated energy is invisible to human eye. These Signals caused due to heating effect can be detected by using PIR sensor which is specially designed for such purpose.

#### D. L298N MOTOR DRIVER:



**Fig 5: L298N Motor Driver**

This dual bidirectional motor driver is based on the L298 Dual H-Bridge Motor Driver IC. Motor driver L298N module will permit you to easily and independently control two motors of up to 2A each in both directions. It is absolute for robotic applications and well suited for connection to a microcontroller requiring just a couple of control lines per motor.

#### **E. SERVO MOTORS:**



**Fig 6: Servo Motor**

Servo motor is used to control robotic arm. For Robotic Arm we have used 4 servo motors.

#### **F. ROBOTIC ARM:**

A robotic arm is a type of mechanical arm, which is programmable, with similar functions to a human arm. According to requirement the links of such a manipulator are connected by joints allowing either rotational motion or translational (linear) displacement. The links of the manipulator can be reflected to form a kinematic chain. The terminus of the kinematic chain of the manipulator is called end effector and it is analogous to the human hand. We have used 4 servo motors, 1 for base rotation it can be 180 degree or 360 degree. Second for left side and third for right side used for up and down movements. And last for gear opening and closing for picking things.



**Fig 7: Robotic Arm**

#### **G. DC MOTORS:**



**Fig 8: DC Motor**

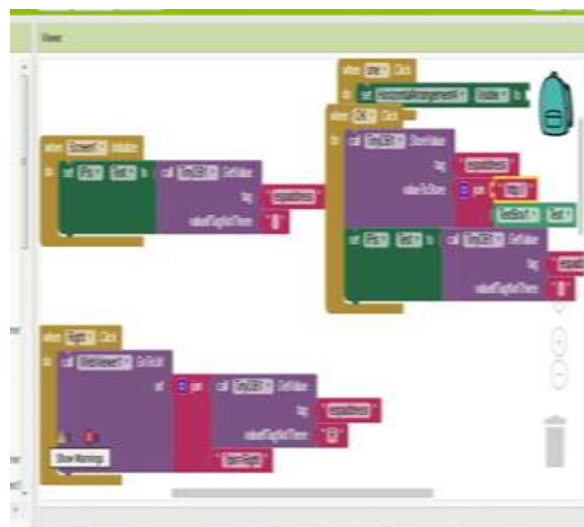
DC Motors are used for the wheel rotation of robot. It is operated using motor driver which helps it to rotate clockwise and anticlockwise. This motors used to left, right, forward, backward movements.

### **IV. Operations And User Interface**

The Arduino Atmega microcontroller is programmed in such a way that it provides output for the motor driver IC as well as servo motors of the robotic arm as per the character obtained from the host. The movement will be as follow for each character.



**Fig 9: Android Application Design**



**Fig 10: MIT Block Programming**

## V. Project Progress

We have successfully constructed robotic arm from scratch. Initially we worked on the block diagram and the circuit diagram of our project. We checked out all the components required to make our defence robot. We done with application creating for android control using MIT app inventor. Android application is used to control servo motors of robotic arm and dc motors of robot for forward, backward, left, right rotation through ESP8266 module connected on robot for wireless and communication.

## VI. Applications

- Military operations to avoid tedious and manual efforts.
- Surveillance along border for security purpose.
- Search and Rescue Operation.

## VII. Future Scope

In Future, the robot may use gas sensors to detect the poisonous gases in the environment. The robot may also have a bomb disposal kit in order to diffuse bombs in the war field. It may also contain laser pointed gun to shoot enemy in war field.

## VIII. Conclusion

In this paper, the model is described to build a robot using wireless communication for camera, robotic arm controlled by android application and gives the idea about developing android application in order to control the robot through application using the platform of MIT app inventor. To Enhanced the robot we can add features like gas sensors, bomb defuse kit and laser pointed gun.

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