

# Ware Field Robot with Integrated Night Vision Camera for Nighttime Operations

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**Abstract**— In order to decrease enemy infiltrations, the primary goal of building this robot was to monitor human activity in border zones or the fighting field. In order to capture footage of the battlefield in the dark and send them to safety, the robot has a built-in night vision wireless camera. Entering uncharted region puts military personnel at grave danger. In the military industry, the robot will be an effective tool for reducing casualties and thwarting criminal activity. Knowing the state of the land before entering it will be helpful for all members of the armed forces and military personnel.

**Keywords:** Android App, Bluetooth, Arduino Uno.

## INTRODUCTION

The introduction of new technology has caused a dramatic change in robotics and automation, which has an effect on every sector of society, from the defence sector to the domestic sphere. Also, the proliferation of smartphones in today's global market has altered people's daily routines and given rise to an abundance of applications for a broad range of operating systems. The Android operating system is one example of an influential open-source system; it has given humans practical assistance from a number of robots. In this case, the primary method of serial communication with the robot is Bluetooth. Bluetooth enables devices to share data based on their distance from one another. Connecting the robot to the HC-05 Bluetooth module is the plan. To talk to the robot, you'll need the Android app. Combat robots use an Arduino Uno as its central processing unit. It has L293D motor driver ICs and an HC-05 Bluetooth module. Two DC motors also

allow the robot to move. An android software and a motor allow the robot's night vision wireless camera to rotate 360 degrees, allowing for comprehensive situational monitoring. The introduction of a robot to a dark room before the military commanders during the Sydney siege, armed with a bomb disposal kit and a laser beam light, was a landmark event in the history of automation and robotics. Its purpose was to reduce the chance of human losses. There has been reduced casualties as a consequence of the use of cutting-edge technology by the New South Wales Police Department, which has been recognised as the most successful operation to date.

## I. LITERATURE SURVEY



The literature survey includes the architecture of Bluetooth module HC-05 along with L293D motor driver IC.

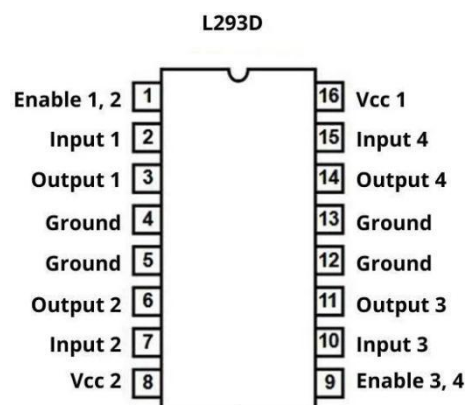
### A. Bluetooth Module HC-05

The Bluetooth module HC-05 consists of six pins. The six pins are Key, 5V, GND, Tx, Rx, Status. The Bluetooth module has two devices i) master device ii) slave device. One device connects to the master while the other device connects to the slave. The connection between the devices takes place as follows:

- One of the pin Tx is connected to pin Rx of the Arduino board while the pin Rx of Bluetooth module is connected to the Tx pin of Arduino. Thus, in a way cross-connection is

required for the operation of Bluetooth module. The GND pin is given to the GND pin of Arduino and power supply pin of Arduino is given to the pin of power. In order to have proper communication, the master device must be connected to the slave. Once the pairing is done between two devices, the device will ask to enter the password.

- The password will be either 0000 or 1234. Enter the password and both the devices will be connected to each other.[3]



### L293D Motor Driver IC

- The L293 and L293D are quadruple high-current half-H drivers.
- The L293 IS designed to provide bidirectional drive currents of up to 1A at voltage from 4.5V to 36V.

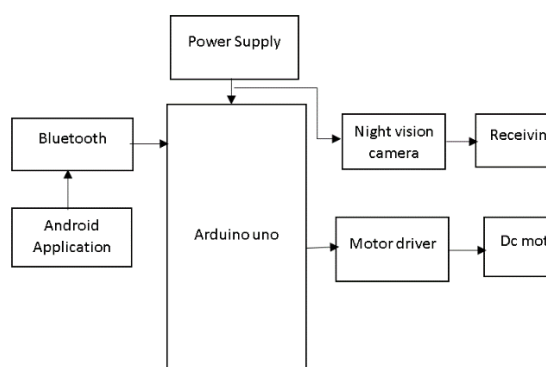
The L293D is designed to provide bidirectional drive currents of up to 600- mA at voltages from 4.5V to 36V.

- The L293D IC has sixteen pins. There are four input pins and four ground pins. Two motors are connected between the four output pins.

### Proposed System:

War, terrorism, and sensitive locations are the intended uses of this technology. It may also be used to work in areas that are too dangerous for people to access at night, such as rainforests. An Android smartphone may be used to remotely control the car, making it simple to operate. It can go forward, backward, and to the left and right using controls from an Android app. Receivers connected to an Arduino Uno make up the vehicle. Upon getting a command from the recipient. A driver IC now allows the v to control the motor that moves the object. Any Android smartphone may be used to effortlessly control the robotic car. A nice user interface is provided for controlling the vehicle. Assuming a solid Bluetooth connection, the Android handset can control the transportation. Control movement data is sent from the app to the car using the Bluetooth receiver at the vehicle. Robots equipped with night vision cameras can effectively use infrared lights to snoop even in the darkest of places.

### Block Diagram:



### List of Components:

#### Hardware:

- Arduino uno
- Bluetooth

- Night vision camera
- Dc motor with Driver

#### Software:

- Arduino ide
- Embedded C
- Android Application

## II. HARDWARE DESIGN

The hardware design consists of the mainly three sections.

### A. Bluetooth Connection with Arduino:

The Bluetooth module HC-05 is connected with Arduino board with Rx and Tx pins connected with the Tx and Rx pins of Arduino board i.e., Cross –Connection. [2,4]

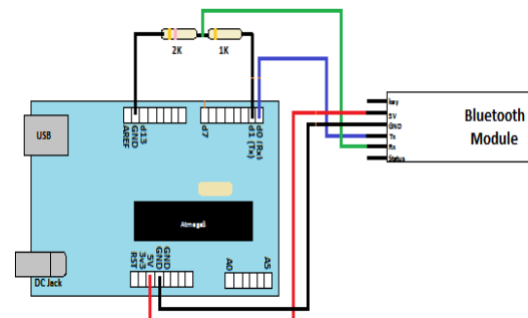


Fig.4 Bluetooth connection with Arduino

### B. Motor Interfacing

the DC motors is connected with the L293D IC through pins 3 and 6 and other motor through pins 11 and 14. The input pins are connected with the Arduino board. The Figure shown below is the Proteus implementation of connection of Arduino with L923D along with the motor interfacing for driving the robot. Fig.5 Motor- Arduino interfacing.

### C. Night Vision Wireless Camera





Fig.6 Night vision wireless camera [11] Features of Wireless Camera:[11]

- Automatic Motion detection features.
- Minimum 100 meters transmission distance without block.
- Imaging Sensor 1/3 Inch-CMOS. • CMOS Total Pixels:628\*582(PAL)/510\*492(NTSC).
- Minimum Illumination:1.5 lux
- View angle:62 Degree
- Camera Head weight: 15 gm.

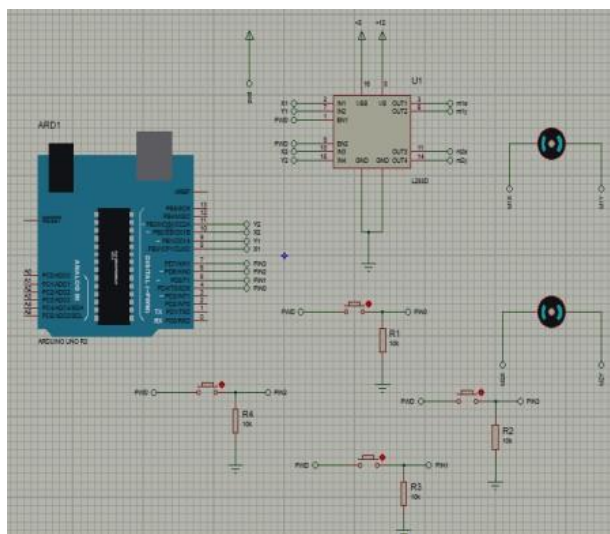


Fig.7 War Field Robot with Wireless Night vision Camera.

### III. ANDROID APPLICATION

Millions of users are using android applications today. MIT app inventor is one of the forum which has provided millions of creators and inventors the opportunity to design their own android application. The following are the procedures and steps to create the android application. A. Procedure and Steps for Android Application

- Select the [ai2.appinventor.mit.edu](https://ai2.appinventor.mit.edu) website and create an account on it.
- There are two sections
  - i) Designer
  - ii) Blocks.
- First step is to select the Horizontal arrangement from the Layout option.
- Select the block of List Picker and Upload Image in that from the properties Section. The List Picker will help to pick

the required Bluetooth connection from the List.

- Now to design the Remote Control, Select the Button option.
- Select the Tabular Arrangement and then one by one place five buttons which will act as forward, reverse, right, left and stop buttons.
- A slider is placed at the bottom to control the speed of the robot
- Select Bluetooth Client from the block Connectivity.
- Select the Clock option also.
- Create two more buttons for rotating the camera left or right.
- Next step is the blocks designing.
- Block designing consists of connecting programmed blocks with each other. Some

figures below will describe the block programming.

- Select the block of list picker before picking and adjust the block of Bluetooth client. Next select the list picker after picking option.
- Select the block of clock and adjust the Bluetooth client block with it. Select the connected option from the different options given like control, Math etc. [5,10]

#### IV. APPLICATIONS [11]

- Military operations.
- Surveillance along border.
- Search and Rescue Operation.
- Maneuvering in hazardous environment.

#### V. FUTURE ENHANCEMENT

It is possible to reduce the size of the robot. The short range is one of the robot's drawbacks. This robot can't be controlled from far away since the Bluetooth module utilised here has a restricted range. Wi-Fi and Zigbee are only two of the numerous available modules that can extend the range. Gas sensors to identify potentially harmful gases may be a future addition to the robot. In order to disperse explosives in combat zones, the robot can come equipped with a bomb disposal kit.

#### VI. CONCLUSION

This article provides a blueprint for a robot that can be programmed to use a night vision wireless camera and an Android app. Readers can also find information on how to use the MIT app inventor platform to create their own Android apps, which will allow them to

operate the robot wirelessly. Gas sensors and a bomb defuse kit are two ways to upgrade the robot.

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