A robot for the warehouse that can see in the dark

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Abstract— The main motivation for developing this robot was to keep tabs on human behaviour in combat zones or border areas in an effort to reduce enemy incursions. The robot has an integrated night vision wireless camera that can record the battlefield in low light and convey people to safety. Military men are gravely endangered when they enter an unexplored territory. When used by the military, the robot will help cut down on fatalities and foil criminal plots. Everyone serving in the military would benefit from being aware of the terrain's condition before venturing upon it. Bluetooth, an Arduino Uno, and an Android app are the main components.

I. INTRODUCTION

The introduction of new technology has caused a dramatic change in robotics and autmation, 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. You may give the robot commands using the Android app when you couple it with the HC-05 Bluetooth module. 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. Thanks to the use of state-of-the-art equipment, which has decreased fatalities, it has been the most effective police operation in New South Wales up to this point.

Section II: Literature Review

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:
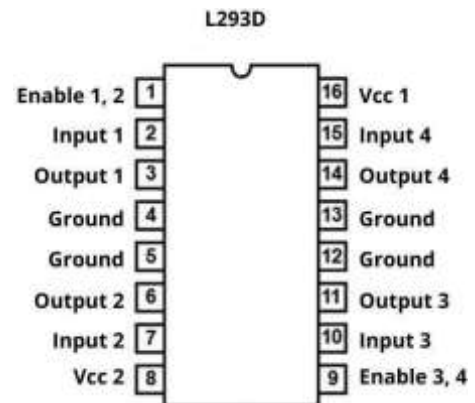
• One of the pin Tx is connected to pin Rx of the Arduino board while the pin Rx of Bluetooth module is connected to the Tx pin of Arduino. Thus, in a way cross-connection is required for the operation of Bluetooth module. The GND pin is given to the GND pin of Arduino and power supply pin of Arduino 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:
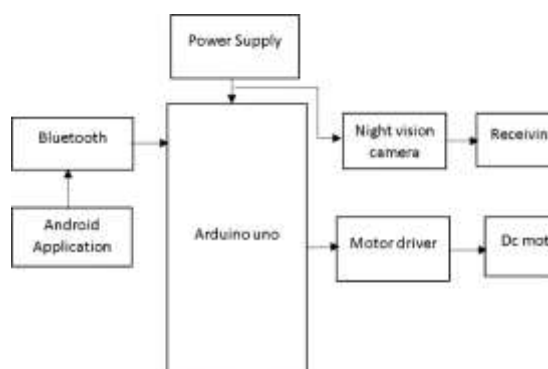
List of Components:

Hardware:

- Arduino uno
- Bluetooth
- Night vision camera

- Dc motor with Driver

Software:
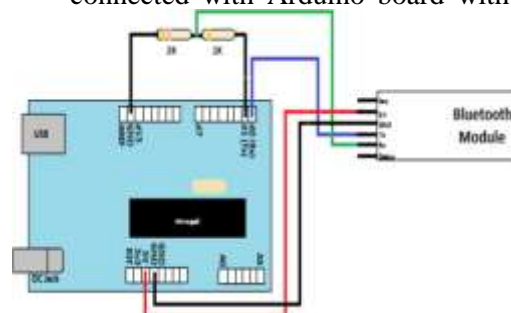
- Arduino ide
- Embedded C
- Android Application

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
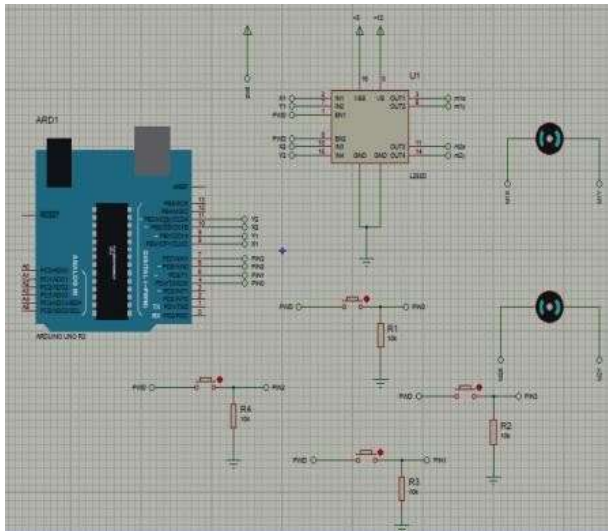
• Camera Head weight: 15 gm.

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

III.   ANDROID APPLICATION

These days, Android apps are used by millions of people. The chance to build their own Android app has been made available to millions of entrepreneurs and inventors via forums like MIT App Inventor. The processes and stages to build the app for Android are detailed below. A. Android Application Process and Steps
• Go to ai2.appinventor.mit.edu and sign up for an account.
The following are the two parts:

(i)   The   designer.   (ii)   Builders.

To begin, go to the Layout menu and choose the Horizontal arrangement.
• From the properties section, choose the list picker block and upload an image to that. Selecting the necessary Bluetooth connection from the List is made easier using the List Picker.
Choosing the Button option will bring you to the design part of the remote control.
• After choosing the Tabular Arrangement, arrange the five buttons—for forward, backward, right, left, and stop—in that order.
• The robot's speed may be adjusted via a slider located at the base. Bluetooth Client may be found in the Connectivity block.
Also, be sure you choose the Clock option. Make two more buttons to pan the camera to

the left or right.Designing the blocks is the next stage.
• Linking pre-programmed blocks together is what block design is all about. You can see the block programming in action in the figures below.
• Before choosing and adjusting the Bluetooth client block, choose the list picker block. After making your selection, go ahead and choose the list picker.
• Find the time zone and use it to set the Bluetooth client zone. From the many choices provided, such as control, math, etc., choose the linked option. (5), ten

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. Features such as gas sensors and a bomb dispose kit may be added to the robot to make it more effective.

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