



**IJIRCCCE**

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 4, April 2024

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 8.379**



9940 572 462



6381 907 438



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# Android Based Spy Robot with Night Vision Camera

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**ABSTRACT:** The project proposes the development of an Android-based spy robot equipped with a night vision camera system for surveillance purposes. The robot integrates Arduino microcontroller for control and communication, along with a mobile application running on an Android device for remote operation. The system aims to provide real-time video feedback to the user, allowing for remote monitoring and control via Bluetooth connectivity.

**KEY WORDS:** Microcontroller, Bluetooth, Camera, Android Application, DC Motor.

## I. INTRODUCTION

Our project aims to provide a robotic vehicle equipped with a wireless camera having night vision capability for remote monitoring/spying purposes. The night vision camera allows for transmitting real time night vision video even in dark environments. Whatever is recorded by the camera can be viewed in PC for reference This system is to be useful in war, terrorism and sensitive areas. It can also be used to operate in jungles and other environments humans cannot possibly enter during the night.

The vehicle can be controlled remotely by an android device for easy operation. It uses android application commands to move in front, back and left right directions.

The vehicle consists of receivers interfaced to an ATMEGA328P digital microcontroller. On receiving command from the receiver. The ATMEGA328P microcontroller now operates the movement motor through a driver IC.

The robotic vehicle can be easily operated from any android device. It provides a good user interface for handling the vehicle. The android device can operate the vehicle at a good Bluetooth communication range. The Bluetooth receiver at the vehicle is used to transmit control movement data from app to vehicle.

The night vision camera mounted on robot allows for efficient spying even in darkest areas using infrared lighting.

## II. LITERATURE REVIEW

Literature on Warfield spy robot with wireless camera has been reviewed and discussed in this section based on technology used and its working research works.

Sreejith M A, Vivek S.K, Vimal Kumar. S. N [1] have developed a cost-effective three-wheeled robot using an Arduino nano microcontroller which is used in surveillance. This also uses a smart phone which is running in android operating system. It uses android application commands given by the user to move in forward, backward, left side and right-side directions. The vehicle has receiver device connected to Arduino nano, on receiving the commands from the receiver the Arduino nano now activates the motion of the motor using a driver. Since the robot can be operated by any android device at any place with ease therefore it gives quality interfacing with the user for conducting the robotic machine. Good range of Wi-Fi communication is an important factor to operate the robotic vehicle using the android app. The night vision camera placed on the robot permits to efficiently spy at dark environment with the help of infrared lighting.

Dilliraj. E, Rekha. S, Sindu Priya. N. R, and Vedhavalli. A [2] have used ZigBee technology in the robot for serial communication. Keeping the range into among the devices into consideration the data can be shared in ZigBee technology. The ZigBee module is connecting the robot and any instructions will be given by it. The war field robot consists of Raspberry pi board as a microcontroller board and it also has L293D motor driver IC's along with ZigBee module. There are two DC motors present which are also used for the motion of the robot. We are using a night wireless camera which is placed on top of the robot for the main purpose of spying which will use infrared lighting to capture the environment even in complete darkness. Using buttons, commands, are sent from the transmitter end to the receiving device to regulate the robot motion that is to move in all directions.

### III. THE OBJECTIVE OF PROJECT

The specific objective of this project was

- 1) **Remote Surveillance:** Enable users to remotely monitor and gather visual information from areas that are difficult or dangerous access directly.
- 2) **Real Time Monitoring:** Provide real time video streaming capabilities to users, allowing them to observe live footage captured by the robot's night vision camera through their Android device.
- 3) **Enhancement Mobility and Control:** Allow users to control the robot's movements and functions through an intuitive Android interface, enabling navigation through different terrains and environments.
- 4) **User Friendly Interface:** Design the Android application to provide user-friendly interface for controlling robot, adjusting camera settings, and accessing recorded or streamed footage.

### IV. COMPONENTS

#### 4.1. Microcontroller ATMEGA328P



Figure 1- Microcontroller ATMEGA328P

ATMEGA328P is high performance, low power controller from Microchip. ATMEGA328P is an 8-bit microcontroller based on AVR RISC architecture. It is the most popular of all AVR controllers as it is used in ARDUINO boards.

#### 4.2. Motor Driver IC- L298

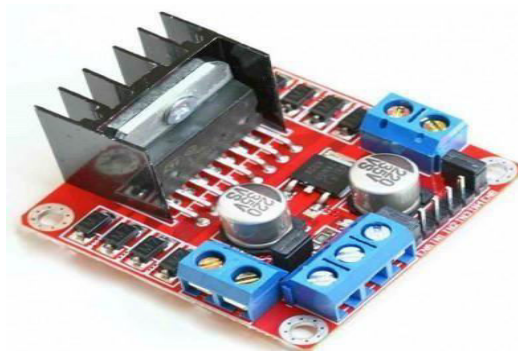


Figure 2 -Motor Driver IC- L298

This device works on dual H-bridge motor driver which allows speed and direction control of two DC motors at the same time.

#### 4.3. Bluetooth Module- HC05

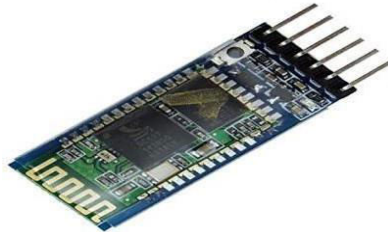


Figure 3 -Bluetooth Module- HC05

This HC-05 Bluetooth Module helps to send data from android application to the microcontroller over the wireless Bluetooth connection. Main use of this Bluetooth is controlling the motors. **4.4. DC Motor**

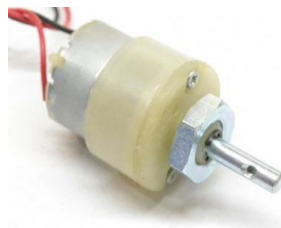


Figure 4 -DC Motor

Here in our android based spy robot, 4 wheels are driven by the 4 DC motors. The DC motor converts the electric energy into mechanical energy.

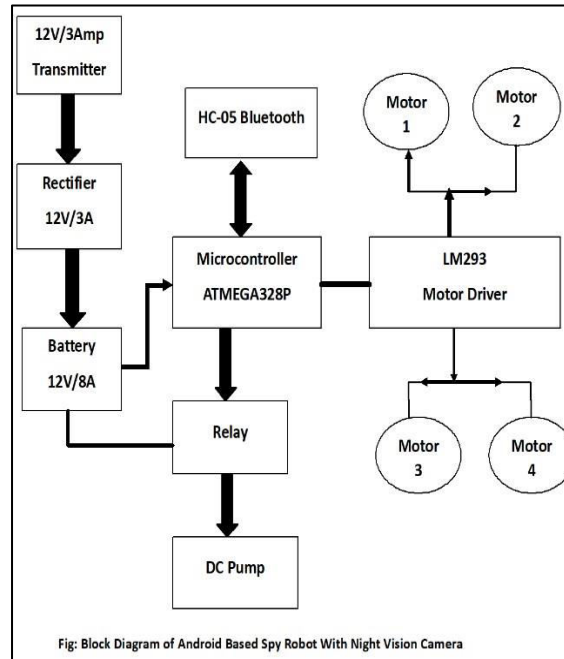
#### 4.5. Battery



Figure 5 -Battery

The robot will likely be equipped with DC motors for movement. These motors usually operate at voltages around 6V to 12V, making a 12V battery suitable for powering them. The battery can provide the necessary voltage and current to drive the motors for locomotion. For this project, we need 12 v batteries to run this project.

### V. BLOCK DIAGRAM



### VI. FLOWCHART

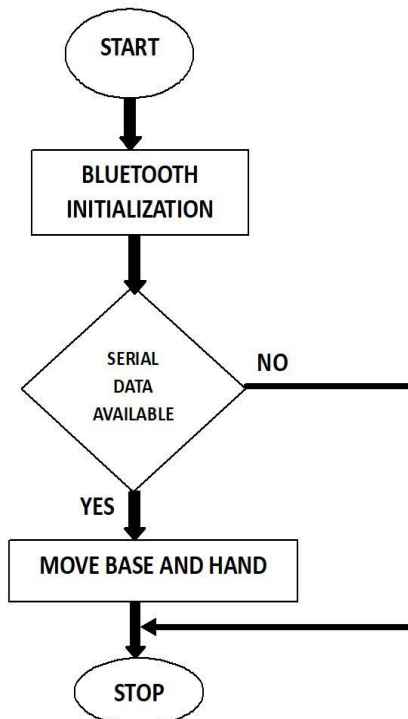


Fig. Flow Chart of Android based Spy Robot with Night Vision Camera

## VII. WORKING

### Steps involved in creating the Spy Robot

- 1) **Gather Components:** Collect all the necessary Hardware components including the motor, wheels, camera module (with night vision capability), battery, microcontroller or controller board and an Android device.
- 2) **Setup Microcontroller or Controller Board:** Choose and configure a microcontroller or controller board to control the motors, read sensor data, and communicate with the Android device.  
Program the microcontroller with firmware that interprets commands from the Android device and controls the robot's movement accordingly.
- 3) **Design Android Application:** Develop an Android application that serves as the user interface for controlling the robot and accessing the camera feed.
- 4) **Implement Communication Protocol:** Establish a communication protocol between the Android device and the microcontroller or controller board.  
Define commands and data formats for transmitting control signals, sensor data, and camera feed between the two devices.
- 5) Implement this protocol in both the Android application and the firmware running on the microcontroller.
- 6) **Integrate Camera:** Connect the night vision camera module to the microcontroller or controller board.
- 7) **Wireless Connectivity Setup:** Establish a wireless connection between the Android device and the microcontroller or controller board.
- 8) Choose a suitable wireless technology such as Bluetooth, and configure both devices to communicate over this connection.
- 9) **Testing and Calibration:** Test each component individually to ensure proper functionality.  
Calibrate sensors and camera settings as needed to optimize performance.  
Test the entire system to verify seamless communication between the Android device and the robot, as well as the reliability of the camera feed and control mechanisms.
- 10) **Deploy and Monitor:** Once the system is fully functional, deploy the Android-based spy robot in the desired environment.  
Monitor its performance remotely using the Android application, and make any necessary adjustments or improvements based on real-world usage.

## VIII. RESULT

The system operates by relying instructions from a smartphone to the microcontroller via Bluetooth within a range 10 meters, ensuring precise communication. It exhibits omnidirectional movement capabilities and effectively utilizes a wireless camera for video transmission, seamlessly integrating with the system's sensors. Signal transmission quality remains consistently robust, facilitating smooth operation.

## IX. FUTURE SCOPE

In this project, Bluetooth is used, limiting the scope of the robot due to its short range. However, this limitation can be addressed by utilizing modules such as Zigbee and Wi-Fi with larger and more secure ranges. The size can then be further reduced to the desired size. Additionally, in the future, the robot's functionality can be enhanced by integrating more sophisticated modules and sensors to monitor the environment with greater precision. It may even include a bomb disposal kit to defuse bombs in the war field without the need for manual intervention.

## X. ADAVANTAGES

1. **Mobility and Versatility:** The robot's mobility allows it to navigate various terrains and access hard-to-reach or hazardous locations, making it versatile for different applications.



2. **Wireless Connectivity:** With Android-based control and connectivity, operators can control the robot from their smartphones or tablets, providing convenience and flexibility.
3. **Data Collection:** The robot can collect and transmit data, which can be valuable for monitoring, analysis, and decision-making in various fields, including security, research, and inspections.
4. **Safety:** It can be used in situations that are dangerous for humans, such as search and rescue missions in hazardous environments.
5. **Cost-Effective:** Compared to traditional surveillance systems, an Android-based spy robot may be a cost-effective solution for remote monitoring and surveillance.
6. **Night Vision Capability:** The night vision camera allows the robot to operate effectively in low light or completely dark environments, enhancing its usability during night time or in areas with limited light.

## XI. CONCLUSION

The Android-controlled spy robot with a night vision camera represents a remarkable convergence of technology, offering an invaluable tool for surveillance, reconnaissance, and exploration. Its versatility, stealth, and remote accessibility make it a game-changer in various fields, enabling safer and more efficient operations in challenging and low-light conditions.

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