WARFIELD SPYING ROVER WITH DEFENCE MECHANISM FOR MILITARY APPLICATIONS

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Abstract – The soldier serves the Armed forcesof our nation. The importance of soldiers in India is very high in defending and protecting the borders. The soldier's life security plays a vital role in the field of the military. To overcome this problem, we have planned to replace smart rovers in hazardous areas wherethe soldiers feel insecure. The rover will have aSniper Gun which is used to help the soldiers for defence purposes. Sniper Gun can be moved in any direction with the help of servo motors.

The proposed project consists of two main parts: Defence & Surveillance, for surveillance, we are having a High-quality wireless night vision camera is going to fix on the robot circuit which captures images and for defence purposes, we are having a sniper gun. This device runs with the DC motor to drive the wheel and it is controlled by Wi-Fi technology. A camera in a rover is used to capture the movement of the rival and also attacks the enemies by using a sniper gun. We are using Node MCU microcontroller for this project. It is an inexpensive system on a chip (soc). Tinker Cad simulation software is used to simulate the proposed hardware part. The overall project is controlled by using the Mobile app which is called Remote XY. This rover vehicle is designed for defence as well as surveillance under certain circumstances.

Keywords: Defence, Rover, Sniper Gun, Node MCU, Tinker Cad, Remote XY.

I. INTRODUCTION

In today's world security depends on soldiers, who play a vital role, many soldiers lost their lives for their nation. Now days the leading issue of the world is Security system. Terrorist have increased their attacks on public buildings and sensitive buildings. To fulfill the demand of the terrorist, they pressurize the government for the same. To save the hostages many security officers have lost their lives in operations conducted against them.

The soldiers have their life always in risk. While taking action against the terrorist, we came to the conclusion that the most critical issue faced by the forces is that they have no information about the exact number of terrorists, the weapons they are equipped, and their exact location in the building [1], [2]

To overcome this, the best ways are to replace rovers in critical areas or areas which cannot be accessed by soldiers. [3] In this project our aim to reduce the death rate of soldiers and to help the army with sniper gun for defense purpose. The sniper gun can be moved in any direction with servo motors. The energy requirement for the rover is gained from the battery.

The project consists of two parts, where the first part acts as surveillance and other acts as a defense. Surveillance is a part that has high-resolution cameras and for defense, we have a sniper gun. [4] These devices run with a DC motor to drive the wheels and are controlled by Wi-Fi technology. The main reason for the project is for surveillance and defense Purpose, which will be used in the areas not easily accessible by soldiers. The camera in a rover captures the movement of the rival and also attack by a sniper it gives information about climate and battery level.

II. EXISTING SYSTEM

In the existing techniques the vehicle consists of different types of sensor and moving techniques for specific applications. For moving techniques, the existing paper used either wheels or chains and it can be controlled by remote. The sensor used in the existing paper was collecting the information from the surroundings and transmit the information to distant monitoring facilities. The main objective of the existing paper is used to investigate the poor accessibility and in suspected disasters. The main drawback of the existing paper is Bluetooth devices. Bluetooth is good for only Short Distance communication.

III. PROPOSED SYSTEM

We need to replace few soldiers in hazardous zones where the fighters feel unreliable. Smart Defense rover is more active than the existing system. We use Wi-Fi module for communication. Simulation is done with Tinker cad. It is controlled by mobile app called Remote XY. A laser pointer act like a Sniper gun, where it is for Attacking Enemies or Opponents. The block diagram of the proposed system is shown in Fig: 1

IV. BLOCK DIAGRAM
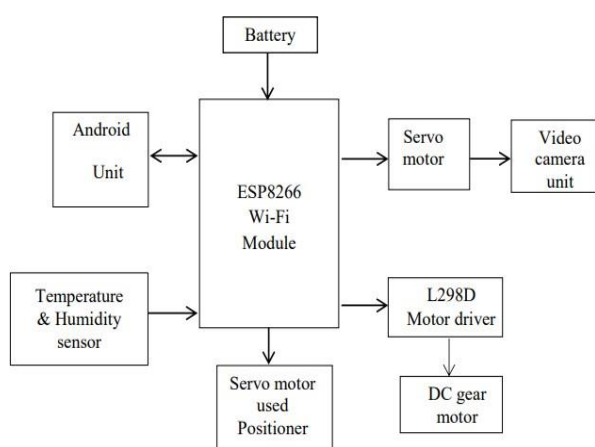
Fig. 1 Block Diagram of Proposed System.

A) Servo Motors

A **servomotor** is a rotary actuator allows for specific control in linear or angular position, velocity and acceleration. It works in closed loop control system mechanism. In Warfield spying Rover, One sever motor is used for Video camera unit and other one is used for Position respectively as shown in Fig. 1. For Video camera servo motor unit is used for monitoring the movement of the obstacle in the border line. The propose of Position Sever motor is used for detect and find the position of the obstacle which latitude and longitude is located.

B) DC Motor

L298D is DC motor is used for moving the robot in front and backward direction. It's also used for control for gear section in robot. It is used to control the velocity and acceleration of the steeper motor. From the Wi-Fi module, the DC motor will control the robot movement and used for obstacle finding in the area. Also in DC motor will help to access the soldiers guide line in the border.

C) RF transmitter-receiver

In the Fig.2 the block diagram is about the RF modules for Transmitting and receiving unit. In the RF transmitting is used for transmitting the information from Video Camera unit which capture the obstacle in the moving location. Similarly, in the receiver side, the RF Module is used to collect the capture video to display unit to see and control the robot by using Android unit.
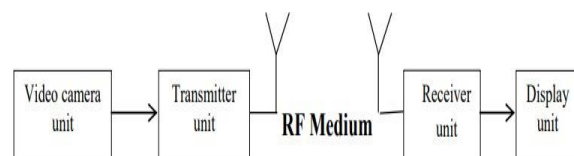
Fig. 2 Block Diagram – Data Sharing

V. TECHNICAL SPECIFICATIONSOF COMPONENTS USED

A) Node MCU

Node MCU is an open-source Lora-based firmware and development board specially targeted for IoT-based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espress if Systems, and hardware that is based on the ESP-12 module. Node MCU can be powered using a Micro USB jack and VINn (External Supply Pin).

It supports UART, SPI, and I2C interface. Node MCQ image is shown in the Fig.3

Fig.3 Node MCU ESP8266

B) Microprocessor

The Node MCU ESP8266 development board comes with the ESP-12E module containing the ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. Node MCQ has

128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating featuresmake it ideal for IoT project.

C) RF Transmitter Receiver

RF module operates at Radio Frequency. This frequency range varies between 30 kHz & 300 GHz. This type of modulation is an Amplitude Shift Keying (ASK). This RF module is a combination of RF Transmitter and RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 433 MHz the RF transmitter receives serial data and transmits it wirelessly through t its RF antenna. The transmission occursat the rate of 1 Kbps – 10 Kbps. RF receiver receives the transmitted data and it is operating at the same frequency as that of the transmitter. [5] The image of Rf is shown in Fig.4
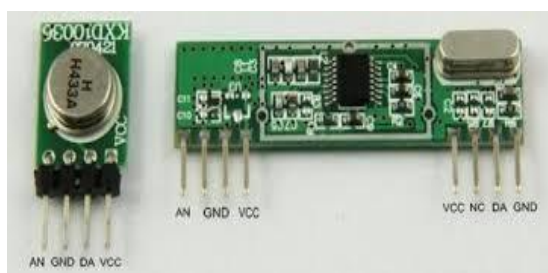

Fig.4 RF Transmitter Receiver

VI.   SIMULATION

Simulation is the tool which is used to created and analysed the circuits and verify the behaviour and performance of the circuit. Simulation is the main step in an electronics project, where we can check our idea and block works in a good way as the author thinks of it. Here we used the Tinker cad software as the simulation tools. To create the complete 3D model for this circuit we used the online collection of software tools from Autodesk as Tinker cad. The output of the Tinker Cad simulation is shown in Fig. 5
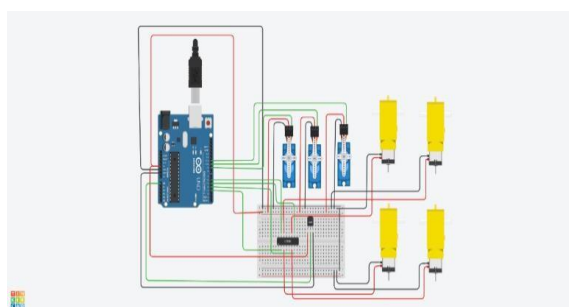
Fig.5 Simulation Output

VII.   ROVER CONTROL

Motion of the Rover is Control by an Mobile App called Remote XY. The motion includes Forward,Reverse, left and Right. It is designed by Servo Motor. Both are connected by Wi-Fi Technology. This app can also provide Temperature Value and Humidity Value and it is shown in Fig.6

Fig.6 UI for mobile app (Remote XY)

VIII.   CAMERA OUTPUT

For Surveillance, we have added used a Camera on rover which can be monitored by using Internet. The position can be adjusted by servo motor. For Defense, we attached laser gun whichis also controlled by Servo Motor. The night vision camera output shown in Fig.7

Fig.7 Camera's Output - Focusing a Gate

IX.   ROVER OUTLOOK

This is the final image of our rover shown in Fig.8., the main features of our rover are Sniper gun Model, Camera, Temperature and Humidity Measuring and Rover can be operated remotely. This has a very high battery connected to it.

Fig.8 Final Image of the Rover

X. CONCLUSION

To reduce the death rate of our soldiers is the main moto of our project. We had competed Sniper Gun Model, with surveillance camera in our Rover and working on them to get out more feature in Future. This project will make a revolution in the Military field and save many lives of our valuable soldiers.

XI.   REFERENCE

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