IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SMART SURVEILLANCE ROBOT FOR MILITARY APPLICATIONS USING IoT

K. Ravikiran[1], J. Ajay Kumar Reddy[2], J. Harika[3]

Dept of Electronics & Communication Engineering,

TKR College of Engineering & Technology, India.

Dr. B. Swapna Rani[4]

Associate Professor, Dept. of Electronics & Communication Engineering,TKR College of Engineering & Technology, India.

ABSTRACT

Surveillance plays a major role in National security. This paper presents a new approach for surveillance at remote and border areas, using multifunctional robot based on IoT used in defence and military applications. This Smart surveillance robotic machine has the ability to substitute the soldier at border areas to provide surveillance in critical situations. The roboticvehicle works as manually controlled vehicle using Internet communication medium. The multi-sensory machine is used to detect the presence of enemies and live stream the situation to the authorized person. In addition,it gives location information. Using NODE MCU, GPS module and ESP32 camera we design the system and its communication with IoT server.

Keywords: IoT, Node MCU ESP 8266, ESP 32 camera, high intensity laser, L293D motor driver, different sensors.

I. INTRODUCTION

In today's world the monitoring of military areas is essential due to increased attacks from enemies but the quality of that monitoring i.e., surveillance is not that satisfactory, as a result, the percentage of soldiers living in danger is rising. Because of that it is necessary to improve the quality of surveillance through effective surveillance. High quality video transmission makes this possible more successfully. In this paper the quality of video is improved using Closed Circuit Cameras. For all this there is a need of the ground Robot, which can move on the hills, muddy areas. By using Closed Circuit Cameras various technical advancements are taken place in surveillance. Lots of crime scenes have been solved by using this technology but still, the crime rate has not reduced because of immobility of the surveillance equipment's. In this project design and development of the robot is done which will move from one place to another, it has capability of capturing real-time images and videos required for the surveillance. The main constraint in surveillance is the mobility of the robot.

There are similar products on the market, but their key distinction is how well they can be used. Most of the products on offer have a lot of interaction and are passive in nature.

These were primarily created using the ESP32 and LEDs to display information. Few of them can respond to touch, voice, or mobile device commands. A few of the systems are also made to use PIR sensors to provide security [4]. But the systems thus designed have more false alarm rate and sensing range is also very low. The proposed system shows the date and time on the screen and is interactive. According to the requirements, the display can be modified. The system responds in an interactive manner and will take any commands. (Reference to figure 1).

Accordingly, the camera mounted on top of the Smart surveillance robot will be able to provide a live streamingof a robot, when a human or object is detected, it sends an alert of the intrusion without the intruder being awareof it. The intrusive party will remain unaware that he is being watched

constantly. Home automation is mainly created using intelligent IoT devices, IoT is an integrated system of communicating devices in which each device can carry out tasks by themselves.

Everyone can easily access this system even while doing their daily chores [3]. One of the main benefits of the system is this. The proposed system identifies people to detect intrusions. Once the intruder enters the camera's field of view, intrusion detection begins. The ESP32-camera's 8–10 m to 10 m range makes it compatible with ESP32. It can detect humans. The owner of the Smart mirror is alerted via message of the Human presence if detected, the current time are included in the alert message. Both the mobile device and the ESP32 must be connected to the internet.

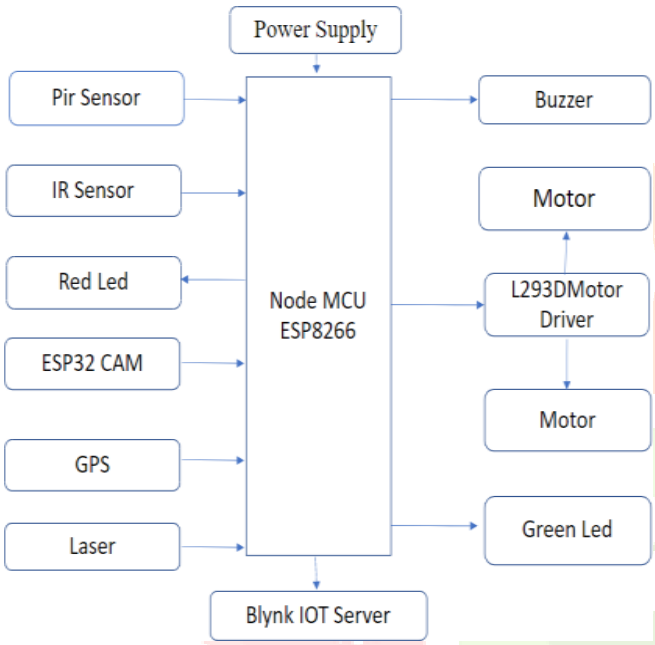

Figure 1. Block diagram

II. Existing System

According to our extensive research, the cost of the system used for Smart surveillance purposes is high, according to our market research, we discovered that all previous systems on the market are a little bit expensive and not user-friendly because technological integrated with the Raspberry pi and Arduino making the system complex and difficult to understand by newcomers. Our system, on the other hand, will provide a user-friendly interface and be cost-effective, making it superior to all other systems on the market and the existing system which are IoT based Military robot using Raspberry Pi and IoT based vehicle for Military Services. [1]

III. Working

This system consists of 2 Micro controllers Node MCU ESP8266 and ESP32 CAM, which are interfaced to the L293D motor driver for the movement of the robot, and we have a PIR sensor for motion detection or person detection. Whenever a person is detected, an alerting system gets activated which consists of a red led, green led and a buzzer. And a notification will be sent to the authorities to their Mobile. An IR sensor is used for the obstacle's detection and alerting via notification. This robot can be tracked via latitude and longitude values which are obtained from GPS module. An ESP32 CAM for the live streaming of video which can be accessed via mobile phone or laptop by entering the IP address. A laser module is used for shooting purpose which is controlled via relay module. This whole system can be accessed by IoT technology which is provided by the BLYNK IoT server and Blynk IoT App**.** (Reference to figure 2).

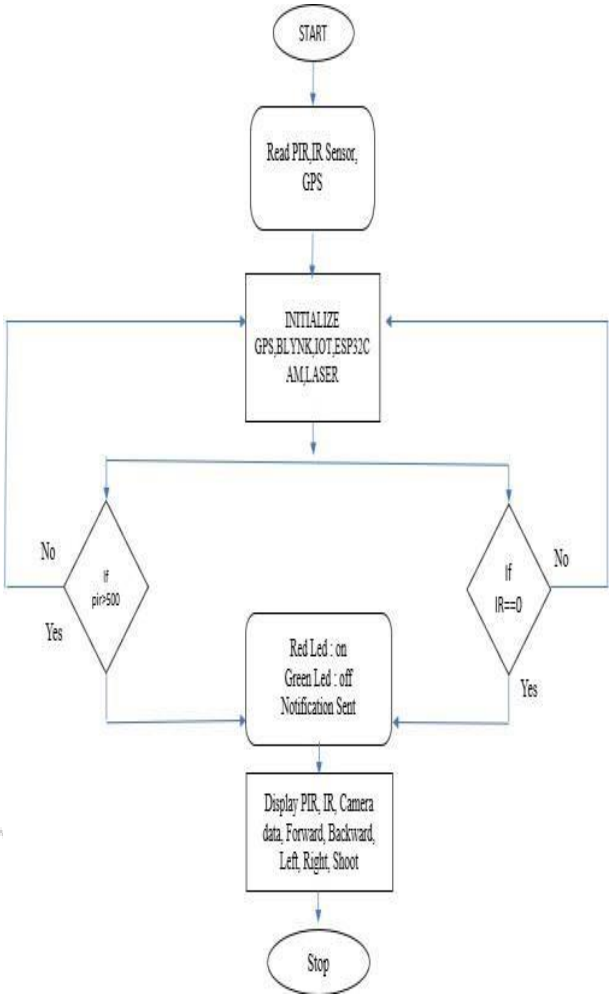

Figure 2. Flow Chart of Working

IV. Proposed System

In our proposed system, we will monitor the environmental conditions using several sensors. We use PIR and IR sensors also, ESP32 Camera to continuously to provide Live Streaming of the vehicle to the specialized person, who is controlling the Robot, live Streaming data and alerts are transferred onto the Blynk app using IoT technology [2]. The PIR is used to detect the presence of human beings, by measures infrared light radiating from the objects and range up to 7m and covers an angle 120°, IR sensor is used to detect the presence ofthe object range up to 10cm. PIR and IR sensors that monitors and the values are

uploaded them into the Blynk app. GPS Module provides longitudinal and latitudinal values of the vehicle, and whole system is working withthe help of NODE MCU ESP 8266, and we also using high intensity laser light.

V. Implementation and results:

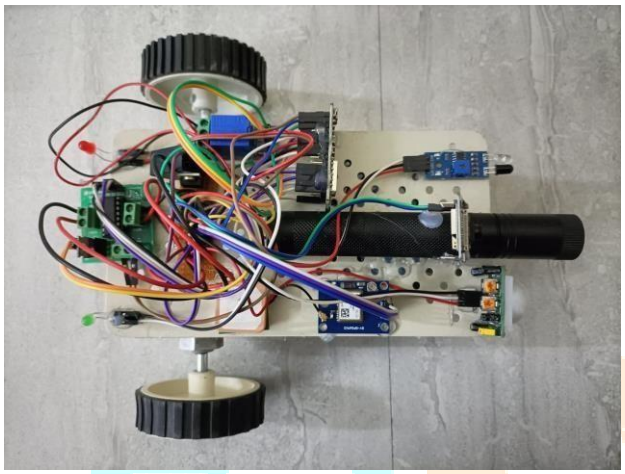

Figure 3. Prototype

The Data from the military robot is being monitored in Real Time with the help of the different sensors being employed for monitoring. (Reference to the figure 3)

- Node MCU ESP8266 is an open-source development board specially targeted for IoT based Applications and consists of 32bit microcontroller and built in Wi-Fi. It operates with a frequency of 80MHz. It is the most advanced device and very compact in nature.
- ESP32-CAM is an advance development board with Wi-Fi camera. It allows creating IP camera projects for video streaming with different resolutions. ESP32-CAM has built in PCB antenna. ESP32 module has WIFI/Bluetooth. Built-in 520KB SRAM, external 4M PSRAM. Range up to 240MHz.
- A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in their field of view.
- L293D Motor Driver Module is a medium power motor driver perfect for driving DC Motors and Stepper Motors. It uses the popular L293 motor driver IC. It can drive 4 DC motorson and off or drive 2 DC motors with Bi- directional and speed control.
- Laser diode modules produce a laser beam when current flows through the diode. The term"laser" is an acronym that means "light amplification by stimulated emission of radiation."
- An infrared sensor is basically an electronic device which is used to detect the presence of objects. Infrared light is emitted by this device.If this device does not detect any IR light reflected back that means, there is no object present. If the light is detected by the sensor there is an object present. Its Range is up to 10 meters.
- LEDs indicates when human or obstacle is detected red light glow for 3seconds, in other wise green light will glow continuously, it indicates safe state.
- GPS (Global Positioning System) is a satellite-based navigation system that provides location and time information anywhere on or near the Earth's surface. It works by using a network of satellites orbiting the Earth, ground control stations, and receivers. It provides the coordinates (latitude and longitude) in real time to the Blynk app with the help of a Blynk IoT server. It provides the latitude and longitude of the container on the app.
- Blynk is a Server and APP Service providing Platform. It provides a High Security Service and Server for IOT applications, this is easy to use and supports all advanced Micro controllers. (Reference to the figure 4).

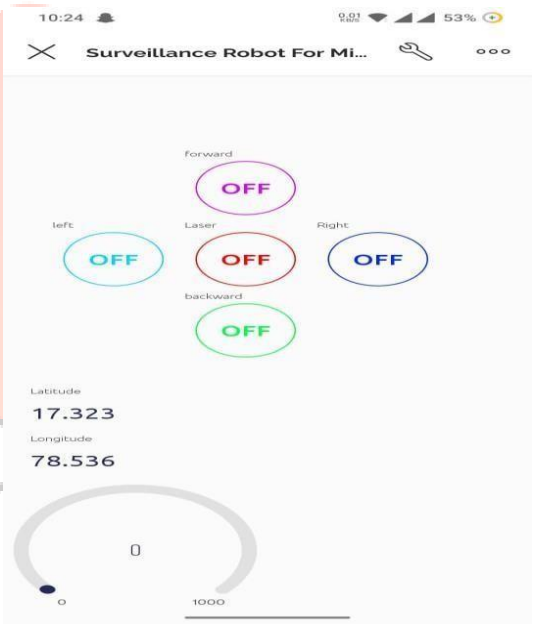

Figure 4. Data from the prototype

This robot is fast and accurate, and it can be controlled from anywhere. It is very small and compact in size. Very economical to develop. If the internet is not available this system cannot work properly. It does not know whether he is a common man or enemy. This robot can be used for surveillancepurposes. This robot can be used for industries forsecurity purposes. This robot can be used for patrolling. This system can be used in the military.

VI. Conclusion

Military uses were taken into consideration when creating this robot. So, it comes with basic video surveillance and human detection so that it can detect underground persons etc. Further extensions can be made to the same models such ashome automation, telemedicine system. The robot can be equipped with interactive voice feedback. Itis possible to install a ME (medical emergency)

band in the robot to look after the health of an elderly person in the house.

VII. Future scope

The system can be improved by including RGB,depth, EEG, thermal, and wearable inertial sensors, are used to obtain data. These sensors may provide extra information and help face recognition systems to identify face images in both static images and video sequences. The system can be further developed by including Receptor-free nano sensors that are basedon detecting physical properties of explosives. The system can be further developed for bomb diffusion.

REFERENCES

[1] A. Aashraya, P. Munaswamy, *"IoT Military Robot Using Raspberry Pi3*," European Journal of Molecular & Clinical Medicine, Vol. 7, Iss. 1, 2020.

[2] Abhijeet Dhule, Neha Sangle, Supriya Nagarkar, Asmita Namjoshi, "*Military Surveillance Robot,*" International Research Journal of Engineering and Technology, IRJET, July 2020.

[3] Keerthana. D, Naresh Babu, Nivethitha, Gayatri, Leando, "*Design and Development of WirelessControlled Surveillance Robot Using IoT*," International Journal of Recent Technology and Engineering, IJRTE, September 2019.

[4] A. Arthi, G. Kalpana, M. Kavitha, Jaya Surya, "*Smart Spy Surveillance Robot System*," InternationalJournal of Recent Technology and Engineering, IJRTE,2018.

[5] Nagaraju Sakali, G.Nagendra, "*Design and implementation of Web Surveillance Robot for Video monitoring and motion detection,*" IJESC,Vol. 7,Iss. 2, Feb. 2017.