Soldier Health Monitoring & Surveillance Robot using War field using IOT

Prof. Seema Firdose[1], Rakshitha H M[2], Shree Laxmi Kolli [3], Anushka H M[4], Ankitha R[5]

[1] *Assistant Professor, Computer science and Engineering, Vidya Vikas Institute of Engineering & Technology, Karnataka, India*
[2] *Student, Computer science and Engineering, Vidya Vikas Institute of Engineering & Technology, Karnataka, India*
[3] *Student, Computer science and Engineering, Vidya Vikas Institute of Engineering & Technology, Karnataka, India*
[4] *Student, Computer science and Engineering, Vidya Vikas Institute of Engineering & Technology, Karnataka, India*
[5] *Student, Computer science and Engineering, Vidya Vikas Institute of Engineering & Technology, Karnataka, India*

ABSTRACT

A long way from home and friends and family, these saints forfeit their own lives so the whole country can rest in peace. Military Assistance and Surveillance System (MASS) can get a sensational effect on troopers making the country more secured. This framework is joins a few propelled highlights that could spare the lives of fighters in mission basic situations. MASS is intended to incorporate data obtaining and preparing to upgrade summon and control of a military unit. Advances in this model incorporate a land data framework, Multi sensor information combination framework, figuring gadgets and IoT-based correspondence framework for troopers. Once completely created and demonstrated, MASS will be basic components of the Army's system driven fighting project and will connect infantry level troops on the front line to the summon base camp. It will likewise arrange ground troops with the different Army order central command and incorporate all components in a fight gathering, giving constant strategic situations. This project tracks the temperature, breathing and heart rate of the Solider.Arduino Uno and Node MCU are used in designing the soldier monitoring system. The biosensor consist of temperature sensor and heart beat sensor.The current location and Health related information of the soldier can be sent to the base station in real time. Surveillance Robot will detect the Hazardous gas and Metal.

Keyword:- Surveillance, Wireless sensor networks, Energy efficiency, Schedules, Military communication, Security.

1. INTRODUCTION

In modern warfare, ensuring the safety and well-being of soldiers is as crucial as achieving strategic objectives. Traditional combat zones pose significant challenges to monitoring soldier health and maintaining situational awareness in real time. To address this, the integration of Internet of Things (IoT) technologies with robotic systems offers a transformative solution.

The Soldier Health Monitoring & Surveillance Robot is designed to enhance battlefield intelligence and soldier safety by combining real-time health tracking with remote surveillance capabilities. Equipped with biometric sensors and a range of surveillance tools (such as cameras and motion detectors), this IoT-powered robot continuously monitors vital health parameters—like heart rate, body temperature, and oxygen levels—while also transmitting live video and environmental data to command centres.

This system enables military units to make faster, more informed decisions, respond quickly to medical emergencies, and improve tactical coordination. By minimizing human exposure to high-risk areas, the robot not only protects soldiers but also strengthens strategic operations through enhanced data-driven insights

2. METHODLOGY

This project is based on a micro-controller and IOT concepts. Where we are using Arduino, Servo motors, car chassis, camera module, sensors and mechanical arm to build this surveillance robot setup. The camera which we used to stream the video over wi-fi use the internet and provide us a live feed and the amazing part is here that we can control the whole setup from an android app. So for this we build an android application using android studio, the app has controls like forward, backward, turn left, turn right. And same for the Arm. The Arduino uses C language for coding. The data capture through camera module, send to the desired device using internet. By using this data the user gives further commands to the robot.

2.1 HARDWARE SPECIFICATION

• **Arduino UNO:** Arduino uno is a micro-controller. It is base on a Microchip ATmega328P. It is developed by Arduino.cc. The chipset has set of digital and analog I/O pins, which is used to interface with various other boards and circuits.

• **Servo Motors:** A servo motor is a type of motor, which provide precise actions and rotations. With using gears which helps the shaft to rotate in precise .

• **Robotic Arm:** Robotic arm is a mechanical arm inspired by human arm. It is programmable and can be control as per user requirements.

• **PIR Sensor:** PIR stand for Passive Infrared Sensor, it is a electronic sensor light radiating from object in its field of view. This kind of sensors are highly sensitive and mostly use in motion detectors.

2.2 SOFTWARE SPECIFICATION

• **Arduino UNO:** The Arduino Integrated Development Environment is a cross-platform application which is written in functions from C and C++ programming language. The code which is used for controlling our bot is developed using this application.

• **Blynk application:** Blynk is a Platform with which IOS and Android users control Arduino, Raspberry Pi and that links it over the Internet. It's a digital dashboard enables us to build a graphic interface for our project by simply dragging and dropping widgets.

3. PROCEDURE

While creating this project we had to deal with various aspects like the right positioning of the sensors, we had to consider other aspects like what terrain would it be suitable for, what could be the possible weather conditions it would have to work in, what other challenges it might have to face, etc. We here deal with a basic module consisting a motor driver, an arm with a gripper and the software part which consists of the Arduino IDE software with the controlling application Blynk. A brief discussion on this project would be as such:- Our bomb detecting bot is assembled on a Small Chassis of Length: 115 mm Width: 105 mm Height: 50 mm with One Castor Wheel Arrangement and Two Round Wheel Arrangements. On top of it we have our hardware, of motor driver connected to its respective components. The sensors used for this project are situated on the front side of this bot which will have clear access of its radius for its function. These connections are secured in a case on which the robotic arm is attached with its 4 controlling servo motors for the movement of the arm. The movement of the wheels is controlled by the user through the Blynk application installed in the android which is interfaced through a code between the Node MCU and the application. Once it is interfaced we can easily control the movements of the bot**.**
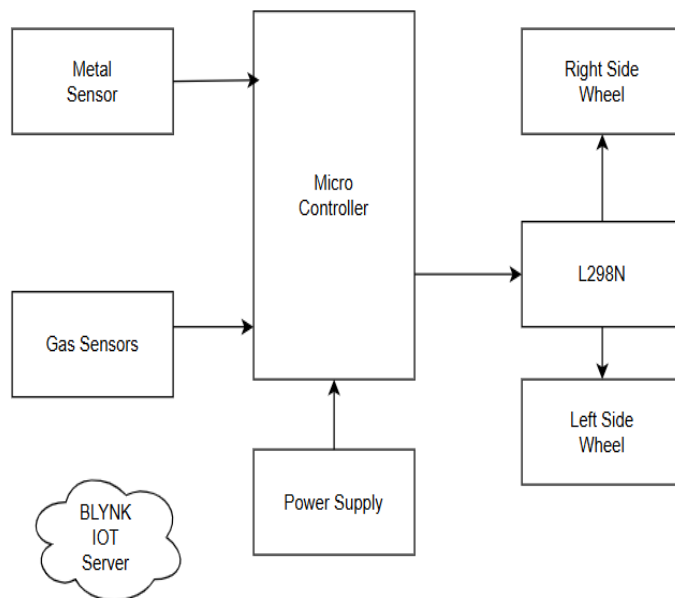
Fig -1: Methodology Surveillance Robot
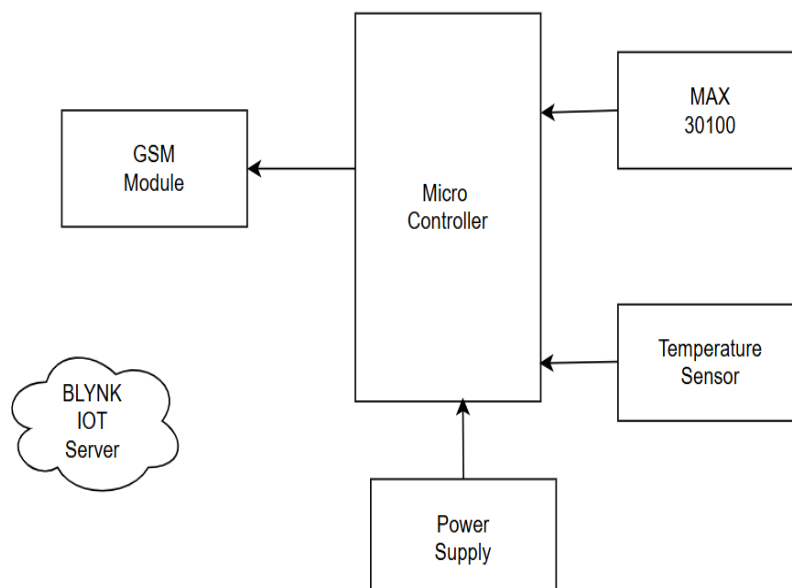
Fig -2: Methodology Soldier Health Monitoring

4. 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 of the 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 with the help of NODE MCU ESP 8266, and we also using high intensity laser light.

4.1 System Architecture Overview
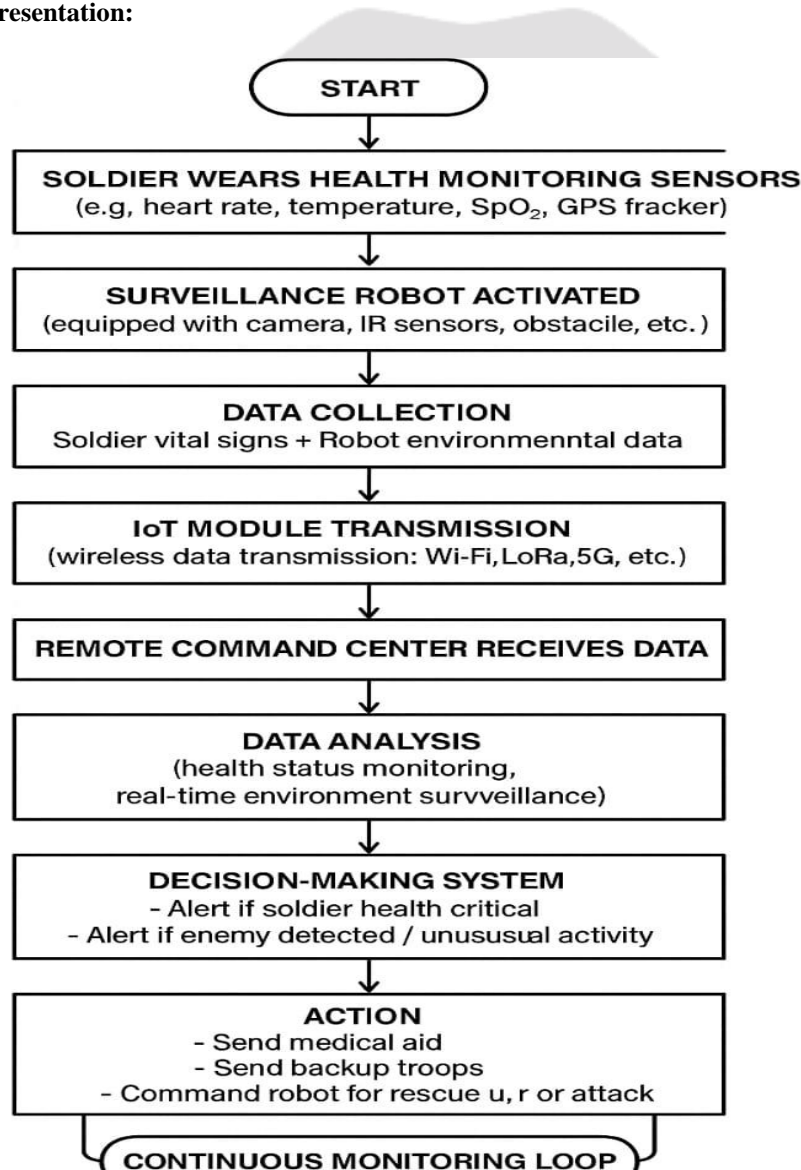
Diagram Representation:

Fig-3: System Architecture

5. CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

Thus, the proposed system affords exposure to design of simple bot for bomb detection. Manual control is applied to the robot from a certain distance. The buzzer alarms when it detects a metal. If the detected metal is a bomb, the robotic arm is manually controlled to dispose the bomb safely. The building cost for the robot is greatly reduced because of the use of smartphone which makes this system very efficient and its manufacturing cost low. Therefore designed bot could assist bomb disposal squads in military and police applications.

The Data from the military robot is being monitored in Real Time with the help of the different sensors being employed for monitoring. 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. 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). 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 motors on 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.

6. REFERENCES

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