Situational Awareness and Risk Assessment during Armed Conflict using Ceaseless Video Monitoring via IoMT

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Abstract - The project proposes to implement smart warfare techniques by analyzing the data obtained to diminish real-time combat consequences. An improvised system can be accomplished which can monitor the vicinity of the warzone through continuous video recording for actionable intelligence, And this system also involves sensors to examine the health condition of the soldier that will allow us to take appropriate action by sending an alarm to the nearest teams if the sensor outcomes are beyond the expected threshold. The ultimate aim of the project is to achieve an interface that can assess the risk and send much-needed data to the armed forces to plan accordingly. This approach can be attained by using IoMT (Internet of Military Things), Sensors like Temperature sensor, Heartbeat sensor, Arduino UNO, Global Positioning System(GPS) for coordinates, GSM for emergency SOS, Switches, Buzzer, Camera for live monitoring, and a Max232 module for serial communication which are all embedded into a garment. This kind of strategic approach can be helped for defense application purposes so that the army does not have to encounter unforeseen circumstances.

I. INTRODUCTION

The Internet of Things (IoT) has the potential to be one of the most transformative technologies of the last several decades. It has the potential to have an impact on both civilian and military applications. The Internet of Things (IoT) refers to a network of physical devices that use an IP address to connect to the internet, as well as the connections between those devices and other Internet-connected devices and frameworks. The Internet of Things enables items to detect or control remotely across existing system foundations, allowing for more straightforward integration of the physical world into PC-based frameworks, resulting in increased effectiveness, precision, low inertness, and monetary benefit while reducing human mediation. The Internet of Things is an amalgamation of numerous current technologies such as wireless sensor networks, embedded systems, machine-to-machine communications, cloud computing, and mobile apps, rather than completely new technology. Recent breakthroughs in these individual technologies enabled the integration, which involves physical sensing, networking, data processing, and context-aware workflows and applications, and allows for cost-effective and relatively simple implementation of cyber-physical systems.

Military Assistance and Surveillance System is a concept model for an IoT-based military wearable device. This concept has a variety of military applications. MASS is also an improved version of the Battlefield Management System - BMS (a system that combines data security and planning to improve the order and control of a military unit). This framework also underpins the popular IKC2 Movement (Integrated Knowledge-based Command and Control), a framework designed to integrate data security and preparation to improve a military unit's order and control.

II. THE INTERNET OF THINGS IN MILITARY APPLICATIONS

In a military setting, there are various high-impact use cases for IoT adoption. The following are a few of the most important usage cases. [2] contains a more extensive explanation of the IoT's relevance to military operations.

A. Ingenious equipment

The Internet of Things can be used to connect a wide range of military assets, including vehicles, supplies, and even weapon systems. Many of these network-enabled gadgets have been shown to have serious security problems and vulnerabilities. Several severe vulnerabilities in automobiles have been discovered [3]–[6], resulting in widespread vehicle recalls. The enemy has also been known to take advantage of security flaws in military cyber-physical systems [7]. In a similar vein, researchers have recently discovered critical security flaws in commercially available smart guns [8].

B. Situational awareness

Situational awareness is one of the most crucial parts of any military mission. The majority of armed services now collect intelligence using a variety of sensors and unmanned vehicles. Incorporating civilian IoT solutions into military IT systems could improve a commander's operational picture and help significantly to improve overall situational awareness. However, the positive effects of such augmentation may only be realized if the information given from IoT systems is of sufficient availability and integrity. As a result, before being integrated as trusted and reliable sensors within cyber situation awareness capability, COTS IoT systems must be thoroughly reviewed in this regard.

C.Medical attention

One of the most widely mentioned uses of wearable and stationary IoT systems in the military setting is to aid in the treatment of medical ailments and injuries during combat operations. Smart medical care systems, however, may present certain new risks in addition to the enormous potential for enhancing the speed and precision of delivering, often lifesaving, medical treatment to soldiers. Wireless functionality is common in modern medical systems and health monitoring systems, allowing connection between devices and with medical back-end systems. This wearable - or implantable - medical systems have been shown to have security flaws, and it has recently been revealed that several well-known public figures were aware of the problems and worried enough to stop remote connectivity in their implanted medical equipment.

III. EXISTING SYSTEM

There is no method to track the crimes committed against women under the current system. There are, however, some locations where CCTV cameras are installed and the recordings are retained. They are only utilized after everything has occurred.

They have no choice but to use their cell phone to send a message to their friends and relatives to plead for assistance. Most women find it difficult to get a hold of their cell phones at that critical moment. Even if they do, sending a message fast before anything heinous occurs is tough. It's also incredibly unreliable.

The following are the drawbacks of current systems:

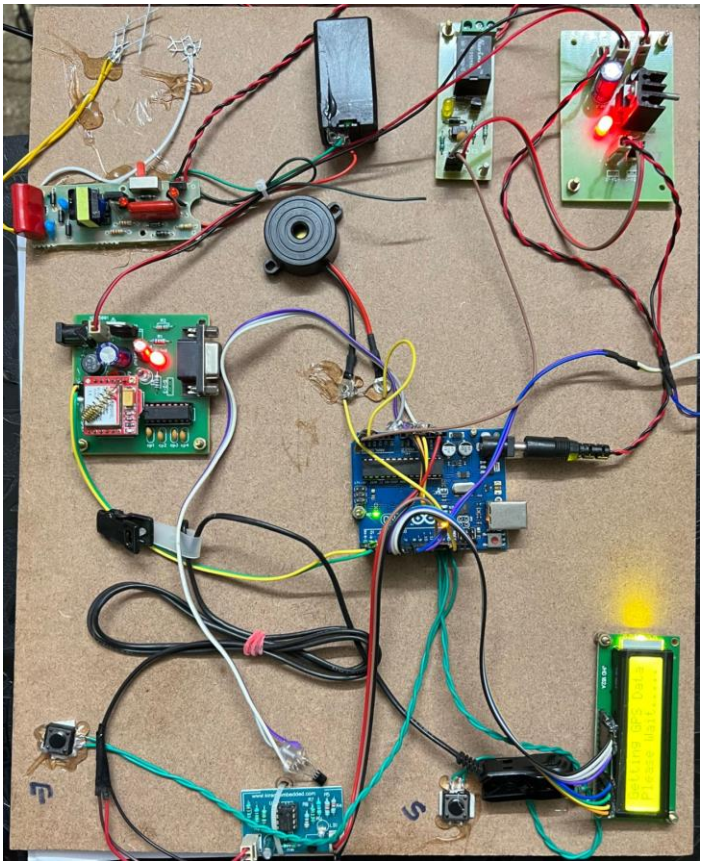
- Not very reliable
- Need manual effort
- Expensive

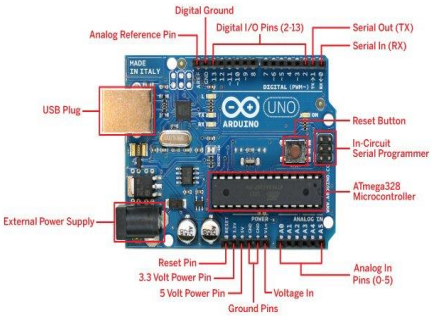
IV. PROPOSED SYSTEM

•We design a reliable system to decrease the unexpected human loss during hostility and also to obtain relevant data from the war zone.

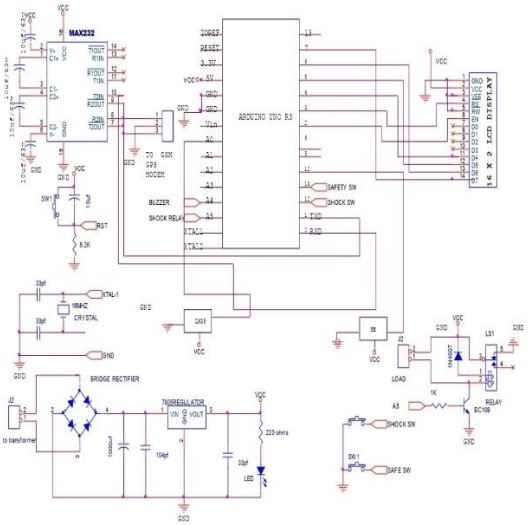
•This system will detect any unusual condition of the soldier with the help of sensors and immediately sends a response to the nearest available teams.

•It will also constantly record the sensitive information required with the help of the camera embedded in the garment along with the sensors.



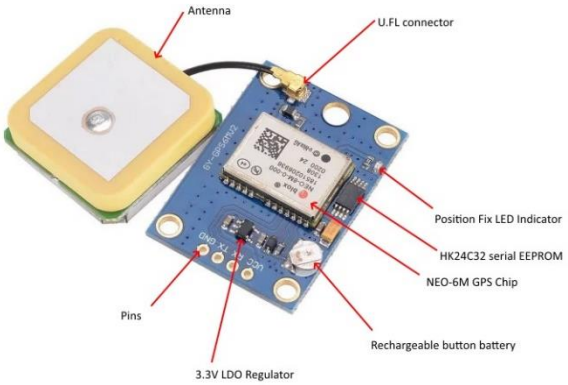


The Arduino Uno is a microcontroller board that uses the ATmega328 processor (datasheet). There are fourteen digital input/output pins (six of which can be used as PWM), six analog inputs, a sixteen-rate ceramic resonator, a USB connection, an outputs influence jack, an ICSP header, and a reset button on the board. It comes with everything you'll need to get started with the microcontroller; simply plug it into a computer with a USB cable or power it with an AC-to-DC adapter or battery.



- ARDUINO UNO R3 ATMega328

- GPS-SMV2 Module



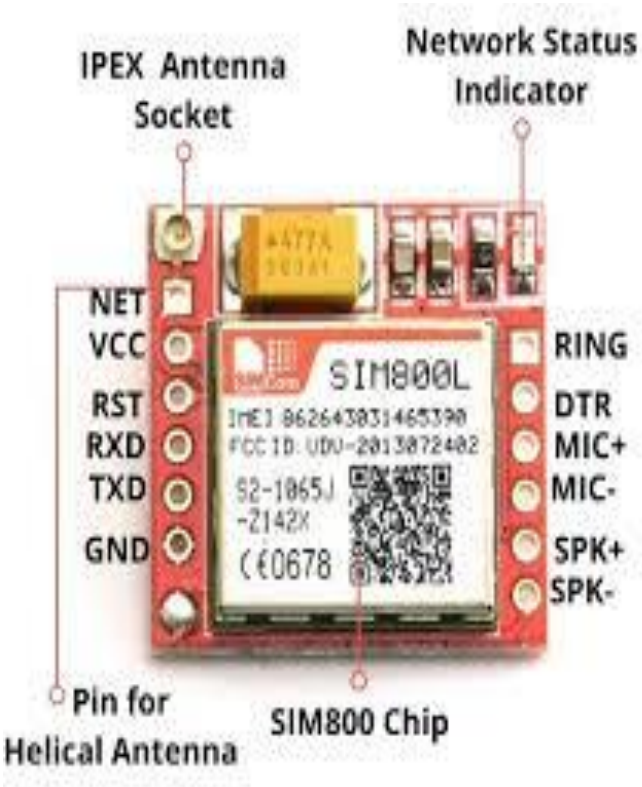
The NEO-6MV2 is a navigation module that uses the GPS (Global Positioning System). The module just checks its position on the globe and outputs the longitude and latitude of its location. These versatile and cost-effective receivers come in a small (16 x 12.2 x 2.4 mm) design with a variety of connecting choices. NEO-6 modules are suited for battery-operated mobile devices with severe cost and space requirements because of their tiny architecture, power, and memory

options. Even in the most difficult conditions, the NEO-6MV2's innovative design provides superb navigation performance.

- GSM SIM800 Module

A GSM modem, also known as a GSM module, is a physical device that connects to a remote network using GSM mobile phone technology. They are substantially equivalent to a typical mobile phone in the eyes of the mobile phone network, including the necessity for a SIM to identify themselves to the network.

SIM800 is a comprehensive Quad-band GSM/GPRS solution in an SMT form factor that can be incorporated into client applications. SIM800 supports Quadband 850/900/1800/1900MHz and can transmit voice, SMS, and data while using very little power.



- ARDUINO IDE

The Arduino Software (IDE) includes a text editor for writing code, a message area, a text console, a toolbar with buttons for basic functions, and a series of menus. It connects to the Arduino hardware, allowing it to upload and communicate with programs.

Sketches are programs created with the Arduino Software (IDE). These sketches were created with a text editor and saved with the. no file extension. Cutting/pasting, as well as searching/replacing text, are all available in the editor. The message section indicates faults and provides feedback while storing and exporting. The Arduino Software (IDE) outputs text to the console, which includes detailed error messages and other information.

V. CONCLUSION

This project presents a wearable-based IoT-based military aid and surveillance system. This system is in place to find a practical solution to the difficulties that soldiers experience. System MASS is a wearable intended specifically for soldiers that, once completely developed and proven, will be a crucial component of the Army's network-centric combat program, connecting infantry level troops on the battlefield to command headquarters. It will also connect ground troops to Army command centers and combine all aspects of a fighting group, allowing for real-time tactical scenarios.

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