

An Approach to Replace Deployed Forces Using IOT Controlled Robot

A Literature Survey and Review Paper

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Abstract:- Consider the military soldiers who are not autonomous robots or remote-controlled mobile robots. They are living beings. They have emotions, fear, and limitations and are inaccurate compared to machines and robots. They are sensitive to external factors and are subjected to environmental effects easily. The expenditure bared by the Government is very high for deployed forces like salary and other expenditures. Life Losses occurs often in the borders. Modifications / Up gradations cannot be made possible for soldiers. Humans or deployed forces are subjected to factors such as Diseases that are Infectious, Non-Battle Injuries that occur, Injuries from Heat and Cold, Stress that are Psychological, Toxic Industrial Chemicals, Weapons that are Chemical or Biological.

This approach is a robot system, a security system that can be deployed in protected areas especially borders. It is an infrared (IR) & security system consisting of a camera. It is a system that senses the Intruders and trespassers. It is also capable of transferring the recorded video to the specified destination. The robot is a system that is going to have an IR Sensor. The sensor in the robot system senses any intruders / trespassers and will activate the alarm and also switch on the guns. The robot will also be capable of shooting the intruder when he cross the border, the

bullet shall also be equipped with a GPS facility so that incase if the intruder tries to escapes he can be tracked with devices or smart phone. The robot will capture the live video and also transmit the same from the camera to the receiver, which is the smartphone. It will trigger the alarm and the data will be transferred to the mobile device.

Keywords:- IoT; Internet of Things; Robot; Wireless Communication; Sensor; Infrared; Defense; Security; Soldiers; Deployed Forces;

I. INTRODUCTION

The Internet of Things (IoT) is an arrangement of interrelated processing gadgets; it consists of mechanical and computerized machines, along with articles, creatures or individuals that are given novel identifiers (UIDs). Without human-to-human or human-to-PC association the system is developed to move information over a system. The IoT innovation is generally synonymous with items relating to the idea of the "smart home", covering gadgets and apparatuses, (For example- lighting installations, indoor regulators, home security frameworks and cameras, and other home machines). The military applications of IOT include the first Internet of Battlefield Things and other is the Ocean of Things.

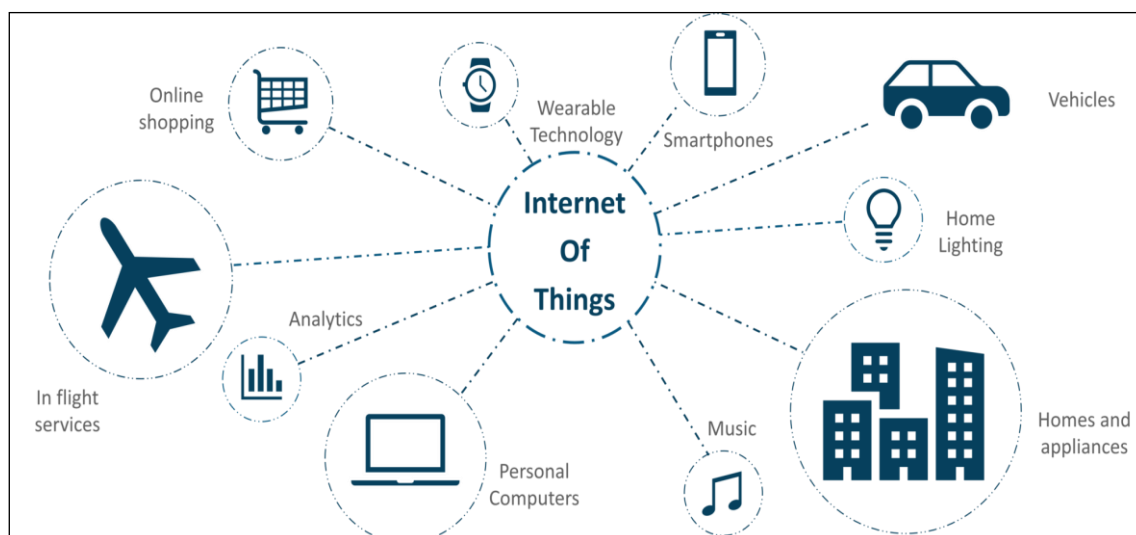


Fig 1:- Internet of Things

The Internet of Things has strong military applications, even ships, planes, tanks, automatons, officers, and working bases in a firm system that increments situational mindfulness with hazard evaluation, and reaction time. It will likewise deliver a gigantic measure of information. "The Internet of Battlefield Things (IoBT) includes the full acknowledgment of unavoidable detecting, inescapable figuring, and inescapable correspondence, prompting an exceptional size of data created by the arranged sensors and registering units".

This paper presents an approach of an IR & camera based security system for protected areas, which senses the Intruders, trespassers and transfer video to other end for confirmation. This system is embedded with an IR Sensor which senses any intruders / trespassers and will activate the alarm as well as switch on the guns in that particular place. The robot will shoot the intruder when he crosses the border. It will likewise initiate the Camera, which will begin recording the live video and transmit the equivalent to the collector end, the advanced cell. In a similar time it will begin gives alert and the information will moved through the RF Transmitter and Receiver to the cell phone.

II. RISKS & LOSSES

A. Defense & Budget Losses

A military spending plan (or military use) or protection spending plan, is that the amount of budgetary assets committed by a country in developing and maintaining a military division. Military spending plans always reflect how firmly a nation sees the probability of dangers. Similarly it gives an idea of how lots of financing required to be accommodated the forthcoming monetary year. Military elements incorporate the dimensions of that nation's economy, other financial substance and therefore the ability of that element's group or individuals to hold such military movement. Thus the Government bears huge losses every year spent on the raising and protection of deployed forces of the nation.



Fig 2:- Defense & Budget Losses

B. Risks to the Deployed Forces

The deployed forces like soldiers face tons of risks regarding like Infectious Diseases, Non-Battle Injuries also occur, Injuries from Heat and Cold, Psychological Stress, Toxic Industrial Chemicals, Chemical and Biological Weapons also has an impact.



Fig 3:- Risks to Deployed Forces

III. LITERATURE SURVEY AND REVIEW

The literature survey and reviews for the regarding are as follows:

[8] This paper introduces an origination of military web of things (MIOT) and breaks down the design of MIOT in three methods such as data detecting, data transmission and data serving, are individually detailed to present different military area applications. An application suspicion of MIOT from the weapon control perspective is given to approve the application modes that are being proposed. [11] The paper portrays a method or a solution for secure information transmission through Wireless Sensor Networks (WSN). The aim of the approach is to confirm security characteristics of information travel in the information connect layer. In the paper a system model comprising of sensors' space is explained in detail. [15] The paper shows a psychological instrument which is novel and trust-based equipment making the objects of IoT basics that suits to the situational mindfulness and making use of this information for providing response to different dangers. [12] This paper conducts investigation and research on the design squares of advanced ZigBee transmitter. The headway in VLSI innovation ignited the advancement of increasingly effective & efficient, accurate & precise, fast & speed. [18] On the combat zones of things to come, huge numbers of clever things will impart, acting, and teaming up with each other and with human soldiers or deployed forces. This will request significant advances in science and innovation. With the development of the Internet of Things (IoT), plainly industry and military IoT applications need to work at an extremely huge scope. Here we find out about the Internet of Battle Things (IoBT) and the one of a kind arrangement of difficulties the military countenances while under danger from foes. [13] This paper examines the applications of PIR sensors in frameworks and usage of ZigBee to make a remote sensor system and ESP8266 module to transfer information to a remote server. [3] This paper shows the radio recurrence sensor from business off-

the-rack (COTS) innovation and addresses different situations by which the work from radio recurrence sensors can be extracted in a brilliant city to display, recognize/identify, and track clients in a savvy city. [4] This paper presents work performed by the NATO IST-147 "Military Applications of Internet of Things" to study the possibility in misusing non-military personnel IoT programming characterized radio recurrence sensors for military purpose. A few situations are viewed as running from range investigation, course finding, and data combination etc. [14] This paper presents a reasonable cost solution that can be applied in the field of continuous monitoring of critical equipment in industry and smart homes is described. At present ease arrangement relevant in the field of nonstop checking of basic gear in industry and brilliant homes is portrayed. It has an approach that moderately uses new IR cluster sensor MLX90621 and actualizes the IoT idea and three-layer engineering. The usage of this IoT system is dependent on an open source equipment microcontroller improvement board PIC32-T795 and remote MOD Wi-Fi ESP8266 module. [19] This paper presents the design, the acknowledgment and the estimation aftereffects of a high affectability, long range and low information rates radio recurrence (RF) device. The handset device can be used for Wireless Sensor Networks or Internet of Things (IoT) applications. [17] In this paper, we study synchronous remote data and force move (SWIPT) for Internet of Things (IoT) sensor systems. The transmitters utilize cross breed beam forming and each IoT collector embraces a force parting (PS) strategy that isolates the signal into two sections for data recuperation and vitality reaping. We propose a novel system for SWIPT in which the transmitters have the alternative to either send a private or a typical message. [16] This paper discusses a vitality sparing electrical gadget Surveillance and Control framework dependent on IOT. A lot of vitality is devoured by lighting machines, so making improved proficiency and brisk shortcoming location is a huge test. [5] Diverse IoT applications and strategies for Military exercises are talked about and broke down right now. This paper likewise examines the conventions and techniques for execution utilized and exhibited by individuals over the globe.

IV. EXISTING AND PROPOSED SYSTEM

The existing system and its disadvantages and the proposed system and its advantages are as follows.

A. Existing System

In the existing system the military soldiers are not autonomous robots or remote-controlled mobile robots. They are living beings. They have emotions, fear, and limitations and are inaccurate compared to machines and robots. They are sensitive to external factors and are subjected to environmental effects easily.

B. Disadvantages of the Existing System

- The expenditure bared by the Government is very high for living beings compared to the machines or robot.
- Life Losses occurs often which cannot be regenerated or repaired.
- Modifications / Up gradations cannot be made or implemented on Humans.
- Psychology factors such as a human dropping his/her attention and concentration after 30 minutes or so. Also getting tired gradually are few factors.
- Living beings are subjected to factors such as Infectious Diseases, Non-Battle Injuries, High/Low Temperature Injuries, Mind/Body Stress, Toxic Chemicals that are industry released, Chemical Weapons, Biological Weapons.

C. Proposed System

In the Proposed system we have Military robots that are autonomous or remote-controlled mobile in nature, they possesses features from transport, searching & rescuing and execution of attack on the targets.

D. Advantages of the Proposed System

- The expenditure is reasonable compared to the existing system. One time investment can serve for many years.
- Life Losses can be prevented since they are machines and can be repaired if damaged.
- Modifications & Up gradations can be made by implementing according to the latest technologies.
- The accuracy, performance & efficiency of the robots are very high compared to humans.
- Machines don't get tired unlike living beings. They don't drop concentration or take rest. Machines are not afraid of anything and ready to fight.

V. SPECIAL FEATURES OF THE ROBOT

The following are the special features that the IoT controlled robot possess.

- Wireless Movements–Forward, Reverse, Right & Left
- All axes of the robot will have 360 Degree Rotation with Angle free movements.
- Sensors– Motion Sensor is featured which senses a trespassers
- Sensors–Ultrasonic, Obstacle detection & Direction changing
- Wireless Solutions – RF
- Obstacle Sensing
- NG and Collision Avoidance
- Direction Sensing
- Mechanical Model For Real Time Operations
- Stepper Motor OR
- Stepper Power Supply Board
- Optocoupler with Stepper Driver Board
- Auto Dialer
- RS 232 Converters OR
- Power Source
- RF Receiver OR
- Transmitter Module - 433.92 Mhz (Ft-Com-Rx2), Bandwidth – 4 Mhz



Fig 4:- IOT Controlled Robot

VI. MECHANICAL FEATURES & MODEL

Unbreakable, Less in Weight, Easy Movements, No need for surface grinding, Economic in Fabrication, Electrical Isolation, Thermal Stability, Free Rotation, Metal Construction, Stepper Motors, Hose Clamps, Shaft Collars & Couplers, Universal Joints, Wheels, etc.,

VII. REQUIREMENTS SPECIFICATION

A. Components

- Power Supply 5v DC - 7805
- Micro Controller - AT89C52 - ATM
- External EEPROM Memory - AT24C02/4/8/16/32A
- LCD - (Liquid Crystal Display) 2 x16
- Real Time Clock (RTC) - DS1307
- Serial Communication - MAX 232
- GSM Modem (900/1800 MHz)
- GPS Receiver (with license)

B. Software Requirements

- Android SDK 1.5 OR above.
- Eclipse IDE
- Java
- Embedded C
- Embedded Java
- KEIL-C Compiler
- Flash Magic Burner Software

C. Hardware Requirements

- Microcontroller Board
- Optocoupler with Stepper Driver Board
- Stepper Power Supply

VIII. TECHNICAL SPECIFICATION

A. Wireless Communication

The procedure utilizing the Radio - Frequency range for Transmitting and Receiving Voice, Data and Video flags by which information(s) are shared are known as Wireless Communication.

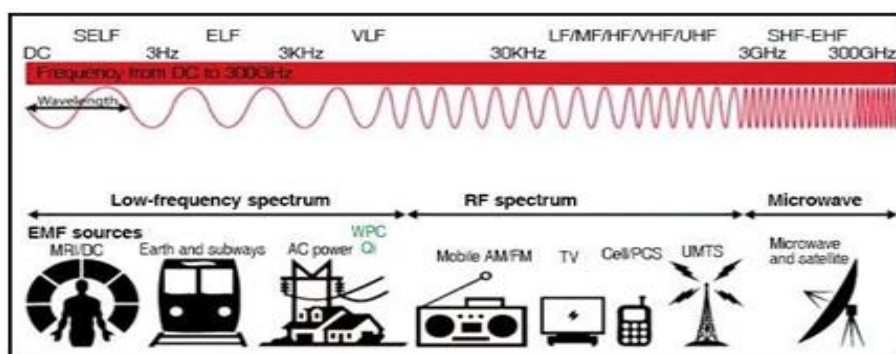


Fig 5:- Wireless Communication

B. Video/Audio Color Security Camera Wireless

We can utilize this video color security camera with audio in the application, smallest truly wireless color video camera. The little camera is with transmitter and receiver and video surveillance for security. High resolution, color, wireless cordless

camera with clear audio output is used. It has a simple start process, continuous monitoring, and excellent resolution. We can gather sensitive information while handling materials, fire fighting and night time operations. Live video transmission is also possible.



Fig 6:- Wireless Camera

C. Infrared

Infrared (IR) radiation is electromagnetic wave of a wavelength that is between that of unmistakable light and the radio waves. The collector uses a silicon photodiode to vary over the infrared to an electric flow. The collector reacts to the fast producing signal from the transmitter and gradually shifts through the infrared from the light in the surrounding. Infrared interchanges are helpful for indoor use in regions of high populace thickness. The beam is switched on and off, to encode the information. The receiver uses a silicon photodiode to convert the infrared to an electrical current. It responds only to the rapidly pulsing signal created by the transmitter and filters out slowly changing infrared from ambient light. Infrared communications are useful for indoor use in areas of high population density.

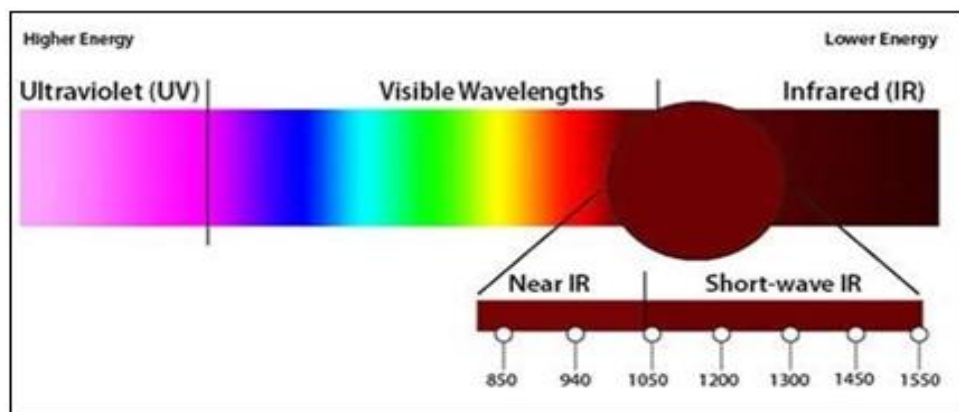


Fig 7:- Infrared Wavelength

IX. APPLICATIONS

The following are the applications of the IOT controlled robot.

- The expenditure can be reduced up to a great extent for Government.
- Implemented in areas where Life Losses has to be prevented.
- Implemented where Modifications & Up gradations has to be made periodically.
- The areas where accuracy, performance & efficiency and high concentration is required.
- If autonomous robotics is required for assistance.
- Deployed in areas where emotions are to be avoided.

X. CONCLUSION

In this paper, I presented a solution to the problem of the nation's military. The intention is to build a system that is an IOT controlled robot that will replace the human or living deployed forces. The paper contains the details with respect to the domain Internet of Things, introduction to IOT, its application areas of security & defense. An explanation regarding introduction to the development of the system is mentioned in the paper such as Overview of the robot, Defense expenditure & losses, risks to deployed

forces, the solution for the problem and military applications of IOT. This paper also contains the detailed explanation about the problems in the existing system, the proposed solution & the pros of the approach. This paper also contains the list for special features that the robot possesses. This paper also contains the details of the requirements specifications such as components used, hardware requirements & software requirements. The technical specification such as wireless communication, V/A WL color security camera & infrared are also explained. The details about the applications of IOT in military, The Major areas of applications of IOT are also mentioned in this paper.

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