INTELLIGENT UNMANNED ARMY ROBOT

ABSTRACT

An intelligent unmanned army robot (IUAR) is actively being developed for both civilian and military use to mainly perform in dangerous activities. Predominantly these vehicle are used to replace human in hazardous. Lately IUAR are the focus of many research projects for military and civilian applications like military, surveillance, security service, riot control, hostage situation, police, law enforcement, border patrol, etc. Example is explosives and bomb disabling vehicles. IUARs in varying sizes to meet mission capability requirements are today saving lives and providing critical supporting capabilities in military operations worldwide. The main issue in every country is border problems due to this problem border guarding force of army men are implemented for guarding land border during peace time and surveillance of border preventing transnational crime and to monitor intruders like terrorist, and civilian of other nation. During surveillance operation many army men wounded and shot dead in borders by the attack of terrorist and army of opponent country, so to protect the precious life of army men and women. We are implementing sensor based robotic technology for border surveillance and guard the boarder from enemy. This robotic technology will be very useful for army of every country so that the lives of many army men/women’s are protected. We expect that the intelligent unmanned army robot plays an important role in the future military operation.

1. INTRODUCTION

An intelligent unmanned army robot is actively being developed for both civilian and military use to mainly perform in dangerous activities. Predominantly these vehicle are used to replace human in hazardous. Lately IUAR are the focus of many research projects for both military and civilian applications. The IUARs are used in different kind of applications like military, surveillance, security service, riot control, hostage situation, police, law enforcement, border patrol, etc. Examples are explosives and bomb disabling vehicles. IUARs in varying sizes to meet mission capability requirement, are today saving lives and providing critical supporting capabilities in current military operations worldwide.

We guys are concentrating to secure our place from intruders first and sometimes used as an attacking those intruders. Now days the intruders have a chance to enter our place easily or by using some techniques to enter easily. By avoiding this method we introduce an intelligent unmanned army robot for security purpose. If anyone wants to enter our place using the IUARs then the commander will collect the details about that person and feed the information into the database system. Why because the security camera can capture that particular person face and comparing it with into the database and send that information to the robot by using GSM. If that person has a permission it will allow that person otherwise it will attack that person. The information’s are transfers through GSM. IUAR getting an input from commander by using zigbee network communication at manual mode.

Soldiers say one of the biggest advantages to having this “Is the ability for this vehicle to stop out enemy snipers in the area. The remote control station and the robot play very important role in the future military operations.

During the research time of military operation they found more men and women’s were died in wars, etc. So DRDO planned implementing of robot will reduces the human loss. Then creating a remote control ground vehicle for attacking purpose only.

Afterwards improving the robot performance and finding new techniques like “mine scanning, bomb diffusion, etc.” Long ago they create a robot for some specific purpose only. But now days the technologies are improved so creating a multipurpose operation robot for military surveillance. In the existing system our soldiers has to stand in the boarder for long time in rotational timings not only this problem, they have to bare the climatic conditions which is the great problem to face. Whenever the enemy enters the boarder our soldier has to fight with them. Possibility of defeating them is depends. We may survive or they may. Any way a human loss will happen.

1.1 PROPOSED SYSTEM

In the proposed system we have implemented a new technique to for overcoming the human loss. We have planned of implementing a Robot in the place of humans. It means that the military fully will not as Robot. Only in the boarders we will place the Robots. We use camera, DC motor, laser, Zigbee, Gsm, Pc, Robot.

We guys are concentrating to secure our place from intruders first and sometimes used as an attacking those intruders. Now days the intruders have a chance to enter our place easily or by using some techniques to enter easily, so we will place the camera in all the boarder lines and also along with the robots. In Pc we will be having all the data base of the military people. The camera will be monitoring all the places. If any new face is emerged the camera will send the image of the person to the Pc and will check in the data base. If he is new person then the Zigbee which is connected to the controller will send the information to another side of the Zigbee, then the DC motor will be initialized and make the Robot to move towards the person and attack them using the LASER.

Here we have used two way of Mode automatic mode and Manual mode. If the computer operator used the auto mode then the robot will taking an action independently. If he gives manual mode the camera will analyze the person and send information to Pc and check the data base, if so he is new person the microcontroller will send information to GSM, the GSM will send information to the
other side microcontroller then Robot will be initiated and the Robot will get the command from the commander and act according to the command. This robotic technology will be very useful for army of every country so that the lives of many army men/women’s are protected. The remote control station and the robot play very important role in the future military operations.

2. IUAR’s SYSTEM ARCHITECTURE

![Fig 3 IUARs System Architecture](image)

As shown in the above diagram, to secure our place from intruders. We will place the camera in all the border lines and also along with the robots. In Pc we will be having all the data base of the military people. The camera will be monitoring all the places. If any new face is emerged the camera will send the image of the person to the Pc and will check in the data base. If he is new person then the Zigbee which is connected to the controller will send the information to another side of the Zigbee, then the DC motor will be initialized and make the Robot to move towards the person and attack them using the LASER.

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2.1 IUARs FUNCTIONS

Some functions of Intelligent Unmanned Army Robot are

2. Risk Reduction.
3. Situation Awareness and Intelligence Gathering.
5. Efficiency and Productivity Increase.

![Fig 3 IUAR](image)


Unmanned systems can provide a capability increase to forces through expanded surveillance capabilities and all-weather operations. Armed drones can “loiter, observe and strike, with a far more precise application of force. The possibility of deploying more than one unmanned system per human operator can also be a force multiplier, especially during force projection. At the same time, the task and load capacity of soldiers can also be increased with the aid of unmanned systems.

2.1.B Risk Reduction.

Unmanned systems can help reduce unnecessary risk to humans. They are ideal for filling roles that are known in the field as the “Three Ds”: Dull, Dirty and Dangerous. Unmanned systems are able to reduce operational risks to soldiers such as Chemical, Biological, Radiological and Explosive (CBRE) threats or the breaching of obstacles, especially while under enemy fire.

2.1.C Situation Awareness and Intelligence Gathering.

Unmanned systems can provide heightened situation awareness and are highly suitable for intelligence gathering. To provide as many as 60 simultaneous live video feeds directly to combat troops. Some new drones will be as small as flies, others walk—all appear destined to work with decreasing human input.”

2.1.D Consistency.

Unmanned systems are consistent in performance as compared to humans who may be affected by fatigue, stress and other distractions. On the other hand, poorly programmed unmanned systems can also be consistently bad.

2.1.E Efficiency and Productivity Increase.

Like robots, unmanned systems can replace humans in low level, manual jobs, thus freeing manpower for higher value jobs. According to Lance Winslow, “it is estimated that for every soldier or airmen on the front line or participating at the tip of the sword, there are 20-25 military personnel in the command and control and logistical supply chain. Military robotics clearly increases efficiency and productivity.” Singer suggests that “unlike humans, robots can perform boring tasks with unstinting accuracy for long periods of time.”

2.2 IUAR’s CHARACTERISTICS

In the broadest "dictionary" sense, an Intelligent Unmanned Army Robot (IUAR) is any piece of mechanized equipment that moves across the surface of the ground and serves as a means of guarding our borders. A discussion of such a broad universe of possible IUAR systems needs some organizing principle, and in fact a taxonomy of IUAR systems could be based upon any of a number of characteristics of each system, including:

1. The purpose of the development effort (often, but not always, the performance of some application-specific mission).
2. The specific reasons for choosing a IUAR solution for the application (e.g., hazardous environment, strength or endurencerequirements.).
3. The "long pole" technological challenges, in terms of functionality, performance, or cost, posed by the application.
4. The system's intended operating area ( outdoors on roads, border areas, etc.).
5. The vehicle's mode of locomotion (e.g., wheels, tracks, or legs).
6. How the vehicle's path is determined (i.e. control and navigation techniques employed).

3. IUAR’s STRUCTURAL DESIGN
3.1. A Automation and Manual Mode

The Intelligent Unmanned Army Robot system will operate in two different modes (1. Automation 2. Manual). If the IUAR’s are set into the manual mode the camera will analyze the person and send information to PC and check the data base, if so he is new person the microcontroller will send information to GSM, the GSM will send information to the other side microcontroller then Robot will be initiated and the Robot will get the command from the commander and act according to the command (e.g. allow or attack). Handling the robot manually with the help of personal computer.

If the IUAR’s are set into automation mode the robot behaves an independent. If any intruder is sensed by camera the immediate of firing and attack on intruder is done without any command from military commander.

The personal computers with MATLAB software were used for controlling the intelligent unmanned army robot for military operation. The MPLAB compiler provides a comprehensive solution for your projects development software needs and replaces all MPLAB C and HI-TECH compilers. The MPLAB compiler will compiles the high level language to low level language (machine language). The controlling command is an high level language so the machine cannot understand that language due to the MPLAB compiler were used converting ASCII code to binary code.

3.1. B Area Sensing

The Intelligent Unmanned Army Robot sensing the surrounding areas with the help of Infra-Red cameras at 24/7. If cameras are identified anything it will alert the micro controller to get ready for capturing the image.

The PIC was used for controlling the infra-red camera. The microcontroller which is used to control the microchips. An each microchip will do a particular task.

The pickit2 programmer is an application which is used to writing an electrical coding’s for the PIC microcontroller.

The PICkit2 Development Programmer/Debugger can program microcontroller devices that are installed in an application circuit using In-Circuit Serial Programming (ICSP) requires five signals:
1. VPP Programming Voltage; when applied, the device goes into Programming mode.
2. ICSPCLK or PGC Programming Clock; a unidirectional synchronous serial clock line from the programmer to the target.
3. ICSPDAT or PGD Programming Data. A bidirectional synchronous serial data line.
4. VDD Power Supply positive voltage.
5. VSS Power Supply ground reference.

3.1. C Image Capturing

If anything’s are identified by camera then the microcontroller will order to capturing the target image immediately and send this image to personal computer by using GSM. The GSM modem which is used to send and receive information from one device to another device and vice versa.

The infra-red cameras are used for capturing images in day and night vision. The infra-red camera will take the image very clearly so there is no problems will occurs during face detection method. The PICKIT 2 Programmer applications were used for capturing the image with the help of microcontroller.

3.1. D Face Detection

The personal computer, gsm and camera plays an very important role in the face detection method. If any faces are detected it will compare the image with an existing image stored in database system. In this method to conform whether he/she is an authorized person or not.

The personal computer is used for monitoring the objects. GSM modem is used to transfer the images from camera to personal computer. The camera will capture the image as clear shot.

The Database systems are used to store the images into the database like SQL, etc. It is best way of backup the images and the information’s.

The database systems are used to manage the data about the authorized and
unauthorized persons. The database system plays an important role in worldwide.

The MPLAB compiler provides a comprehensive solution for your projects development software needs and replaces all MPLAB C and HI-TECH compilers.

3.1.E Database Management
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The database systems are used to manage the data about the authorized and unauthorized persons.

3.1.F Commanding Information
The IUAR’s are active in Automation mode and manual mode. If the IUAR is in automation mode it follows the steps and does an action of whatever we wrote in the program design.

But in manual mode the robot will send a request to military commander and get a response for attacking or leaving the person. The Proteus methods are used for commanding to robot with the help of mobile or any hand held device.

The Proteus project, which is dedicated for developing an integrated system mobile system for counterterrorism and rescue operation. Fig.12 Proteus System

The ZIGBEE communication methods are used for transferring the command from handheld device to the Intelligent Unmanned Army Robot.

3.1.G Attacking or Leaving
The IUAR’s are plays an important role in this method. The IUAR’s consists of camera and laser guns. The IUAR robot is built by using some peripheral components like (Motors, Wheels, etc.). Fig.13 Attacking or Leaving

The motor drive which is used to control the motor movements (e.g. rotating the laser position).

The motors help to the robot for moving from one place to another.

The laser is used for firing the intruders.

The Embedded C programming language is a collection of one or more functions. Every function is a collection of statements that are used to perform some tasks.

The embedded system C languages are used for writing a code for peripheral component. Fig.14 Embedded C Language

After getting the command from commander the IUAR attacking or leaving the person of consists of command it received.

4. FUTURE IUAR CAPABILITIES

4.1 BENEFITS OF IUAR
1. Soldiers say one of the biggest advantages to having this “Is the ability for this vehicle to stop out enemy snipers in the area”.
2. It deserves the military operations.
3. This robot replaces having the possibility of a soldiers being killed by war.
4. To avoid more human loss.
5. Easily documenting the area information with the help of visualizing method.
6. To secure our border line with full of robots.
7. It sensing the intruders’ arrival at 24/7.
8. More powerful than our soldiers.

5. CONCLUSION
There is a role and place for both unmanned and manned systems on the future battlefield. While operating unmanned systems can prove costly, keeping people out of harm’s way is priceless. The use of unmanned systems brings many benefits, but they should be seen as complementary to rather than replacements for existing manned systems. The IUARs are used in different kind of applications like military, surveillance, security service, riot control, hostage situation, police, law enforcement, border patrol, etc. They work more effectively in environmental extremes such as heat, cold, or nuclear, chemical and biological
contamination. Thus, IUAR can be used to augment the soldiers’ capability in the field of military operations. In this paper, we present automation robot and its software architecture to efficiently control IUAR in the future combat fields. In addition, we develop the IUAR for autonomous moving using a variety of sensing techniques and sophisticated-designed systems. To verify the effectiveness of our proposal, we develop the automation robotic system and IUAR respectively. In addition, we conduct a great many automation tests for multiple unmanned ground vehicles in the predefined combat area. The developed systems, IUAR and automation system, is easy to operate and enable significant reduction in station operator workload by utilizing an intuitive graphic user interfaces for IUAR navigation and allowing a single station operator to command multiple IUAR’s at a time. In the consequence of the operation test, we expect that the automation system and IUAR play an important role in the future military operation.

REFERENCES


