



INTELLIGENT BORDER SECURITY TRESPASSER DETECTION USING IOT AND EMBEDDED SYSTEMS

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ABSTRACT

Trespassers cross our borders unknowingly. It is not possible for our soldiers to watch the borders at each and every moment. An essential requirement in security is the capability to automatically detect trespasser in borders, to inform nearby control unit and to empower security personal to track the trespasser. To detect the trespasser we are using FLIR (Forward looking infrared) camera. FLIR for detecting various objects and it captures picture. Sound sensors are using to detect sounds and motion sensor to detect suspicious movements near border. A buzzer, and electric current through the fence for further protection in large border area.

Keywords: Embedded, IOT, GSM, FLIR Camera

1. INTRODUCTION

Now a day's a danger event is normally happened by the negligence of humans. To implement real time inspection and surveillance of the border security, intelligent Border security system is developed. Robots are used for rescue security and surveillance. The skill of robot can be utilized were a human is not capable for doing it. For monitoring remote areas an intelligent robot can be designed with reliable economic communication. In Robot FLIR camera detects trespassers using face recognition algorithm. System can detect a trespasser using intruder detection subsystem which relies on invariant face recognition and it tracks the trespasser using intruder tracking subsystem based on streaming technology. Intruder detection subsystem captures images periodically when it detects trespasser in a secure area and verifies whether the object detected is human using invariant face recognition algorithm then security system will alert the security guards through wireless or wired communication. The security guards use the images in FLIR camera to control motion and to recognize trespasser.

An embedded system is a special-purpose system in which computer is completely encapsulated by the device it controls. Unlike a general-purpose computer, such as a personal computer, an embedded system performs predefined tasks, usually with very specific requirements. Since the system is dedicated to a specific task, design engineers can optimize it, reducing the size and cost of the product. Embedded systems are often mass-produced, so the cost savings may be multiplied by millions of items.

Android Based Intelligent Robot for Border Security, which identifies trespassers using PIR motion sensor, alerts security personnel by SMS using GSM and captures image of trespassers using camera in android device and mail this image to corresponding email ID using android based application. It enables security personnel to detect effectively and at low cost to identify an intruder. Border security robot can be operated in three different ways in accordance with user requests and possessions of task: (A). Patrolling mode: Here robot roams in the environment and tracks predefined routes unconventionally. It will send key information related to security to the server for further analysis.

First Responder mode: robot will work in collaboration with fixed monitoring devices and it is programmed. It will be directed to target location in order to perform on-site inspection when a security related event is reported by one of the monitoring device. Obstacles in its path can be avoided by creating a deviation or unswervingly jumping over them.

Remote Control mode: In this mode remote user will navigate the surveillance robot to the target region. Security system can be accessed by the users through PCs, mobile phones and PDAs.

2. LITERATURE SURVEY

Annu Maria Alex et al. [9], For automatically detecting trespassers in borders, an autonomous intelligent Robot can be used. Our borders extend thousands of miles and therefore our soldiers will not be able to provide complete security. Illegal immigration, smuggling and trafficking in drugs and arms can be prevented if the borders are secured. Every government gives more priority for border security. As technology increases new threats and risks arise towards national security. To improve the border security, sensor technology and computer processing power can be used. In our project an autonomous intelligent robot is used which is enhanced with a video surveillance camera for detecting the trespasser, inform nearby control unit and to check whether an intruder is detected and fire if necessary. PIR motion sensor is used for detecting the trespassers

Pooja S N et al. [10], Terrorists cross our borders unknowingly. It is not possible for our soldiers to watch the borders at each and every moment. An essential requirement in security is the capability to automatically detect terrorist in borders . In this paper we propose an robot which identifies terrorist using IR sensor and capture image of terrorist using pi camera and sends notification to respective admin. If admin accept to shootout that terrorist then

that notification is sent back to robot through server to kill that person, if admin decline to shootout then the process will stop their itself. This development enables security personnel to effectively detect terrorist at low cost.

Kanoujiya Akhilesh et al. [11], Border surveillance is the most difficult and important task for national defence and security. Especially under certain circumstances when activities like terrorists infiltrations, intrusions and illegal happenings between the borders, it has become utmost important to protect the borders with smart and advance technology. Our project is based on a Border security system which fabricates on border security, by using advance technologies. The main objective of the paper is to describe how the technologies used in this system works and how this will help the soldiers to secure the border of the country. To curb such happenings the least we can do is to constantly monitor across the border and detect intrusions. if something suspicious is detected by the system, it must be able to perform necessary actions by issuing an alarm alert and weapon activation system. The central room can be set up within a distance from the border. Once the human controller is aware of intrusion it is upon them to take next course of action.

3. BLOCK DIAGRAM

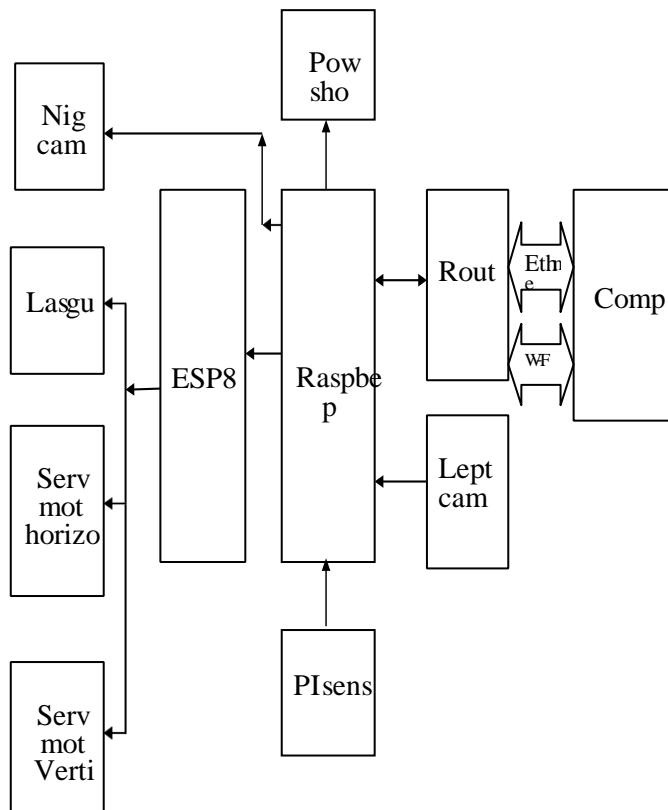


Fig: Block Diagram of System in the Border Site

4. ADVANTAGE

1. Sensors detect objects on cloudy days or beneath trees and produces higher quality images for better identifying individual objects or people.
2. It provides us the ability to sense and control objects remotely across pre-existing network infrastructures creating new opportunities for more integration of the physical world into a cloud based system.
3. It reduces human involvement in the borders. This method reduces the risk in the lives of our soldiers.
4. Alert message is being sent to the control room, and the provision for firing is passed on. This system provides more security and reducing the risk of soldiers.
5. Enabling quick action on trespassers.

5. APPLICATIONS

1. Beneficial in emergency around Border areas.
2. FLIR (Lepton) and night camera can monitoring even during fog, dark and humid environment.
3. Electronic shock in the border fence to block the intruder movement.
4. Warning facility monitoring center to alert the infiltrators.

6. FUTURE SCOPE

1. In the future enhancement can be done by incorporating an IR camera that can exactly capture IR pattern emitted By human body. Furthermore, mental and bomb detector can be used to protect from possible damage.
2. In the future enhancement can be done by incorporating an IR camera that can exactly capture IR pattern emitted by human body. Furthermore, metal and bomb detector can be used to protect from possible damage.
3. A coherent system is needed which combines various technologies to create a more accurate and efficient systems. Border security is an important factor concerned for many nations. It controls illegal crimes in the country. By implementing a large number of robots the security levels can be increased. A single robot could only monitor a local area but more robots could detect intruders in a global area. More number of sensors can be included for more safety. Large number of sensors is used to detect more intruders. Metal detectives and other technologies can be established to further increase security levels. A less expensive and complex system can be introduced for increasing the border security.

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