INTERNATIONAL JOURNAL OF TECHO-ENGINEERING

ISSN : 2057-5688

INTELLIGENT BORDER SECURITY INTRUSION DETECTION USING IOT AND EMBEDDED SYSTEMS

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ABSTRACT:

The Internet of Things (IoT) of smart objects is ever-growing network. It refers to the physical objects which are capable of exchanging information with other physical objects. It introduces various services and human's routine life depends on its available and reliable activities. Therefore, the challenge of implementing secure communication in the IoT network must be required. The IoT network is secured with encryption and authentication, but it cannot be protected against cyber-attacks. Therefore, the Intrusion Detection System (IDS) is needed. Some security attacks and various intrusion detection approaches to mitigate those attacks are presented.

Keywords: IOT, IDS, encryption, secure, border.

1. INTRODUCTION:

An autonomous robot system is an innovation of modern technology. It has been able to provide significant support to mankind by accomplishing task that is impossible for human beings. These robots can be used to accomplish tasks like rescue, security, surveillance in unstructured and natural environments. An Internet-based intelligent robot security system, "iBotGuard" in [2] 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

ISSN : 2057-5688

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 robot will alert the security guards through alert signal using internet. The security guards use the images in robot camera to control robot motion and to recognize trespasser. The reconnaissance robot [3] can be operated in three different ways in accordance with user requests and possessions of task: (a). Patrolling mode: Here reconnaissance robot roams in the environment and tracks predefined routes unconventionally. It will send key information related to security to the server for further analysis. (b). First Responder mode: The reconnaissance 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. (c). 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:

1."Human Motion Detection Using Passive Infrared Sensor" K Sravani, Md Parvez Ahmed, N Chandra Sekhar, G Sirisha,V Prasad.International journal of research in computer application and information vol2,issue-2,march-april,2014.The objective of this project is to develop a motion sensor alarm based on a Passive InfraRed (PIR) sensor module. In this project, microcontroller continuously monitors the output from the sensor module and turns a buzzer on when it goes active. The application areas of this project are: All outdoor lights, Lift lobby, Multi apartment complexes, common staircases, for basement or covered parking area, shopping malls, for garden lights.

2."Border Surveillance using sensor based thick-lines" Ramzi Bellazreg , Noureddine Boudriga, Sunshine28-30,Jan,2013,information

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networking(ICOIN). The primary objective of the deployment research is to find the deployment strategy using the minimum number of each type of sensors to cover the whole surveillance area and to achieve a desired intrusion detection probability when intruders near the border. minimum number of each type of sensors to cover the whole surveillance area and to achieve a desired intrusion detection probability when intruders near the border. minimum number of each type of sensors to cover the whole surveillance area and to achieve a desired intrusion detection probability when intruders near the border.

3.“Advanced Border Intrusion Detection and Surveillance Using Wireless Sensor Network Technology”. IJCNS 251-259,2013.This paper surveys the literature for experimenting work done in border surveillance and intrusion detection using the technology of WSN. The role of WSN in border surveillance, as in most WSN applications, focuses on information gathering from various types of sensors, such as seismic, camera, and motion detectors. Some advanced WSN process these raw data and send an abstracted alarm or aggregated data to the command center, which, in turn, takes the appropriate defence action

4.“Defence Security Systems”.IEEE , Harry J. woodroof, Ase k jakobsson , 8 sep 2014.The main purpose of the project is to enhance the border security electronically with automation and with that to reduce the work load and responsibility of the soldiers that continuously take a look on border 24x7. This project will not fully remove the responsibility of soldiers but shares the maximum responsibility and will reduce human efforts on the border. 5.“Wireless sensor networks to prevent unauthorized entry into critical military borders” .IEEE 20 jan 2011,Yan-Xio Li, Lian Qin, Qian Liang. Human activity at border is performed by the system with the help of PIR Sensor. This will alert if someone enter at border. In second stage the system is going to detect whether the person is carrying a weapon or not. If a person is carrying a weapon then it will alert at monitoring area about the weapon by using metal detector sensor. Then at the final stage capturing the image of the person entering at military border is performed. For this the system uses a camera which is capable of capturing the image clearly when the person is near to it. After capturing the image ofthe

ISSN : 2057-5688

unauthorized person, image processing is used to process the image. By the use of MATLAB the image is processed and transmits to the required destination i.e. monitoring section. The transmission is possible through ZIGBEE. Thus the human activities and penetration of terrorist are easily monitored and can be prevented at high dense fog and critical military borders.

3. PROPOSED SYSTEM:

Border areas are generally considered as places where great deal of violence, intrusion and cohesion between several parties happens. This often led to danger for the life of employees, soldiers and common man working or living in border areas. Further geographical conditions like mountains, snow, forest, deserts, harsh weather and water bodies often lead to difficult access and monitoring of border areas. Proposed system uses thermal imaging camera (FLIR) for detection of various objects and infiltrators. Software code captures video and subsequently the intrusion detection. A motor controlled spotlight with infrared and laser gun is used to illuminate under various conditions at the site. System also integrates motion sensors to sense suspicious movements. Based on the decision, a buzzer and electric current through fence for further protection can be initiated. Sensors are be integrated through IoT for an efficient control of large border area and connectivity between sites.

Ensuring security across border region is considered as an important aspect for any country. It provide protection to the country at the same time, it incur huge expenses for a

country. Many systems are developed by researchers to provide a solution for efficient monitoring of borders. In a mechanized robot controlled by embedded system is reported. This system employs a group of sensors and a night camera; data from these sensors transmitted wirelessly to control station. In a robot man consisting a laser machine gun and camera to facilitate determination of targets and use Bluetooth enabled communication between the control center and the robot. Metal and sound sensors transmit the information. The control center is responsible to control the robot and the gun.

ISSN : 2057-5688

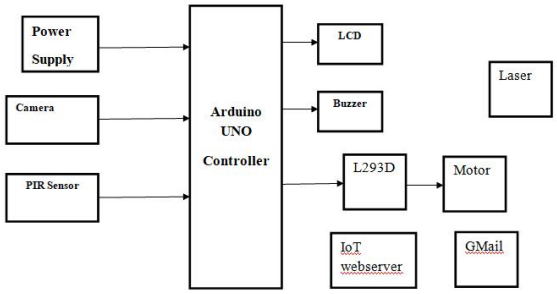

Fig.3.1. Proposed diagram.

4. RESULTS EXPLANATION

Design steps are divided into two, the first section is in the border area while the second section in controller site. Cameras are set such that motors can move it to scan by 180 degrees. Both the camera and motor controlled by ESP8266 [7], [8] controlled by raspberry pi. The controller is also programmed to interface the PIR sensor and the electric shock activators. A communication link between the border area and the control station is established though an independent network switched using two routers (wired and wireless network). When the PIR sensor detects movements it will activate the electric shocker, through Raspberry pi. An additional control for electric shock is provided through the control center. This deters intruders and infiltrators trying to climb the fence. Under normal conditions, in the absence of instructions from controlling station, the system goes under a stable mode. One receiving orders from the control station to the motors, it follows a path according to the orders controlled by horizontal or vertical movements. The instructions are received through ESP8266 from the raspberry pi and from the client. The laser gun and night camera can be controlled by control center via ESP8266 upon reception of commands from the raspberry pi. In addition, the system controls an alarm through ESP8266 to warn the intruders about being in a restricted area. Communication between the system in border area and control center happens either through the wired or wireless network through the router.

Fig.4.1. Hardware kit.

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Fig.4.2. Lcd display Human and metal detection.

5. CONCLUSION:

The system developed has provided efficient communication and control operation. It alarms the intruder and if the intruder ignores the alarm, an electric fence is activated. Image of the border screen is transmitted to the controller side through IoT. System provides surveillance in dark, fog, and extreme weather conditions and provides 180 degree scanning of the scene.

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ISSN : 2057-5688

microcontroller primer; programming and interfacing online: www.amazone.in.