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Bank Locker Intrusion Detection and Alert System

Anupama Hasurkar
Electronics and Telecommunication
Thakur College Of Engineering & Technology
Mumbai, India
anupamahasurkar@gmail.com

Abhishek Dubey
Electronics and Telecommunication
Thakur College Of Engineering & Technology
Mumbai, India
abhishek09dubey85@gmail.com

Ankita Saha
Electronics and Telecommunication
Thakur College Of Engineering & Technology
Mumbai, India
ankitasaha34@gmail.com

***Abstract*— This paper presents an IoT based security system with auto arrest. Day by day with increasing customers bank has to face many challenges and protecting the resources using a very efficient and smart security system is required. Our system only monitors the area when motion is detected by the various sensors which are kept at different sections in the bank and in the event of any suspicious action. In addition, our model also provides the feature of auto arresting which is implemented using the relay system.**

Keywords—burglar alarm, IoT based system, intrusion detection system, microcontroller, relay system

I. INTRODUCTION

Bank is a center where we keep our valuables and money. Where there is money there are thieves. Burglary cases are increasing nowadays so protecting the bank has become more important and are the issue of concern over the decade. Nowadays intrusion has become very smart and so does our technology has become advance. This advancement in technology can be the barrier to the intrusions and to avoid such threats. they receive and to overcome the new challenges they have to face from time to time. To protect bank from fire and other abnormal activities, security is needed. With growing advancement in electronic security system, nowadays all the manual locks are being replaced by electronic gadgets with the most sophisticated technology.

The main objective of our research is to design a bank intrusion alert system and automatically arrest the thief in bank or ATM itself with the help of a central surveillance system. Internet of things has emerged the idea of controlling devices using internet. To boost bank security this framework is managed and maintained by central processingunit.

II. LITERATURE SURVEY

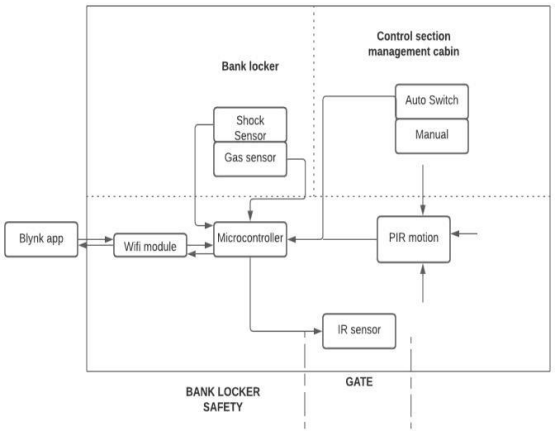
In this paper authors have proposed that HC-SR04 ultrasonic sensor is introduced to catch the range of the intruders. After the detection of intruder, USB camera will be turned on followed by a primary alert. Human detection algorithm using MATLAB will detect intruder morphology [1].In this paper, image processing is used to become aware of robberies and use of sensors. It works upon the actual motion with real time analysis of any human from camera surveillance [2]. In this paper author have proposed use of hand gesture recognition with respect to human security system interaction. Hand gesture recognition consists of five actions such as image acquisition, skin color information for identifying hand gesture which is achieved through the arm area of the hand, background removal, canny edge detection and contour detection.

A successful implementation of the model for bank security from thefts is evaluated by up gradation in hand gesture recognition using web camera. The detection accuracy rate is almost 95.7 percentage [3].In this paper authors have proposed the use of PIR sensor to observe and detect the human motion, based on which alarm produces beep sound from ATM machine. This proposed system makes use of ARM controller based on embedded system to process real time information collected through the PIR sensor. After alarm, the DC motor will close the ATM door and then the gas will be leaked to make thief unconscious. Using camera surveillance, the footage will be recorded and it will be used to make auto arrest [4]. Proposing a single window-based cloud service delivery model, where a smart card serves as a single interface to access multifaceted electronic services like banking, employment, etc. In this paper, author has focused on the intrusion detection system of the Cloud Service Model during cloud banking transaction for detection and prevents unauthorized access [5].

III. METHODOLOGY

With this proposed system, we will replace the existing systems which are unable to provide a high and efficient security to the banks and are not able take quick measures even if a bank intrusion occurs.

Fig.1 represents the block diagram of our proposed system. Our system works on IoT technology with a central processing unit which is the Blynk app which will alert the police when there is any suspicious activity and will also auto arrest the thief which will not allow him to run away and will allow the police to reach on time. PIR sensor is fixed in various parts of bank where human activities can be monitored. The vibrating sensor is fixed to the locking area while the Gas sensor will be fixed to the pipes and all doors are connected to magnetic locks controlled by a transmission alarm and a burglar connected to the transmission circuit. In this proposed activity, the sensors will perform their function accurately based on the data provided by the various sensors. The sensor data will be continuously monitored by the microcontroller. Microcontroller is employed to analyze the sensor data and to generate a decision. If there is any kind of intrusion the data will be sent to the central processing system i.e. blynk app and will be verified by the bank officials and then the police will be alerted and the thief will be arrested inside the bank locker with the auto arrest system using the relay and the information will be forwarded to the Police and the bank manager through the central processing centers.



Gas Sensor: Gas sensor MQ135 is set forth in the proposed method. A Gas sensor's working principle is serve to measure the concentration of gases in the environment.. The sensor has a built-in variable resistor. This register changes its value according to the concentration of gas. When the concentration goes high, the resistance decreases eventually and If the concentration is low, the resistance increases.

Passive Infrared Sensor: Sensor measures infrared light radiating from objects. PIR sensors mostly used in PIR-based motion detectors. Also, it has its use in security alarms and automatic lighting applications. The PIR sensor consists of 3 pins.

- Pin1 corresponds to the drain terminal of the device, which connected to the positive supply 5V DC.
- Pin2 corresponds to the source terminal of the device, which connects to the ground terminal via a 100K or 47K resistor. The Pin2 is the output pin of the sensor. The pin 2 of the sensor carries the detected IR signal to an amplifier from the
- Pin3 of the sensor connected to the ground.

Infrared Sensor: IR sensor is an electronic device that emits the light in order to sense some object of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations.

Shock Sensor: A shock sensor has its working by detecting the shockwaves that are associated with a window or a door being broken. When a large shock wave is detected, the shock sensor will get activated. This will tell the shock sensor to send an alert to the alarm system to let it know about the situation.

NodeMCU: ESP8266 NodeMCU is an open source LUA based firmware developed for the ESP8266 Wi-Fi chip. By exploring functionality with the ESP8266 chip, NodeMCU firmware comes with the ESP8266 Development board/kit i.e., NodeMCU Development board. Since NodeMCU is an open-source platform, its hardware design is open for edit/modify/build. NodeMCU Dev Kit/board consist of ESP8266 Wi-Fi enabled chip. The ESP8266 is a low-cost Wi-Fi chip developed by Express if Systems with TCP/IP protocol.

Blynk: Blynk is an "Internet of Things" (IoT) platform that allows to build apps to control certain devices over the internet.

Resistor: A passive electrical component with two terminals that are used for either limiting or regulating the flow of electric current in electrical circuits. The main purpose of resistor is to reduce the current flow and to lower the voltage in any particular portion of the circuit. It is made of copper wires which is coiled around a ceramic rod and the outer part of the resistor is coated with an insulating paint.

Transistor: A transistor is a type of a semiconductor device that can be used to both conduct and insulate electric current or voltage. A transistor acts as a switch and an amplifier. Transistor is a device that is used to regulate the flow of electronic signals.

Led: A light-emitting diode (LED) is a semiconductor device that emits light. When an electric current flows through it, the electrons recombine with holes emitting light in the process. LEDs allow the current to flow in the forward direction and block the current in the reverse direction. Light-emitting diode (LED) is a widely used standard source of light in many electrical equipment.

Buzzer: The sounding device buzzer can convert audio signals into sound signals. DC voltage is used to power. It is widely used in alarms, computers, printers, and other electronic products as sound devices. It is mainly divided into piezoelectric buzzer and electromagnetic buzzer.

IV. RESULT

The Auto Arrest system will suffice the need of taking action against suspicious activities and robberies in bank instantly. The sensors and relay module will be sending the data to the microcontroller and on processing them the alert can be sent to blynk app via integration, then the intruder will be arrested. The Police and the bank manager will be informed through the central processing centers.

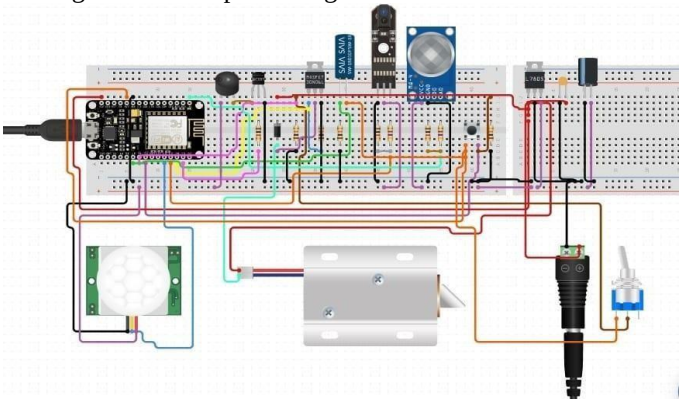


Fig 2: Circuit Diagram

Fig 2 represents the working of detection of intrusion.

PIR sensor, Vibration sensor and gas sensor all attached via connecting wires to the microcontroller. PIR sensor detects the motion of suspicious activity and if the mechanical breakage happens the vibration sensor along with gas sensor will be triggered to send the signals in form of input values to the microcontroller and blue led will blink. The circuit will work in 2 modes: manual and automatic mode. It will be controlled by the switch.

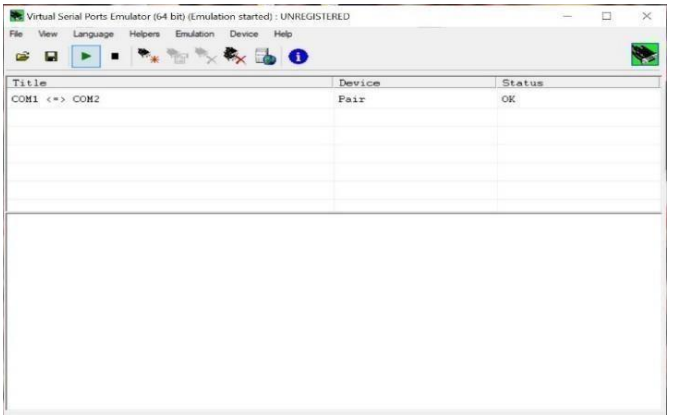


Fig 3: VSPE Connection

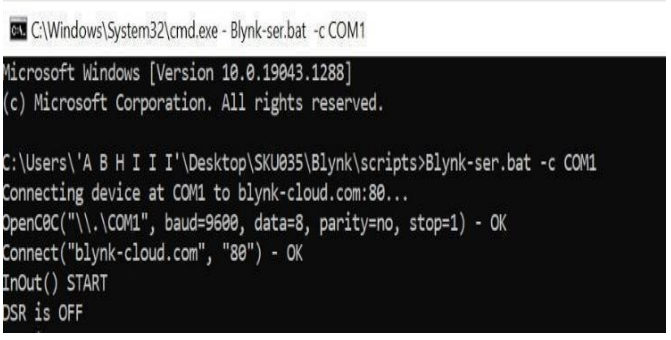


Fig 4: Command for connection of COM Pin

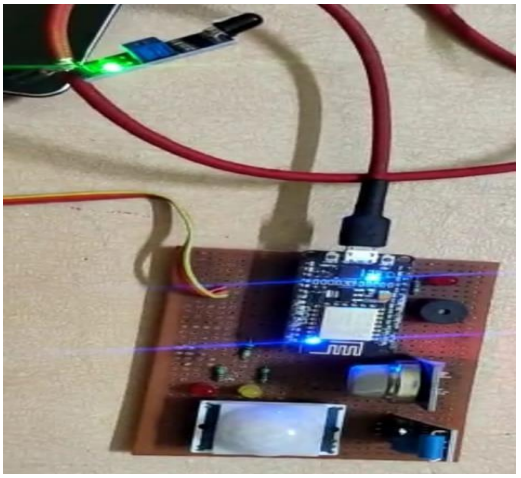


Fig 5: Implementation of project

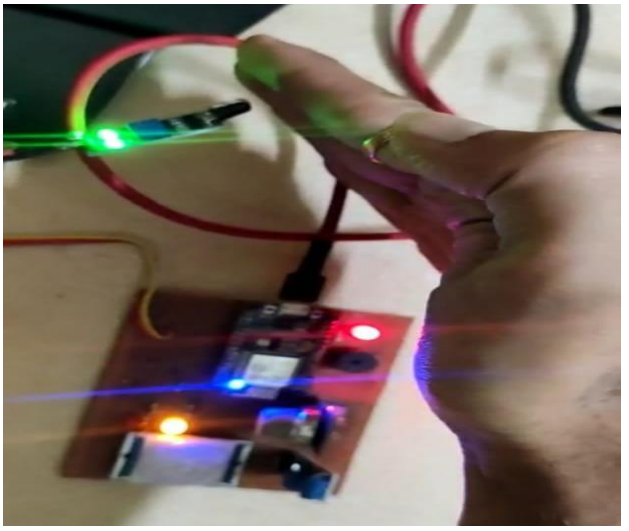


Fig 6: Implementation of Project

Inferences that are concluded from survey of IoT domain – bank Locker Intrusion Detection and Alert System:

1. Majority of the people are unaware of securing valuables. 2.Approx 25% People tend to believe in keeping the valuables in home coffers.

3. There is awareness about the thefts being happen around but less of them believe in adapting new technologies. Advancement of the security is much needed can be seen from the survey.

V. CONLUSION

This project is based on an intelligent and centralized monitoring control system with the use of Internet of things. It will be very helpful to prevent bank intrusion or robbery cases before it takes place. The robber or the thief will be automatically arrested within the bank. It provides security with the latest technology. It is cheap and compact in size. There is no need to constantly monitor and few humans are involved in the monitoring phase. It is also helps for taking immediate actions in the event of any fire inside the bank.

VI. REFERENCES

[1] Unni. R, Pati U.C, “PC based ultrasonic Intrusion Detection System”, International Conference on Communication and Signal Processing, April 3-5, 2018.

[2] Rutvik Kakadiya, Reuel Lemos, Sebin Mangalan, Meghna Pillai, “AI Based Automatic Robbery/Theft Detection using Smart Surveillance in Banks”. Third International Conference on Electronics Communication and Aerospace Technology [ICECA2019]

[3] Ashutosh Gupta, Yogesh Kumar, Sanal Malhotra,"Banking Security System using Hand Gesture Recongnition", International Conference on Recent Developments in Control, Automation and Power Engineering (RDCAPE), 2015.

[4] Kande Archana, Dr.P. Bhaskara Reddy, Dr. a. Govardhan, "To Enhance the Security for ATM with the help of Sensor and Controllers", International Conference on Energy, Communications, Data Analytics and Soft Computing, 2017.

[5] Sonam Biswas, Abhishek Roy, "An Intrusion Detection System Based Secured Electronic Service Delivery Model", Third International Conference on Electronics Communication and Aerospace Technology [ICECA 2019]

[6] A. Kumar, P. Sood and U. Gupta, "Internet of Things (IoT) for Bank Locker Security System," 2020 6th International Conference on Signal Processing and Communication (ICSC), 2020.

[7] S. Sridharan, "Authenticated secure bio-metric based access to the bank safety lockers," International Conference on Information Communication and Embedded Systems (ICICES2014), 2014

[8] A. Verma, "A Multi Layer Bank Security System," 2013 International Conference on Green Computing, Communication and Conservation of Energy (ICGCE), 2013, pp. 914-917

[9] N. Khera and A. Verma, "Development of an intelligent system for bank security," 2014 5th International Conference - Confluence The Next Generation Information Technology Summit (Confluence), 2014

[10] R. Gusain, H. Jain and S. Pratap, "Enhancing bank security system using Face Recognition, Iris Scanner and Palm Vein Technology," 2018 3rd International Conference On Internet of Things: Smart Innovation and Usages (IoT-SIU), 2018

[11] S. Dutta, N. Pandey and S. K. Khatri, "Microcontroller Based Bank Locker Security System Using IRIS Scanner and Vein Scanner," 2018 International Conference on Inventive Research in Computing Applications (ICIRCA), 2018

[12] P. S. R. Teja, V. Kushal, A. S. Srikar and K. Srinivasan, "Photosensitive security system for theft detection and control using GSM technology," 2015 International Conference on Signal Processing and Communication Engineering Systems, 2015

[13] A. Z. M. Tahmidul Kabir, N. Deb Nath, U. R. Akther, F. Hasan and T. I. Alam, "Six Tier Multipurpose Security Locker System Based on Arduino," 2019 1st International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT), 2019

[14] V. K. Kolur and P. Reshmi, "Io T based Security System for Organization," 2020 IEEE Bangalore Humanitarian Technology Conference (B-HTC), 2020