ADVANCED SECURITY SYSTEM

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Abstract: While robbery and burglary is one of the most widespread criminal phenomena, with a very high recidivism rate, it has rarely been the subject of thorough empirical research. In this paper an Advanced Security System is proposed which describes an economic anti-theft setup. This system focuses on the design and development of a triple layered security system to control the increasing graph of crime. This system consist of three layers; keypad locking, face detection & recognition and laser light system. The first and second layer checks for authorization of user while the third layer is used to trap the user inside if he tries to access the area without passing the authorization process. Thus this system is efficient in trapping the unauthorized person.

Index Terms –Face Recognition and detection, Keypad Locking, Laser Light, SMTP

I. INTRODUCTION

Security is one of the major concerns today. With the advancement in technology, there is an increase in number of the robbery cases. This modern advanced security system describes an economic anti-theft setup for highly confidential areas such as defence, banks etc. It focuses on the design and development of a triple layer security system to control the increasing graph of crime. The Advanced Security System consists of three Layers:

A. Keypad Lock
The keypad locking system allows the user to enter the password to unlock the primary door. On successful password entry, the primary door unlocks for 5 seconds. On the other hand, if the password entered is invalid the corresponding door remains closed.

B. Face Detection and Recognition
In this layer, the detected face is compared with the faces stored in the database in order to identify the person. If the detected face matches with the database the secondary doors will open. The face detected is different and does not matches with the database, the images captured are sent to the owner.

C. Laser Security System
Laser security system consists of a laser mesh created by reflection of laser beam by mirrors. This system traps the unauthorized person inside whenever the beam between transmitter and receiver is interrupted.[3]

II. EXISTING SOLUTIONS

An anti-theft system is any device or method used to prevent or deter the unauthorized appropriation of items considered valuable. Theft is one of the most common and oldest criminal behaviours. From the invention of the first lock and key to the introduction of CCTV camera to record and increase security then the invention of RFID tags and biometric identification, anti-theft systems have evolved to match the introduction of new inventions to society. All the existing systems have solution to avoid the unauthorized entrance but no system is able that to traps the person who tries for unauthorized access.

(i) *Anti-theft alarm circuit*

It is an Anti-theft alarm circuit to prevent burglary. It sounds an alarm when someone tries to enter into the confidential or authorized area by hitting, pushing or knocking the door. The sensor element used is a condenser mic, which is fitted on the entrance of the confidential area, preferably on the door frame. Hitting, pushing, knocking or any disturbance on the door will generate some noise. This is detected by the condenser mic and fed to the pre-amplifier section of the circuit, which is connected to the buzzer or the alarm. Thus the alarm turns on when someone hits/knocks at the entrance door.[11]

(ii) *GSM Based Home Security Alarm System*

This system deals with the design of a robbery control system for homes, which can be used to decrease the chances or prevent theft in homes. This system has an embedded system which is based on Global System for Mobile communication (GSM) technology. An interfacing intrusion-detector unit is connected with this system In case of an burglary attempt, a warning message is transmitted by the system to the owner's mobile. [4]

(iii) Home Security System and Door Access Control Based on Face Recognition

This system has two parts; face recognition and intruder detection. First, face recognition is used for door access and then Intruder detection is used which can auto alert the owner. The door lock access system by face recognition system is based on Viola Jones Algorithm. This face recognition systems techniques used, extracts the features of face and compares them with the existing facial images of database. The faces considered here for comparison are still faces. The proposed home security system (i.e. Intruder detection Module) is built up on the frame subtraction approach. The main purpose of this approach is to build a model of the static scene (i.e. without moving objects) called background, and then compare every subsequent frame of the sequence to this background frame in order to identify the regions of motion, called foreground (the moving objects). [8]

III. PROPOSED LAYOUT

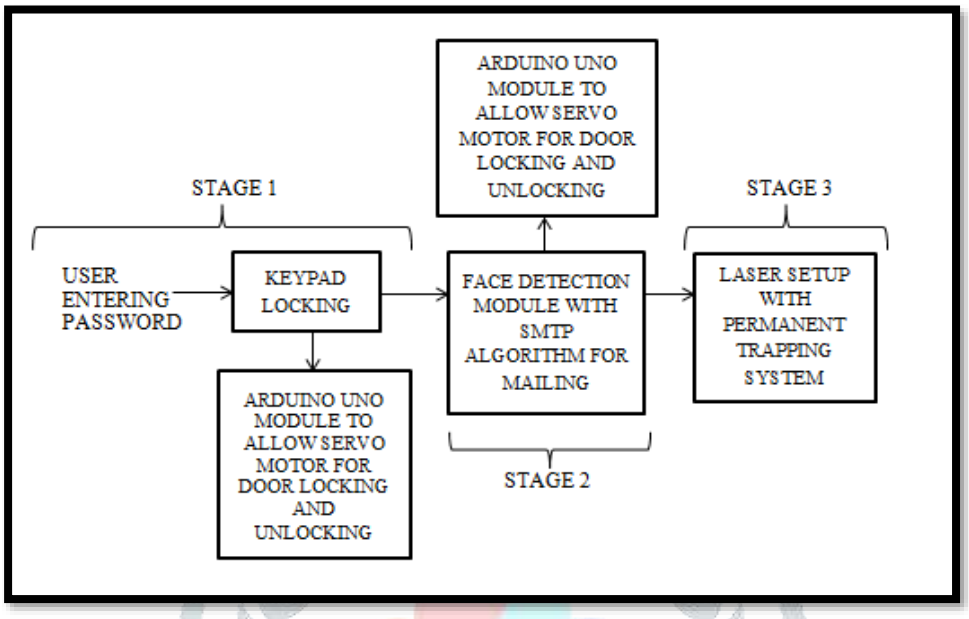

Figure 1: Block diagram of Advanced Security System

In the proposed method, first stage is keypad locking. The keypad system consists of keypad membrane, Arduino Uno and servo motor. The keypad locking system allows the user to enter the password to unlock the primary door. On successful password entry, the primary door unlocks for 6 seconds. On the other hand, if the password entered is invalid, the corresponding door remains closed. The password entered is specially charactered whose first and last bits are fixed. It appears to be a 6 digit number but is actually a 4 digit number. The Arduino UNO is already programmed to operate the servo motor according to the password entered. The servo controls the opening and closing of the door. The second stage is face detection and recognition. In this layer, first the face is detected by taking camera / video sequence as input and locating the face area within these images which is done by separating face area from non-face background region. The detected face is compared with the faces stored in the database in order to identify the person using the Viola Jones Face detection Algorithm. If the detected face match with the database, the secondary door will open. If the face detected does not match with the database, the images captured are sent to the owner via simple mail transfer protocol. The next stage in sequence is laser security system. Laser security system consists of a laser mesh created by reflection of laser beam by mirrors. The laser mesh has a laser pointer and LDR as transmitter and receiver respectively. This system locks the unauthorized person inside the confidential area whenever the beam between transmitter and receiver is interrupted. The laser system has to be turned off manually for authorized access.

IV. COMPONENTS USED

The components used in stage 1 i.e keypad locking system are Arduino UNO, 4x4 keypad membrane, servo motor. In face detection and recognition, Arduino UNO and servo motor is used. In the Laser Security system, laser pointer, mirrors, servo motor and LDR are used.

A. Arduino UNO

The Arduino UNO is a microcontroller board based on the ATmega328P microcontroller. The board is consists sets of digital and analog input/output (I/O) pins. The board has 14 digital pins and 6 analog pins. It is programmed using Arduino IDE software. It is powered using a USB cable or by an external battery.[12]

Figure 2: Arduino UNO

B. SG90 Servo Motor

SG90 is a small and light weight 9g motor with high output power . It has a rotation of 180º (90º on each side).[13]

Figure 3: SG90 Servo Motor

C. 4x4 Keypad Membrane

It is an input device which is used for loading numerics to the microcontroller. The keypad membrane has 12 buttons. The buttons are connected in a matrix manner.[16]

Figure 4: 4x4 Keypad Membrane

D. Laser Pointer

It is a small hand-held device which is powered by a battery. It emits a coherent and very low power narrow beam. It is used as a transmitter in Laser system.[14]

Figure 5: Laser Pointer

E. Light Dependent Resistor

It is a light sensitive device. They are made up of high resistance semiconductor. The resistance of LDR varies accordingly with the intensity of light falling on it. It is used as a receiver in laser system.[15]

Figure 6: LDR

V. METHODOLOGY

Figure 7 shows the flow chart of the proposed system

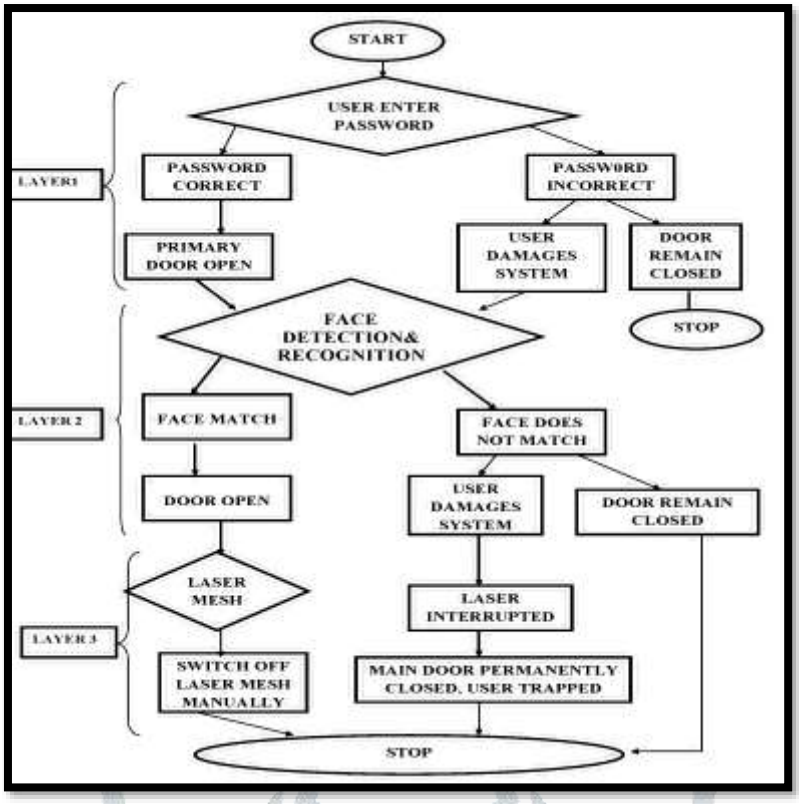

Figure 7: Flow Chart of Advanced Security System

VI. RESULTS

This system has been designed to decrease the number of robbery cases these days. The system is efficient in trapping the thief inside and closing all the possible ways to escape. An authorized person can enter the confidential area in 20 sec while a person who tries to get unauthorized access will get trapped in 2 seconds.

VII. CONCLUSION AND FUTURE SCOPE

With the rapid development of technology, the graph of crimes has also increased. This phenomenal rise in offences and crime is a matter of great concern and alarm to all of us. To provide the solution to this issue, an idea of "Advanced Security System" has been designed. This system describes an economic anti- theft setup which is convenient in use. The design of the project is simple and all the components used are easily available at low cost. This project provides an alternate to all those security projects in which only the information of the unauthorized user was stored but does not prevent robbery. This setup traps the unauthorized user and prevents escape. This is a real time based setup which is difficult to be hacked. Also the system has low maintenance cost. Thus, this system can be effectively applied in a country like India where robbery and burglary cases are common. Although, there is scope for improvement in future. Better and more security layers can be added to enhance security in future. Finger-print module can be effectively introduced instead of keypad locking. Historical Data Recording can also be added so that we have records of all the users who have accessed the system.

REFERENCES

[1] Dwi Ana Ratna Wati, "*DESIGN OF FACE DETECTION AND RECOGNITION SYSTEM FOR SMART HOME SECURITY APPLICATION*",IEEE Trans.Department of Electrical Engineering, Universitas Islam Indonesia, Yogyakarta, Indonesia

[2] Mrutyunjaya Sahani, Chiranjiv Nanda, Abhijeet Kumar Sahu, Biswajeet Pattnaik, "*WEB-BASED ONLINE EMBEDDED DOOR ACCESS CONTROL AND HOME SECURITY SYSTEM BASED ON FACE RECOGNITION*", *Circuit Power and Computing Technologies (ICCPCT) 2015 International Conference on*, pp. 1-6, 2015

[3] Suman, "*LASER SECURITY SYSTEM*" International Journal of Scientific & Engineering Research, Volume 7, Issue 4, April-2016 214 ISSN 2229-5518

[4] S. Umbarkar, G. Rajput, S. Halder, P. Harname and S. Mendgudle, "*KEYPAD/BLUETOOTH/GSM BASED DIGITAL DOOR LOCK SECURITY SYSTEM*" ICCASP/ICMMD-2016. Advances in Intelligent Systems Research. Vol. 137, Pp. 749-757.

[5] P. Komal Vaishnavi , M. Pavitra, " *FACE RECOGNITION USING VIOLA-JONES ALGORITHM*" International Journal of Innovative Science and Research Technology,
Volume 3, Issue 2, February – 2018,
ISSN No:-2456 –2165

[6] Pravada P. Wankhade1 and Prof. S.O. Dahad2, "*REAL TIME VEHICLE LOCKING AND TRACKING SYSTEM USING GSM AND GPS TECHNOLOGY-AN ANTI-THEFT SYSTEM*", International Journal of Technology And Engineering System(IJTES):Jan –March 2011- Vol.2.No.3.

[7] Raghu Ram.Gangi, Subhramanya Sarma.Gollapudi , *"LOCKER OPENING AND CLOSING SYSTEM USING RFID, FINGERPRINT, PASSWORD AND GSM"*, International Journal of Emerging Trends & Technology in Computer Science (IJETTCS) , Volume 2, Issue 2, March – April 2013.

[8] Gyanendra K Verma, Pawan Tripathi *"A DIGITAL SECURITY SYSTEM WITH DOOR LOCK SYSTEM USING RFID TECHNOLOGY"* International Journal of Computer Applications (0975 – 8887), Volume 5– No.11, August 2010.

[9] A.O. Oke, O.M. Olaniyi, O.T. Arulogun, O.M. Olaniyan *"DEVELOPMENT OF A MICROCONTROLLER-CONTROLLED SECURITY DOOR SYSTEM."* The Pacific Journal of Science and Technology, Volume 10. Number 2. November 2009 (Fall).

[10] Ms. Varsha Gupta, Mr. Dipesh Sharma**, "***A STUDY OF VARIOUS FACE DETECTION METHODS*", International Journal of Advanced Research in Computer and Communication Engineering), vol.3, no. 5, May 2014.

[11]https://electronicsforu.com/electronics-projects/anti-theft-alarm

[12] https://www.arduino.cc/

[13] https://www.elprocus.com/servo-motor/

[14]https://gorillagadgets.com/products/50mw-green-laser-pointer

[15] https://potentiallabs.com/cart/ldr-big

[16]http://www.electrodragon.com/product/4x4-matrix-16-key-membrane-switch-keypad-keyboard-new-for-arduinoavrpicarm/