Smart Security System in ATM Using OpenCV

Introduction :

The Internet of Things (IoT) is that the network of physical objects or "things" embedded with electronics, software, sensors, and network property, that permits these objects to gather and exchange information. IoT permits objects to be detected and controlled remotely across existing network infrastructure, making opportunities for additional direct integration between the physical world and computer-based systems, and leading to improved efficiency, accuracy and economic profit. "Things," (ATMs) were 1st introduced in 1939. Nowadays, concerning three million units area unit put in worldwide. Because the variety of ATM units increase, the machines area unit susceptible to hacker attacks, fraud, robberies and security breaches. Within the past, the ATM machines main purpose was to deliver cash of bank notes and to debit a corresponding checking account. However, ATM machines have become additional difficult, and that they serve varied functions, so changing into a high priority target to robbers and hackers. Trendy ATM machines are enforced with highsecurity protection measures. They work beneath advanced systems and networks to perform transactions. The information processed by ATMs area unit sometimes encrypted, however hackers will use discreet hacking devices to hack accounts and withdraw the account's balance. As an alternate, unskilled robbers threaten bank patrons with a weapon to loot their withdrawn cash or account.

The growth in the electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication. User have been largely depending on and trusting the Automatic Teller Machine (ATM) to conveniently meeting their banking needs . However, numerous advantages of ATM system, the ATM fraud has recently become more widespread. This system used to avoid the ATM robberies and wrong person miss uses the ATM. So we proposed things such as sounds and actions of Breaking or damaging the machines threating the ATM users denial of transactions and any other ATM user by invalid users or mask.

Literature Survey :

Existing Problem :

In the existing system, whoever brings the ATM card and inserted in the door of ATM center it, just check whether it is a valid account and allow them inside the center. But has disadvantages that anyone can enter the ATM center by using any other card and may withdraw money if they know the pin number.

In existing system RFID card is used as ATM card, IR sensor in order to sense the presence of the card holders and to turn on Fan and Light, if ATM is tampered then SMS is sent to two main stations via GSM.Based on WI fall detection get security, that network access is not that much secured.

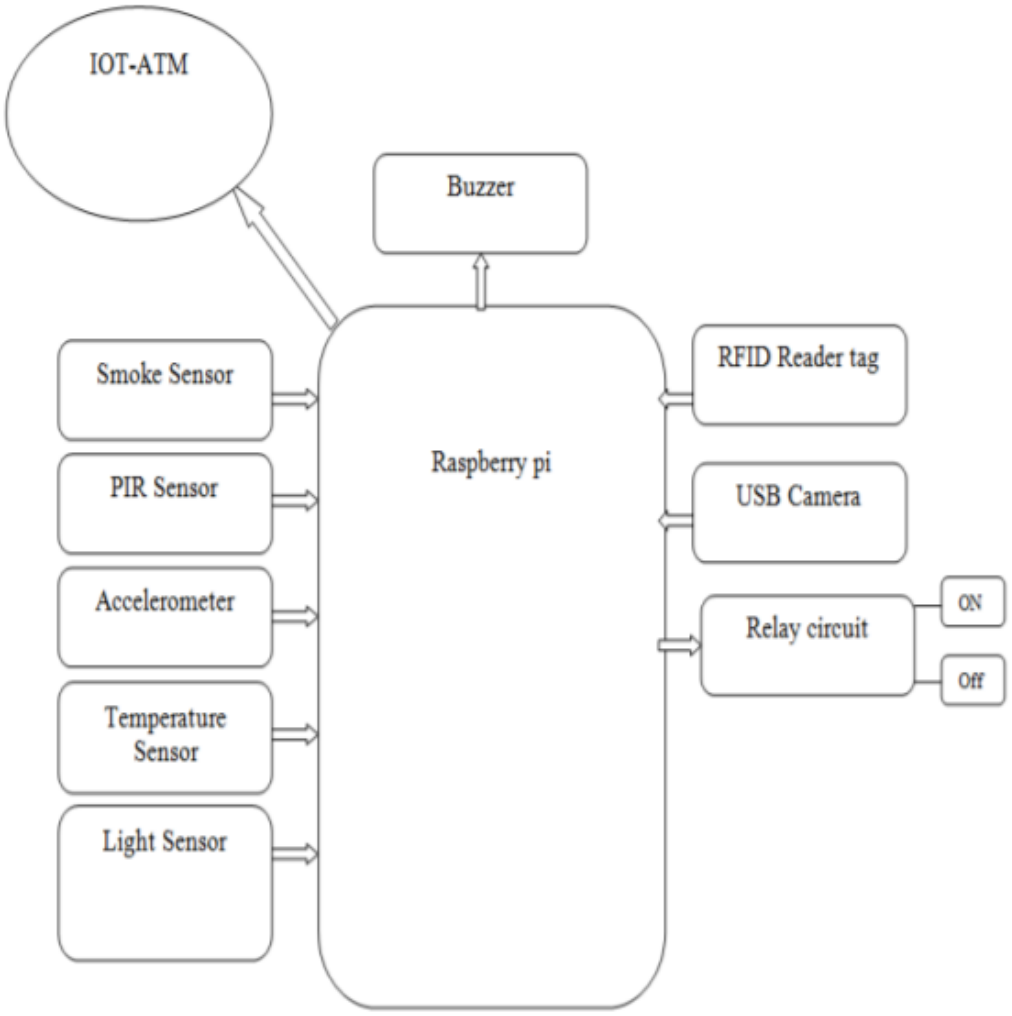
Proposed System :

In our project we are using various sensors like temperature, light, PIR, smoke and Accelerometer to continuously monitor the ATM machines. We also use RFID and a USB camera to indentify the customer. All the values are sending to the maintenance team for security purpose. We also use relay circuit to switch on and switch off the ATM machine shutter. Hence this system is more efficient and secure then all the other existing systems. In the proposed system we use IOT based ATM monitoring and control system. ATM is monitored with vibration sensor, light sensor, smoke sensor and temperature sensor. If any person try to break the ATM it will be detected using vibration sensor and immediately door lock will be activated. The light sensor is used to detect the light intensity and temperature sensor is used to detect external temperature. SMOKE sensor is used to detect the fire occurrence in the ATM. Raspberry Pi is credit card sized single board computer with ARM11 microprocessor with LINUX based operating system. ADC is required to convert the analog sensor signals to digital signals and then gives as input to the Raspberry Pi. Python is used as the programming language in Raspberry Pi, which is an open source programming language.

The study is focused on Design and Implementation of Face Detection based ATM Security System using Embedded Linux Platform. The system is implemented on the credit card size Raspberry Pi board with extended capability of open source Computer Vision (OpenCV) software which is used for Image processing operation. High level security mechanism is provided by the consecutive actions such as initially system captures the human face and check whether the human face is detected properly or not. If the face is not detected properly, it warns the user to adjust him/her properly

to detect the face. Still the face is not detected properly the system will lock the door of the ATM cabin for security purpose.

Block Diagram (1) :



Abstract :

The increased threat encountered by customers and ATM machines, have drifted the ATM center to a danger zone. The present day monitoring system is much vulnerable which in turn encourages the fraudulent activities and crimes in ATM centers. This is high-time for banking sector and government to join hands to weed out this crisis in security system. So it becomes

indispensable to strictly monitor the do's and don'ts inside the ATM centers, very specifically the facial recognition is considered to authenticate the entry of any individual inside the ATM center, it is achieved by employing classifier technique. As an additional feature, a combinational biometry system is used to access the ATM machine. The entire security module is incorporated with an easy access panic button and a sound sensor-cum-alarm, which alerts the cops as well as the bank's security wing, ensuring immediate rescue to the victims including physically challenged people. This overall system proves to be an autonomous, continuous and secured surveillance system.

In order to provide reliable security solution to the people, the concept of smart ATM security system based on Embedded Linux platform is suggested in this paper. The study is focused on Design and Implementation of Face Detection based ATM Security System using Embedded Linux Platform. The system is implemented on the credit card size Raspberry Pi board with extended capability of open source Computer Vision (OpenCV) software which is used for Image processing operation. High level security mechanism is provided by the consecutive actions such as initially system captures the human face and check whether the human face is detected properly or not. If the face is not detected properly, it warns the user to adjust him/her properly to detect the face. Still the face is not detected properly the system will lock the door of the ATM cabin for security purpose. As soon as the door is lock, the system will automatic generates 3 digit OTP code. The OTP code will be sent to the watchman's registered mobile number through SMS using GSM module which is connected with the raspberry Pi. Watchman will enter the generated OTP through keypad which is interfaced with the Pi Board. The OTP will be verified and if it is correct then door will be unlock otherwise it will remain lock.

Working :

Continuous monitoring of the sensors in the system so that any burglary attempt is detected. Informing the controller that the sensors have been triggered and necessary safety actions are due. Buzzer: The controller then activates the alarm system through the driver to dissuade the burglary attempt. Shutter locking: The controller then activates the motor locking down the kiosk and the culprits are locked inside. Electrical hazards can be monitored and controlled.IOT enabled control operations .The raspberry pi microprocessor processes all the input data and activates the output devices according to the input. Sensors like smoke, light , PIR, temperature, and accelerometer are connected to the input pins of the raspberry pi. RFID and USB Camera also connected to the input of raspberry pi. The relay and Buzzer are connecting to the output pins. The apply voltage for all the sensor and output devices are 5V. All the values are sends to the webpage with the help of IOT.

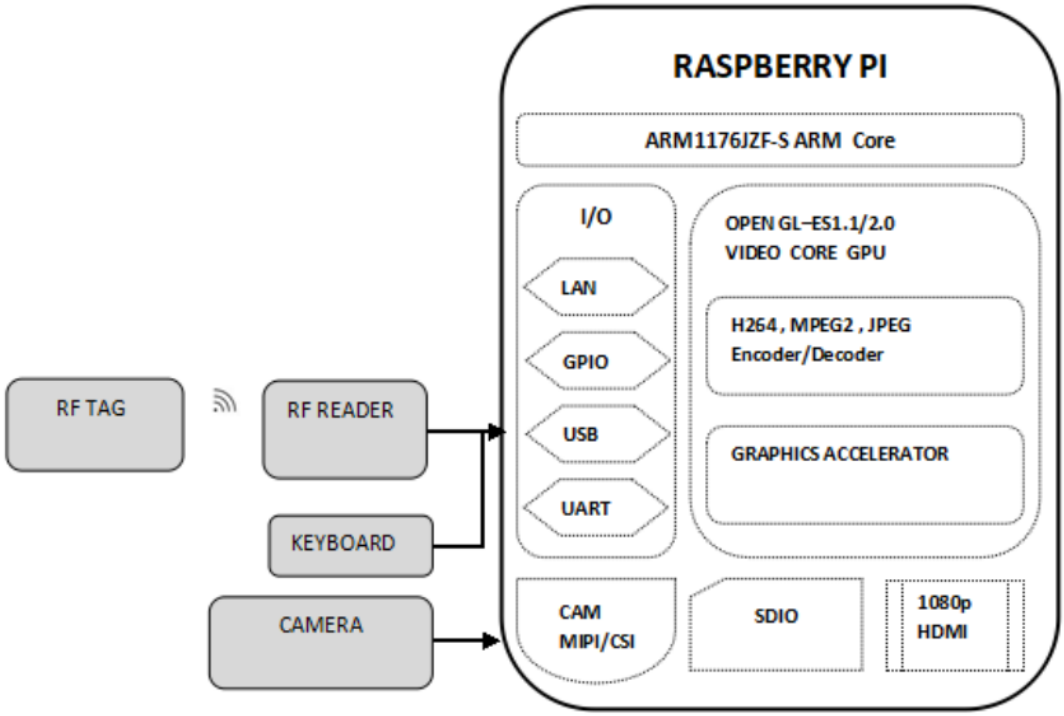
Face Detection Methodology :

The face detection rule contains totally different methodology for detection the face. the first strategies for face detection are Haar based mostly rule and Local Binary Pattern based rule (LBP) . Within the projected system, the face is detected from the image victimization Haar cascade feature. Face Detection victimization Haar could be a machine learning based mostly approach wherever a cascade perform is trained from a great deal of positive and negative pictures. Viola and Jones are the one who originated the concept of using Haar wavelets and developed the supposed Haar-like features. A Haar-like feature considers adjacent rectangular regions at a particular location in an exceedingly detection window, sums up the element intensities in every region and calculates the distinction between these sums. This distinction is then wont to reason subsections of a picture. For example, allow us to say we've got picture information with human faces. It's a standard observation that among all faces the region of the eyes is darker than the region of the cheeks.

Improving ATM Security via Face Recognition :

A facial recognition system is a computer application for automatically identifying or verifying a person from a digital image or a video frame from a video source. Proposed paper uses face recognition technique for verification in ATM system. For face recognition, there are two types of comparisons. The first is verification, this is • ATM security model that would increasing the performance combine a physical access card, a PIN, and face recognition to increase the reliability of ATM transactions. • Finding the valid or invalid user and Avoiding the wrong person to accesses the ATM. • Wrong person wearing mask and have any object he didn't get cash and blocked. where the system compares the given individual with who that individual says they are and gives a yes or no decision. The next one is identification this is where the system compares the given individual to all the other individuals in the database and gives a ranked list of matches. Face recognition technology analyzes the unique shape, pattern and positioning of the facial features. Face recognition is very complex technology and is largely software based. This Biometric Methodology establishes the analysis framework with PCA algorithms for each type of biometric device. Face recognition starts with a picture, attempting to find a person in the image. This can be accomplished using several methods including movement, skin tones, or blurred human shapes.

Block Diagram (2) :



Advantages :

• ATM security model that would increasing the performance combine a physical access card, a PIN, and face recognition to increase the reliability of ATM transactions.
• Finding the valid or invalid user and Avoiding the wrong person to accesses the ATM.
• Wrong person wearing mask and have any object he didn't get cash and blocked.

Result :

Thus the card less ATM can be achieved by this method,Security of this system can be increased by the image processing techniques and algorithms used in this system.

Conclusion :

From the above proposed system it is clear that various techniques are available to avoid robbery in ATM. We have proposed different approaches by different researches for ATM monitoring and security. Generally in all other papers they use the sensors to monitor the unusual activities by GSM, but in our project we update the unusual activities by using IOT and we also added iris recognisation, the person eye was captured by the camera and the iris of the eye was detected using the raspberry pi controller with the help of python coding successfully. The proposed method reduces the cost and also increases the efficiency.

To avoid atm robberies and provide security for atm, To secure such a complex system will be even more difficult than design it. And now people just begin to discuss some issues of ATM security. It will provide some experience for us to implement security services in ATM network.

Future Scope :

This system makes high security with intelligence to permit the ATM users only if they are making transaction under the knowledge of the account holder. It is also possible to install this system in every banking sector to make any account related processes under account holder's knowledge.

Biblography :

[1] Faune Hughes, Daniel Lichter,Richard Oswald, and Michael Whitfield ,Face Biometrics:A Longitudinal Study, Seidenberg School of CSIS,Pace University, White Plains,NY 10606,USA.

[2] GaryG.Yen, NethrieNithianandan, Facial Feature Extraction Using Genetic Algorithm, Intelligent Systems and Control Laboratory School of Electrical and Computer Engineering. Oklahoma State University, Stillwater, OK 74074-5032, USA.

[3] D.L. Jiang, Y.X. Hu, S.C. Yan, H.J. Zhang, "Efficient3D Reconstruction for Face Recognition",0031_3203/2004Pattern recognition society:

doi:10.1016/j.patcog.2004.11.004

[4] Animetrics offers FaceR™CredentialME service on Sprint 3G and 4G networks August 12th, 2010.