Smart Door Lock to Avoid Robberies in ATM

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Abstract. In the present situation, the ATM system is used by most of the population to withdraw currency. The number of ATM Centers is growing increasingly as social computerization and automation are dramatically increasing. Simultaneously, even though the CCTV cameras are installed in the ATM cabins, many ATM thefts have happened in many locations. It is also important to adjust the protection framework. We present a protection mechanism for ATM robbery by using intelligent & powerful technology to minimize these forms of robberies. This scheme also analyses different physical assaults on ATMs. We would use a Wireless Sensor Network in our proposed framework to track the theft and catch the criminal & hand them over to cops in a specific area. USB Camera for the recording & transmitting of the face of the person operating the ATM locker. Tilt and vibration sensors are used to identify the unusual behavior performed on the ATM system. Tilt and vibration sensors are used.

Keywords: ARM Controller, Raspberry Pi, ATM robbery prevention, Wireless Sensor Network, IoT.

1. Introduction
We can regulate any designed device in residence and can manage it remotely, as IoT gains lots of wide acceptance, and this is useful. Many enterprises work hard to build a range of powerful automation systems. [5] IoT therefore, has taken over the market by storm. There will also be tremendous developments in the area of automation growth in the coming years. We primarily rely on two key technologies to build a smart device. One is the IoT, which allows devices to network. The second is the premise of machine learning; however, according to statistical information, the machine can anticipate the next state. [6] We have shown in our paper interaction with the rescue forces from an ATM door. Motion detection is done by the camera, which has an image recording instant message warning. In cloud services, all the information that is generated is stored. All the sequencing & control is thus carried out in the cloud.
This paper presents an acquisition concept on the following sections, consisting of Literature Review followed by Section 3 Proposed system, Section 4 Hardware & Software tools, Section 5 Results & Discussions, and Section 6 Conclusions. Figure 1 has shown the ATM machine.

Figure 1: Image of a Typical ATM

2. Related Work
[1] This system acts as solid evidence of our remote monitoring multi-camera platform that facilitates full-HD still picture acquisition with a refresh rate of 10 seconds. Each Raspberry Pi 2 camera node implements image capture, encoding & broadcasting. Image compression is performed with a Kvazaar HEVC accessible codec that outputs BPG format HEVC images. [16] BPG images are televised over the Web via the WebSocket guidelines from picture nodes to stations. The pictures can be replayed with most search engines in remote areas with Internet connectivity.

[2] Security of ATM Machines (ATMs) in research aimed at technologies that provide & secure their implementations with several defence points against physical & electronic ATM theft. Safety experts are willing to help people get far more into the ATM safety & ATM loss reduction programmes, from anti-skimming protection systems to silent indication systems, advanced ATM video surveillance equipment & ATM tracking options. [7] With the use of Machine-to-machine (M2M) networking technology, deployment is accomplished.

[3] Trying to hack the passcode lock by an unauthorized party has been a simple-sailing activity, considering the existence of automated password lockers & sophisticated door locks. Different electronic blocks are currently available on the market, based on a password, RFID, biometrics, OTP, authentication, wireless & IoT. If one method overcomes the shortcomings of another, each system has its benefits and drawbacks. Current schemes only have single-factor authentication, leading to a less stable method. [8] There has therefore been proposed a secure door locking instrument that allows the user to authenticate, validate and unlock the door to secure entry in real-time, with two-factor authentication and multiple RFID encryption. The primary aim is to develop and enforce a digital security infrastructure in a sensitive zone where only designated persons are accessed [15].

[4] ATM Safety has often was among the most popular & not-so-frequent problems for regular users. This article asserts the fictional, but the real scenario of the ATM card of a person falling into the hands, & a thievery organization breaking the Pin code. [9] Our theoretical model uses some variables tracked right from the start to the end of the conversation in question. We will announce the payment status with the help of these variables before continuing with a card transaction. The payment will be helped by such tracking with a safe bank approach [14].

3. Proposed system
3.1. Door Lock Unit

Figure 2 shows the door lock unit of an ATM of our proposed system. It constitutes an ARM controller, vibration sensor, DC motor, Alarm, GPS module, etc., Here, Controller controls the proposed prototype's overall operation. [10] Input module consists of a vibration sensor and GPS module which fed the controller with some digital or analogue input values.

The vibration sensor is placed in the ATM chamber to detect any abnormal vibrations caused by the robbers' manhandling. [13] Until then, the output data fed by the vibration sensor to the controller will be null. Whenever an abnormal vibration is detected from the vibration sensor, the value will be above the threshold we fix. [11] Once the controller receives such abnormal values as an input, it will capture the GPS location of the ATM simultaneously the doors of the ATM will be locked automatically.

3.2. Capturing Unit

Figure 3. Image Capturing Unit in an ATM
Another function takes place during the abnormalities. A trigger signal of the high pulse is fed to the raspberry pi from the controller. Once if the high pulse is received in a particular pin, [12] which is previously coded, then Raspberry Pi captures the image from the USB camera at the very instance. Finally, the captured image and the controller's detected GPS location are combined in a common string and transmitted to the police or cops' control room.

![Algorithm Diagram](image)

**Figure 4.** Cabin automated locking Algorithm.

Figures 3 and 4 have shown the Image Capturing Unit in an ATM and cabin-automated locking Algorithm.

4. **Experimental Results**
Protection & passive properties are handled physically in ATM rooms, resulting in greater physical interaction, increasing the time & thereby reducing ATM operators' profit. This obligation-bound is to ensure that every ATM site is online, so downtime costs are so high. ATM operators cannot pass on costs of increasing overheads and are thus searching for a stable remote monitoring approach to
revitalizing ATM & maintenance facility. In terms of tracking the ATM using hardware, the proposed work provides a safe way to access an ATM through approved entities alone & the above-mentioned module is achieved. The simulation output is verified, and the output image is shown in fig. 5.

![Figure 5. Simulation of the proposed system](image)

The DC motor area unit is used to close the ATM entrance. 12VDC power supplies power them. In either system, the process relies on basic electromagnetism. The conductor generates a magnetic flux; once and to the frequency of the external magnetic field. It's a DC motor used to close the ATM door for allowed closure (as seen in fig. 6) The device is an integrated high voltage, high voltage monolithic device. The present four-channel driver is built to embrace customary logic stages of DTL or TTL and push inductive masses Control transistors. Hardware model is shown in figure 6.

![Figure 6. Hardware Implementation of the proposed system](image)

5. Conclusion
In this article, an automatic door control system is introduced on a WSN system. We also introduced an effective scheme to provide clients with communications & confidentiality. This is orchestrated at the ATM cabins’ door, bearing in mind the overarching purpose of solid architecture. The system relies on the picture taken, which is an extraordinarily influential advancement in many metropolitan environments to provide security & well-being. It is a sturdy and secure architectural system installed to illuminate erratic and evaluate errands, the key objective of using Raspberry Pi. Using advances in architecture (motion sensing, vibration sensing and image capture) provides various benefits to building the capacity to communicate with the public and the banks' stakeholders and banks’ well-being.
References

[1] Wang, L., Hung, D. (2020). Functional Market Study of Mobile-Health APP for Elderly. In 2020 IEEE 2nd Eurasia Conference on Biomedical Engineering, Healthcare and Sustainability (ECBIOS), pp. 122-125. IEEE.

[2] Viitanen, Marko. "HEVC Parameter Exploration for Efficient Mode Decision." Master's thesis, 2017.

[3] Raaj, M. M. E., & Juliaen, A. (2015). Development & deployment using embedded modules of an anti-theft ATM computer. In 2015 International Conference on Circuits, Power and Computing Technologies [ICCPCT-2015], pp. 1-5. IEEE.

[4] Mathews, Prasad, M., & Divyaa, R. S. (2017). Super Safe Doors for Crucial Zones System. In 2017 International Conference on Networks & Advances in Computational Technologies (NetACT), pp. 242-245. IEEE.

[5] Joge, Vikram, V., Jaine, D., Aroraa, R., & Bhaat, B. (2013). Theft avoidance ATM model uses inactive payment tracking. In 2013 IEEE Conference on Information & Communication Technologies, pp. 1156-1159. IEEE.

[6] Skomeršić, M., Gojević, T., & Žuvanić, M. (2012, May). Impact of non-service related signalling in GSM mobile networks. In 2012 Proceedings of the 35th International Convention MIPRO (pp. 589-592). IEEE.

[7] Shonubi, A. O., Asikhia, O. U., & Obamiro, J. K. (2019). QUEUING ANALYSIS OF SYSTEM FACTORS AND MARKET PERFORMANCE OF ATM OPERATIONS IN SELECTED DEPOSIT MONEY BANKS IN LAGOS STATE, NIGERIA. International Journal of Management Science Research, 4(2), 19.

[8] Martin, I. (2012). Too far ahead of its time: Barclays, Burroughs, and real-time banking. IEEE Annals of the History of Computing, 34(2), 5-19.

[9] Oyemakara, M. I. H. (2020). AN INVESTIGATION INTO THE CHALLENGES FACED BY USERS OF ELECTRONIC PAYMENT PLATFORMS OF NIGERIAN BANKS IN RIVERS STATE, NIGERIA. European Journal of Social Sciences Studies, 5(5).

[10] Jog, V. V., Jain, D., Arora, R., & Bhat, B. (2013, April). Theft prevention ATM model using dormant monitoring for transactions. In 2013 IEEE Conference on Information & Communication Technologies (pp. 1156-1159). IEEE.

[11] Solanke, S., Sonawane, N., Ugale, V., & Khoje, S. A. (2017). Home Security Using Image Processing and IoT. International Journal of Emerging Technologies in Engineering Research (IJETER), 5(6).

[12] Abdullah, S. M. (2018). Design secured smart door lock based on jaro winkler algorithm. Tikrit Journal of Pure Science, 21(6), 154-159.

[13] Somasundaram, K., Saritha, S., & Ramesh, K. (2016). Enhancement of network lifetime by improving the leach protocol for large scale WSN. Indian Journal of Science and Technology, 9(16), 1-6.

[14] Vijendra Babu, D., Saravanan, V., Kumar, P., & Singh, S. (2015). Automated robotic receptionist with embedded touch screen. Journal of Chemical and Pharmaceutical Sciences, 415-417.

[15] Thanikaiselvan, V., Arulmozhiwarman, P., Amirtharajan, R., & Rayappan, J. B. B. (2011, March). Wave (let) decide choosy pixel embedding for stego. In 2011 International Conference on Computer, Communication and Electrical Technology (ICCCET) (pp. 157-162). IEEE.

[16] Anitha, S., Jayanthi, P., & Chandrasekaran, V. (2021). An intelligent based healthcare security monitoring schemes for detection of node replication attack in wireless sensor networks. Measurement, 167, 108272.