Internet of Things Based Central Monitoring System for ATM's

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Abstract - *This paper focuses on the how the ATM facility management industries work and how the internet of things can help to solve the problems faced by this industry and to propose solutions that provide multiple points of protection against physical and electronic theft from ATMs and protecting their installations. One of the buzzwords in the Information Technology is Internet of Things (IoT). The future is Internet of Things, which will transform the real-world objects into intelligent virtual objects. The IoT aims to unify everything in our world under a common infrastructure, giving us not only control of things around us, but also keeping us informed of the state of the things. Scope of the research includes various players involved in the operating and maintaining ATMs across the India and how they work together to provide solution to the public. Also, the paper focus on the frauds and attack incidents that happens at the ATMs and how we solve it using Internet of Things concept. Internet of Things is a topic that has recently attracted much attention. The aim is to propose a real-time monitoring and control without the need for human intervention. Using internet of things to create a central system where we can control the ATM sites facilities like lights, AC , door and also to detect any unusual action like attacks, frauds and to act on situation in real time so that human and monetary losses are reduced considerably.*

Key Words: Internet of Things, Web socket protocol, Http protocol, ATM facility management industry, Esp8266 microcontroller, Arduino, Raspberry Pi, Relays, light sensors, thermostat, IP cameras , PIR sensor , smoke sensor , vibration sensors ,magnetic connectors , panic switch, buzzer.

1. INTRODUCTION

The Internet of Things (IoT) is a recent communication paradigm that envisions a near future, in which the objects of everyday life will be equipped with microcontrollers, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the Internet [1]. The IoT concept, hence, aims at making the Internet even more immersive and pervasive. Furthermore, by enabling easy access and interaction with a wide variety of devices such as, for instance, home appliances, surveillance cameras, monitoring sensors, actuators, displays, vehicles, and so on, the IoT will foster the development of a number of applications that make use of the potentially enormous amount and variety of data generated by such objects to provide new services to citizens, companies, and public administrations. This paradigm indeed finds application in many different domains, such as home automation, industrial automation, medical aids, mobile healthcare, elderly assistance, intelligent energy management and smart grids, automotive, traffic management, and many others [2]. However, such a heterogeneous field of application makes the identification of solutions capable of satisfying the requirements of all possible application scenarios a formidable challenge. This difficulty has led to the proliferation of different and, sometimes, incompatible proposals for the practical realization of IoT systems. Therefore, from a system perspective, the realization of an IoT network, together with the required backend network services and devices, still lacks an established best practice because of its novelty and complexity. In addition to the technical difficulties, the adoption of the IoT paradigm is also hindered by the lack of a clear and widely accepted business model that can attract investments to promote the deployment of these technologies [3].

 In this complex scenario, the application of the IoT paradigm to an ATM facility Management industries context is of interest. This objective can be pursued by the deployment of an ATM IoT solution, i.e., a communication infrastructure that provides unified, simple, and economical access to a plethora of ATM, thus unleashing potential synergies and increasing transparency to the facility management companies. An ATM IOT facility management service indeed, may bring a number of benefits in the management and optimization of traditional public services, such as ATM patrolling, Auditing sites status and infrastructure report and surveillance and maintenance of ATM areas and preservation, cleanliness monitoring .Furthermore, the availability of different types of data, collected by a pervasive ATM IoT, may also be exploited to increase the transparency and promote the actions of the Facility management company toward the ATMs and also stimulate the creation of new services upon those provided by the IoT. Therefore, the application of the IoT paradigm to the ATM facility management is particularly attractive to local and regional administrations that may become the early adopters of such technologies, thus acting as catalyzers for the adoption of the IoT paradigm on a wider scale.

2. OBJECTIVE OF THE STUDY

- The present study aims to achieve the following objective.
- To know the function on ATM facility management service sector in India.
- To understand the scope of the Internet of Things in the scope of the ATM facility management service sector.
- To identify the challenges faced by the ATM facility management companies in India.
- To propose a solution for the above to reduce cost and time and to speed the business process.

3. ATM MANAGED SERVICES AND OUTSOURCING MARKET

The ATM industry in India is rapidly transitioning from the traditional methods of ATM operations into the internationally accepted ones. Companies operating in other sectors in India as well as abroad are eyeing the Indian ATM managed service and outsourcing market since the market offers immense potential.

The banks that create ATM across the India cannot maintain them like maintaining cleanliness, checking lights, ATM machine service, cash management, incident management and any issues that happens at ATM sites across India.

This banks tie up with the Managed service provider(MSP) companies who take the ownership and maintenance of this sites for which bank pay to MSP. The MSP tie up with other facility management company (FMC) which handles few services to the ATM. Different ATM services are managed by different facility management companies. This FCM companies report to the MSP for the payment.

3.1 Some of ATM managed service

- Fault ticketing and reporting.
- Cash management.
- Agent based monitoring.
- Screen distribution and tracking of image files.
- Caretaker for site surveillance and site maintenance.
- Patrolling of ATMs across the India.
- ATM deployment and maintenance.

3.2 Some List of Managed Service Provider in India

- Prizm Payments.
- Tata Communications Payment Solutions.
- AGS Transact Technologies.
- Financial Software and Systems (FSS).
- Fidelity National Information Services (FIS) and Others.

- Clear Secured services Pvt Ltd.

4. IMPLEMENTATION

The proposed Internet of Things based central monitoring systems for ATMs helps the managed service provider and facility management companies to remotely monitor the ATM sites and to control some facilities like light, A/C, door and to act on alerts like fires, theft and to keep check on cleanliness and to check on which user is doing what. The implementation requires the following hardware's to used:

- PIR sensor
- Hooter/ Buzzer
- Vibration sensor
- Light sensor
- Thermostat
- IP camera
- Magnetic contact sensor
- Panic switch
- Smoke detector

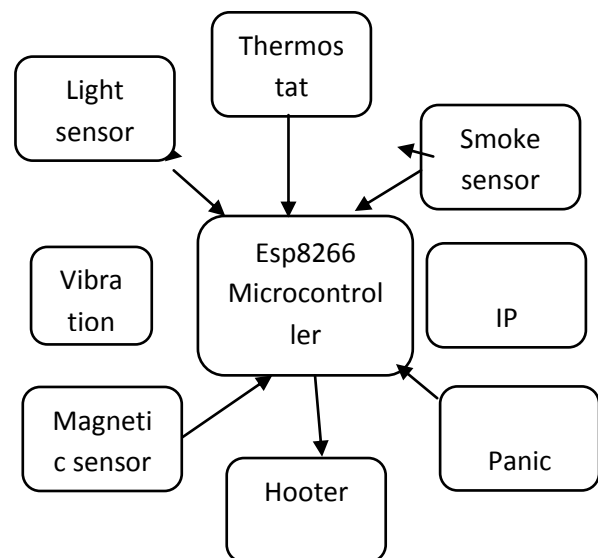### 4.1 Block Diagram Of The Proposed System.

Fg.1. Block diagram of the IOT based central monitoring system for ATMs.

Fig. 1 shows the overall block diagram for hardware part of the central monitoring systems for ATMS. Hardware details and usage:

- Esp8266 microcontroller acts which is programmable logic control acts as an edge device which will control the other sensor and actuators and send alerts to the server and based on logic give signal to other actuators.

- PIR sensor used to detect any person motion in the ATM lobby.

- Vibration sensor used to sense any vibration at certain level to check if some objects are being tampered at the ATM sites. This attached to the ATM machines and glass doors. If someone tampers the machine alerts are sent Thermostat used to sense room temperature and to on and off the AC to consume less electricity.

- Light sensor which will sense the amount of light sensed so that to get alert if the lights are working properly are not. We can remotely send signal to turn light on or off.

- Smoke Detector which will sense the smoke at the ATM site and will send alerts to the admin to take some action.

- IP camera which will send live images and live video surveillance to monitoring the activity at site in case of alerts. If any alerts is received to validate whether the state it true admin can check the images or live video and take decision.

- Panic switch in case of the emergency ATM user can use it to alert the site MSP.

- Magnetic contact sensor is used check if the all the sensors are intact and nothing is tampered. If any of the sensor or actuator are tampered it will signal the microcontroller. This is used to hold the sensor in place. If the connection between two contact sensors is tampered it will signal the issue to microcontroller and it will send it to server.

4.2 Working

The above proposed system contains the different sensor and actuator that are connected to the central microcontroller and which in turn is connected to the website which will the MSP admin panels which will shows the data sent by the microcontroller to the admin. Based on the single sent from the microcontroller the alerts are showed to the MSP website admin panel user. Then user may check the ATM site using IP camera to validate whether something is wrong at the ATM site and take corrective action.

4.2.2 Advantages:

- Real time analysis of what happening at ATMs across India.

- Central monitoring system makes it easy and simple.
- Human error is minimized and action can be taken quick.
- Cost of human deployment at sites and loses due to carelessness of caretaker.
- Can serve the customer better and which will help to improve the business.
- Scaling more ATMs are easy and fast.

5. CONCLUSIONS

A brief explanation about the ATM managed services using Internet of things is explained. The advantages of the Internet of thing s based managed service in ATM industry are discussed. A basic hardware level implementation is proposed. The proposed solution can solve the problems faced in the industry by giving real time alerts so that action can be taken as soon as possible. It also reduces the human effort and will also reduce the error that could happen due to human caretaker In the ATM managed service.

6. FUTURE WORK

This paper discusses the ATMs Managed services and how we can solve it using the Internet of Things. The proposed hardware implementation is just a model which can be improved and implemented in the future to solve the problem faced by various Managed service provider in ATM domain.

REFERENCES

[1]   [1] L. Atzori, A. Iera, and G. Morabito, "The internet of things: A survey," Comput. Netw., vol. 54, no. 15, pp. 2787–2805, 2010.

[2]   [2] P. Bellavista, G. Cardone, A. Corradi, and L. Foschini, "Convergence of MANET and WSN in IoT urban scenarios," IEEE Sens. J., vol. 13, no. 10, pp. 3558–3567, Oct. 2013.

[3]   [3] A. Laya, V. I. Bratu, and J. Markendahl, "Who is investing in machine-tomachine communications?" in Proc. 24th Eur. Reg. ITS Conf., Florence, Italy, Oct. 2013, pp. 20–23

[4]   [4]https://www.researchgate.net/publication/2354361 77_Growth_of_ATM_Industry_in_India [accessed Jun 21, 2017].