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ATM Detail protection using Geofence Technology

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Abstract: GPS technology enable devices to utilize the location information, geofence technology is a novel technology which implement an area with a certain radius and get information trough it. This paper represent how we can use geofence technology to improve existing security mechanism relevant to ATM systems. Current security mechanism for ATM system is pin-based authentication. Which doesn.t provide expected outcome. It has been currently facing many threats due to fraud activities perform by attackers. Proposed system will provide much more accurate procedure compare to the existing system.

Keywords: ATM, Security, Geofence, GPS technology, Android

Introduction

Rapid growth in banking industry has modified how daily banking procedures are handled. Numerous modern technologies were introduced to cooperate regular banking activities. Automated teller machine (ATM) is one of novel technology which was invented to enhance accuracy and efficiency in banking activities. It is a computerized machine which designed to allocate cash to customers without human interaction ATM are currently using by every single bank around the globe to speed up and improve their banking activities. ATM offer customers ability to conduct some banking activities like withdraw cash, transfer money, and also customers can pay their electricity bills and telephone bills after official hours. Nowadays, ATM are installed worldwide and people used to interact with them much often to get their works done easily. Main advantage of ATM can also transfer money among several banks and it gives customers chance to withdraw money from their preferred bank.

There are also different aspects that we should need to consider when using ATM. One of the issues which need proper consideration is security because currently the use of ATMs is increasing worldwide and it means that risks of frauds turn into reality more often than earlier. Nowadays there are many persons use modern technological knowledge to steal people's money by performing offensive acts like Skimming attacks, PIN Cracking, Phishing, hacking and lot more. Managing these risks related with ATM fraud made a huge impact in banking industry as well as these acts have become much harder to control because attackers use advanced techniques for them.

Considering about number of security challenges experienced by Automated Teller Machines (ATM) and users and present security procedures in the ATM system has not been able to avoid these challenges so, there is the higher need to improve ATM security system to overcome these challenges. This project study will focus on how to improve security of banking activities in ATM using geo-fencing technology. The main purpose of this project is to develop ATM simulator-based geo-fencing

verification application in order to avoid fraud acts associated with the use of ATM.

Above challengers can only be solved, or at least reduce their impact on banking systems, by using this novel technology. In general, it will help to reduce some of above challenges, also it offers the capability to keep customers private information in a secure way. Existing ATM are using a PIN as their security procedure, this has not been able to prevent crimes related to that because anyone can steal people's money by cracking these Pins. So, it's better to use location-based information as the authentication procedure.

Only after the user verify his location it will give access to the system.

The ordinary pin-based authentication systems do not provide the expected security to the ATM systems. These types of systems can be affected by many problems like lack of individuality, lack of constant representation and awareness to avoidance. Because of these problems, the pin-based systems occurred higher error rate which makes them unacceptable for give security to systems like ATM that require higher security. All these challenges mentioned in above can overcome by using geo-fencing-based systems which is a provide much higher accuracy and effectiveness. to the ATM system.

Related Works

In below mentioned research works on system which use for Atm protection and some systems developed with the help of geo-fencing technology. Biometric is a most mentioned field on ATM detail protection. There were many researches relevant to this field. Also, there're some systems which use SMS based authentication process.

[1] Prof. Selina Oko and Jane Oruh pointed out the security and privacy issues that customer had to face while using current banking system. The main reason behind introducing this system is to increase security. In this paper they decided to use fingerprint as the Biometric because it offers greater security and convenience than traditional methods. In the proposed system it has three types of users' administrator, bank and customer. Bank register new customers to the system and in the registration process it will capture customers fingerprints. Administrators have the higher access which give them the right to control every procedure happening in the system.

[2] This research work was proposed to avoid limitations in single biometric based systems. The proposed system is about to implement a system using combination of fingerprint and iris identification. System will perform as a multimodal biometric system and record details of iris and fingerprint using sensors. In this study they implemented a code to acquire fingerprints and iris, and then a combination method which is called the two modalities and fusion used to identify those data.

[3] This research works aims to develop a security mechanism for atm system with the help of biometric identification. Fingerprint and iris identification have used as the biometrics. In this system it gives user access if only both fingerprint and iris matched. The purpose of the proposed system is to achieve higher accuracy and also much secure way to protect atm details that may not be enough using a single biometric indicator alone. In the proposed system, it divided the whole process into two stage which are feature extraction and matching stage. Under the matching stage it contain two techniques to get the higher ration for fingerprint and iris match and then system pass those values to the other technique which is about threshold on fingerprint that pass specific number of finger then it use the enrollment iris to derive the matched value for the iris related to this

finger. Afterwards it passes to the fusion equation and get the max fusion and it will give the access to user.

[4] This paper is about the studies on fusion approach to personal identification using iris and fingerprints as biometrics. The study is to study whether the combination of fingerprint and iris biometrics can accomplish performance that is not be possible using a single biometric technology. The results of this research study confirm that a multimodal biometric can overcome some of the limitations of a single biometric resulting in a substantial performance improvement

[5] Moses Okechukwu Onyesolu and Ignatius Majesty Ezeani pointed out challenges' customers had to face while using existing banking system because of some loopholes in it. So, they proposed a biometric authentication system using fingerprints. The target population of this study was customers and staff of some banks around Awka, Anambra State, Southeastern Nigeria. Customers were randomly selected for the project.

[6] This Research work proposed to implement a fingerprint matching system which provides reliable and much better performance than the existing systems. The motivation behind this research is higher need to identify a person well because of some current security issues. In this paper system was implemented using with the help of MATLAB codes.

The table below shows a comparison between existing ATM detail security systems and some geo fence-based technologies.

SYSTEM	TECHNIQUE ADOPTED	TECHNOLOGY	LIMITATIONS
Enhanced Atm Security System Using Biometrics [1][1]	Fingerprint biometrics	• Java Development Kit (JDK) • Fingerprint SDK Java 2009	The system was not implemented as an improvement on the existing system.
Multimodal Biometric system Fusion Using Fingerprint and Iris with Fuzzy Logic [2]	Multimodal Biometric system using Fingerprint and Iris	• Image Processing	Take too much time to process these details and required advanced technology for maintenance.
An Enhanced ATM Security System Using Multimodal Biometric Strategy [3]	Fingerprint and iris based multimodal biometric authentication	• Image Processing	Din.t provide a recommended face recognition algorithm.
Enhanced Automated Teller Machine Using Short Message Service Authentication Verification [7]	SMS Service Verification	• Google API	Implemented algorithm only considered a minimum withdrawal amount.
Fingerprint Recognition Using Minutia Score Matching [6]	Fingerprint	• Image Processing • Minutia Extraction using a MATLAB Code	Fingerprint recognition system did not discuss the local features related to fingerprint verification process
Android Geofencing App for Autonomous Remote Switch Control [8]	Geo-fencing technology	• GPS technology • Android API	System may give unreliable data due to lack of performance. Required to maintain a proper network connection.
Automatic Work-Hours Recorder for Medical Staff (Staff Hours): Mobile App Development [9]	Geo fence technology	• GPS technology • Android OS	Can't obtain accurate details of staff. Not suitable for smaller work areas.
Geofencing post-disaster scenario using android app [10]	Geo fence technology	• GPS technology • Web Server • Android System	Users have limited resources to access to the system. Hard to maintain the database with real-time data. (it may vary with the time)

Proposed system

To overcome limitations in existing systems, geo-fence-based ATM detail protecting system was proposed. This system will develop as an android application with GPS technology. It obtains the location of every user and it will use as the authentication details to the ATM system. System will create geo fence points near every ATM machine with a certain radius. Whenever user want to do transactions with the ATM, they can confirm their location using the android app, it will check whether the user is inside the geo fence point and if so, it will give access to the system, otherwise it will block the users access.

Objective

With the aim of developing the software, our project has identified following objectives.

- Provide users much more efficient and secure ATM system compare to existing ones.
- Provide users assured security to their money and private details.
- Use user location details as a substitution for the existing security mechanism. (PIN code)

This will help to implement a system which can help to change the world in a new different aspect. Research work will mainly help to reduce current fraud acts happening associated to existing banking system. It will also offer a great benefit to solve the national security issues.

Features

- Give access to the user based on their current location using geo fence points.
- Provide fast access to the system.
- Provide better accuracy reliability.
- Provide much accurate location tracking process.

Requirements

Functional Requirements

- System should be able to maintain the database.
- System should be able to record customers details in the registration process.
- System should provide administration the authority to control every procedure happening inside the system.
- System should provide customers' ability to take part in regular banking activities after the authentication procedure.

Non-Functional Requirements

- System should be able to give access to users much faster than existing systems.
- The system should be able to load existing data quickly.
- System should store details of every user in a secured way and should prevent any unauthorized access.
- System should contain a user-friendly interface and need to be very easy to use and adopt to it.
- System should be able to provide a quick authentication process.

Limitations

- Environmental issues can be affected to reduce the accuracy of the system.

- Some people may find it hard than the usual pin-based method.
- Population coverage is another limitation in these systems. When we deploy a novel solution, we cannot guarantee to cover target population.
- Disabled people will find it hard to use these kinds of systems.

Conclusion

The growth in the frauds acts related to ATM systems have made a huge impact to the society. ATM transactions often use PIN's for the identification of users. This existing security mechanism failed to overcome these threats. Novel system based on geo fence technology has been introduced to overcome above problems related to ATM system. In this system it will implement as an android app with GPS technology. It uses user location as authentication details and users need to be inside the geo fence points to get access to the system. Objective behind implementing this system is to reduce errors in ordinary pin-based authentication system and to improve security mechanism related to ATM systems in an effective way.

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