SMART LOCKER

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Abstract: Conceptual Security has systematically been a major worry to the overall public either within the family units or the geographic point condition. There are totally different methodologies originated to deal with these problems. This venture is planned to create up a sav lockup framework utilizing the Internet of Things. Utilizing standard keyed locks is basic since the long time ago, anyway there is a high risk of keys being lost or going in inappropriate hands. Later, several people like biometric locks over ancient keyed locks to enhance the safety of their baggage. In distinction to the traditional lock, an upto-date biometric lock needs no key and instead uses a biometric sensing element. Our project is node MCU based mostly adaptable operating device that gives physical security utilizing the biometric sensing element that is accessible in an exceedingly smartphone. The planned technique during this study uses the IOT technology and therefore the application of smartphone communication technology to standard device . Above all, this study proposes the sensible Smart Lock primarily based on security for the protection issue caused by the physical key utilized in remote-controlled automation machines, like ATMs, KIOSKs, and marketing machines

Keywords: GPS Module, Internet of Things, Smart lock, Arduino, Node MCU, Android

I. INTRODUCTION

(A)The internet of things has been dubbed the "next big thing." The internet of things refers to a network of physical objects that are embedded with electronics and can collect and exchange data. The use of these devices frequently makes our lives easier, but with the rapid development of these instruments, we frequently overlook security. As we increase the connectivity of physical devices, they become more vulnerable to security breaches. With the development of new IoT devices, security is frequently overlooked, making these devices particularly vulnerable. Security firms such as Kaspersky have discovered flaws in systems such as smart homes, baby monitors, car washes, and police surveillance systems. Now a days individuals face a lot of issues concerning security. Our motive is to overcome all the problems related to safety, security and misplacing of important documents, money and some electronic devices in the public residence. The same problem is faced by students leaving in hostel, so we will be going to provide them a smart and secure locker inside their cupboard which will be capable of holding all these things securely. Smart lockers are easily available in the market of various companies like Godrej and Samsung costing from 25400 to 61350 INR. They have made automated smart locker, unlike a typical parcel delivery locker, uses a pin number and kiosk screen to facilitate access to the compartment. Many of hotels also providing these kind of secure and smart lockers[20]. In Our Project, The main aim is to provide security and safety to important luggage of hostellers. Locker has OTP generating system for locker unlocking, Capturing Image module if suspicious unlocking of locker found, and fingerprint unlocking in urgent cases where OTP generation fails.

(B)Motivation:

Over the decade, everyone is concerned about the safety of their valuables like jewelry, money, important documents etc. For ensuring the safety of these valuables bank can be an effective solution. However, due to the increasing rate of criminal approach it becomes difficult to ensure security of the valuables. Banks are considered as a soft target of criminals. In this circumstance, ensuring security of lockers should be taken into consideration. Therefore, in this project we propose a smart locker for hostel students, which is mainly, an IOT based intelligent locker. We also introduce password and finger print detection approach. Now a days individuals face a lot of issues concerning security. Security is that the most essential issue within the world, the most important purpose of our system is to style and implement a locker with high security system supported Fingerprint and Image process technology which might be Organized in bank, hotels, secured offices, hostels and houses[5][9]. During this system solely authentic person will open the lock. We've enforced a locker security system supported finger print and added spy camera for image capturing for evidence purpose.

II. LITERATURE REVIEW

Several techniques are introduced in this paper for different features like human detection which has done by ultrasonic sensors. Fingerprint locking system is used in this project. For charging of mobile phones and laptops Recharging port is also provided in this project. Owners identity is used with which the bag can be activated. GPS and GSM is used for tracking bags location. In this

bag, all the facilities are implemented together efficiently within a small platform. An alarm is set up with the arduino uno board and a GPS module on the basis of which the luggage tracking system works. As soon as the bag is theft and goes outside a particular range the alarm is turned on. Furthermore, we can track the location of the bag as it moves through the map created, as the bag moves away from the owner the markers are dropped with the help of which we can get the location of the bag. To track the bag, the IoT components like GPS Module and an Arduino Board are being used and a frontend or

mobile application is created to monitor all the functioning.

Sr. no.	Name of paper	Year of publish	Methodology used	Result	Limitation
1	Improving Home Automation Security; Integrating Device Fingerprinting into Smart Home	2016	1)Device fingerrprint using JavaScript 2) Login Credentials 3)OTP generated by sever	To improve the Home Security it verifies the user and also device.	Malicious user tried to gain the access of locker more than one time.
2	Development of an Intelligent System for Bank Security	2014	1)Motion detection 2)messaging through GSM module	Unauthorized image detection signal sends to microcontroller and warring message will be generated	Uses of microcontroller not gives that much of reliable system
3	An Efficient Multistage security System for User Authentication	2016	1)RFID system 2)Password 3)Biometric consecutively	By using matrix keypad, GSM technology,RFID tag the security system is successfully implemented	The password can be hacked by the unauthorized user
4	An Advanced Internet of Thing based Security Alert System For Smart Home	2017	1)PIR sensor 2)email alert	Motion is detected by PIR sensor then that will sends to owners email which gives the warrning of theft.	The security alert warrning is only given by the email.
5	Web-Based Online Embedded Door Access Control and Home Security System Based on Face Recognition	2015	1)Face recognition 2)GSM 3)zigbee	In this system monitoring and controlling of equipment is based on web.	Face detection takes more complex algorithm
6	Authenticated Secure Bio-metric Based Access to the Bank Safety Lockers	2014	1)dual key safety lockers 2)bio-metrics	This system provides the dual key of an special characters and a biometric is only for staff id.	It can be easily hacked by any unathorized user.

III. PROBLEM STATEMENT

The major problems for everyone about the locker are sometimes we forgot to lock or sometimes we did not sure that we have locked the locker or not. So we have to go back to check and make sure or leave it on risk of losing important stuff. An IoT based smart locker with wireless connectivity along with an android application that helps user to unlock locker using Android application.

IV. OBJECTIVE

The following are the objectives:

1. Security is the most essential issue within the community, the objective of this project is to style and implement a locker with high security system supported with fingerprint which might be organized in the bank, hotels, secured offices, hostels and houses.
2. To make the smart and affordable lock.
3. To overcome the problem of forgetting password and hacking the password of locker.
4. Increase accessibility without compromising security.

V. METHODOLOGY

This project provides a highly secure, valid, and simple to use system for both customers who have a locker in a bank and the branch manager who is in charge of all operations related to the safety lockers. Our project employs two approaches:

The first method is a three-step verification process that includes a user fingerprint, legitimate login credentials, and an OTP for authorized users. When a user wants to access the locker, he or she enters the login credentials; if the login credentials verification is successful, the system requests the user's fingerprint. The obtained fingerprint is then analyzed and compared to the original.

In our database, there are two lists: the "whitelist," which contains acceptable fingerprints of legitimate users, and the "blacklist," which contains illegal fingerprints of those who attempted to approach the locker. After OTP No. verification, the whitelisted user with acceptable fingerprints can access the locker. Even if their User Name and Password are correct, the blacklisted client and their fingerprints are not permitted to use the locker. The GSM simply generates a One Time Password (OTP) consisting of a random code and sends it via message to the correct user's registered mobile number. That code is entered by the user into the webpage and thus the authorized person is verified.

If the user is unable to verify any of these stages, he is added to the blacklist and is unable to access the locker at all. The information about blacklisted users is then given to an authorized person. If the authorized user wishes, he can add the users to the blacklist, and a trusted third-party device can access the locker after being verified by the legitimate user. The second method is to use a Wi-Fi module (ESP8266). When a third party needs to access the locker, the Wi-Fi module is used. At that time, the authentication process is carried out via Wi-Fi by an authorized user of that locker. If all of the verification steps are completed successfully, the third party will be able to access the locker.

VI. SYSTEM ARCHITECTURE

A system architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. The architectural design of most commercial smart lock systems is based on a centralized IoT architecture in which the application logic is governed by a central entity (deployed in a private cloud) that provides a limited set of well-known entry points (e.g., APIs). Figure below presents an abstract view of the architecture. The main components are an electronically augmented deadbolt, which includes a smart cylinder lock and a controller, and a user mobile phone acting as an Internet gateway. The smart lock lacks direct Internet connectivity and, thus, relies on the user's mobile phone to communicate with the manufacturer cloud.
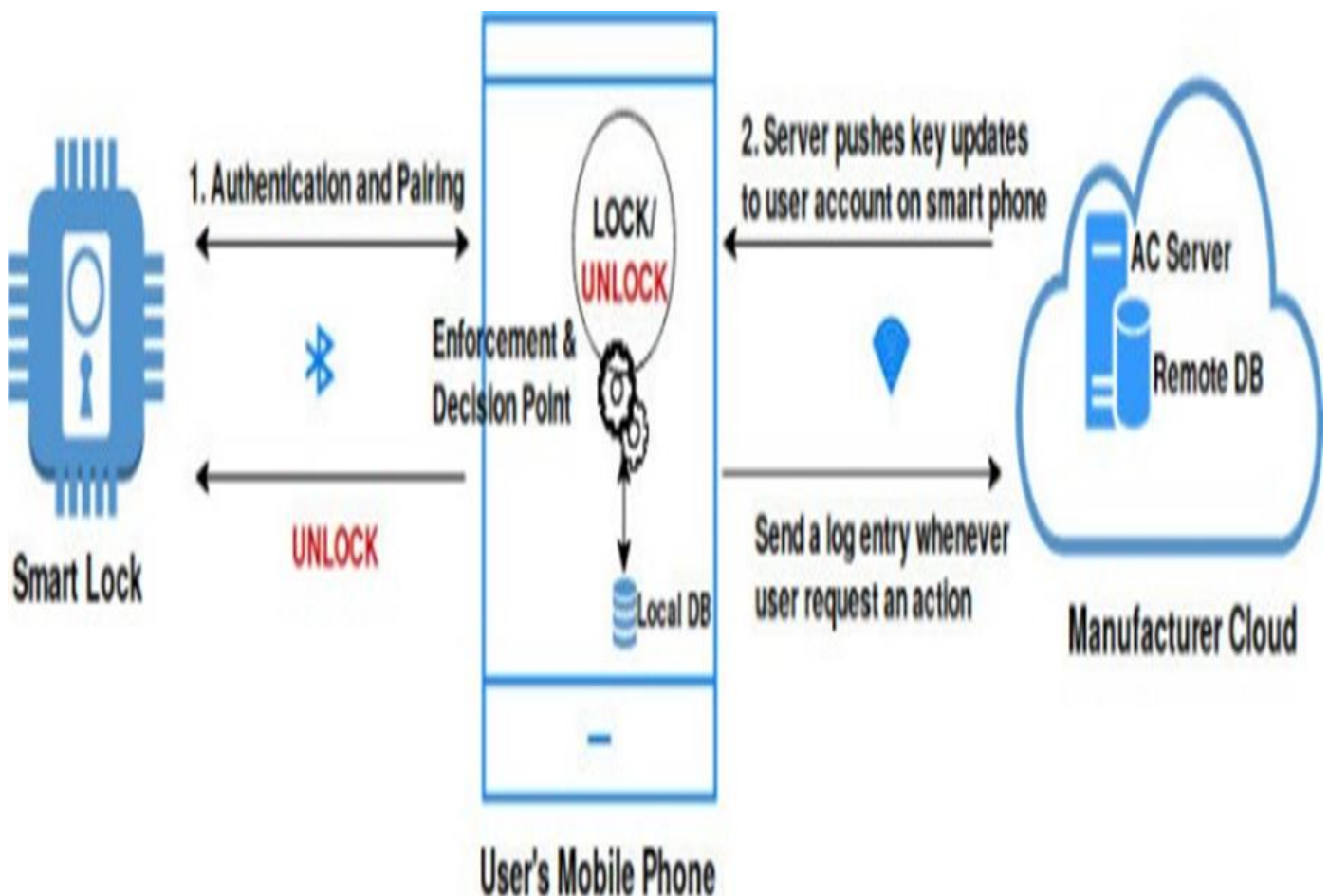
VII. Software Requirements Specification

This chapters holds the Introductory part of the system which is to be implemented, its scope,characteristics,requirements etc. The detailed study of the model is been imbibed in the model.

Introduction

The Software Requirement Specification describes the scope of the project, operating environment, user characteristics, design and constraints. It also elaborates the system architecture of the Breast Cancer Detection Framework.

Project Scope

To supply a high tech multifunction smart lock, which will be helpful for the students, hostellers and day scholars to overcome all the problems related to safety, security and misplacing of important documents, money and some electronic devices in the public residence. The same problem is faced by students leaving in hostel, so we will be going to provide them a smart and secure locker inside their cupboard which will be capable of holding all these things securely. And this locker will be handled with an android application for best user comfort and security purpose.

User Classes and Characteristics

The system requires only single class of users. Users cannot be differentiated in 7 multiple classes for this system. Anyone who knows how to use android phone can use the system. Users can be from number of sectors like students, hostellers, etc.

Assumptions and Dependencies

The following assumptions are made while developing this project:

[1] One assumption about the system is that if sensor fails in any case then data will not be generate and will not be stored on cloud.
[2] If the user forgot to register then he/she will not be able to use the system

NonFunctional Requirements
Non-functional requirements are requirements which specify criteria that can be used to judge the operation of a system, rather than specific behaviors. This should be contrasted with functional requirements that specify specific behavior or functions. Typical nonfunctional requirements are performance, safety, and security. Other terms for nonfunctional requirements are, quality attributes and quality of service requirements

Performance Requirements

Data needs to be gathered by sensors and analyzed in real-time. This allows for rapid response to sudden change.

Safety Requirements

If there is extensive damage to a wide portion of the database due to cloud failure, high quality fabric material for the protection of sensor, sensors are not visible.

Security Requirements

The user of the system should be educated. This proposed model can be used by anyone but users motive should be authentic and harmless to others.

Software Quality Attributes

[1] Portability : Program should work on all computer systems given that execution environment and database requirements are satisfied.
[2] Maintainability : The Database system shall address the maintenance of data storage and administer data retrieval and removal.
[3] Availability : The user shall be available at the instant of request.

System Requirements

Software Requirements

[1] Mobile phone
[2] Android App :- We have developed one android app named 'Smart Lock' which will be used to operate the locker. Firstly user have to register with app so that he will get access to locker. And once user have registered successfully then after just simple login process he will be able to access all the functionality of app.

Hardware Requirements

Arduino Nano:

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor. The Arduino Nano is equipped with 30 male I/O headers, in a DIP30-like configuration, which can be programmed using the Arduino Software integrated development environment (IDE), which is common to all Arduino boards and running both online and offline. The board can be powered through a type-B mini-USB cable or from a 9 V battery.

Fingerprint Sensor Module:

For registering user with locker and then verifying user for locker unlocking.

Solenoids lock Module:

The solenoid lock denotes a latch for electrical locking and unlocking. It is available in unlocking in the power-on mode type, and locking and keeping in the power-on mode type, which can be used selectively for situations. The power-on unlocking type enables unlocking only while the solenoid is powered on. A door with this type is locked and not opened in case of power failure or wire disconnection, ensuring excellent safety

ESP32 CAM Board:

It is low cost development board with Wi-Fi camera. The controller is based on a 32-bit CPU with a frequency of up to 240MHz. It has a built-in 520 KB SRAM with an external 4M PSRAM. It has a combined 802.11b/g/n Wi-Fi + Bluetooth/BLE SoC module. It supports image WiFI upload and Embedded Lwip and FreeRTOS. There is an onboard voltage regulator IC and a PSRAM Chip.

GPS:

To locate locker GPS modules contain tiny processors and antennas that directly receive data sent by satellites through dedicated RF frequencies. The four well-known Global Navigation Satellite System include GPS, BDS(Beidou), GLONASS and GALILEO four satellite navigation systems

VIII. Analysis Models: SDLC Model to be applied

The development model used for this project is called Evolutionary Development Model. This model is a combination of Iterative and Incremental model of software development life cycle.
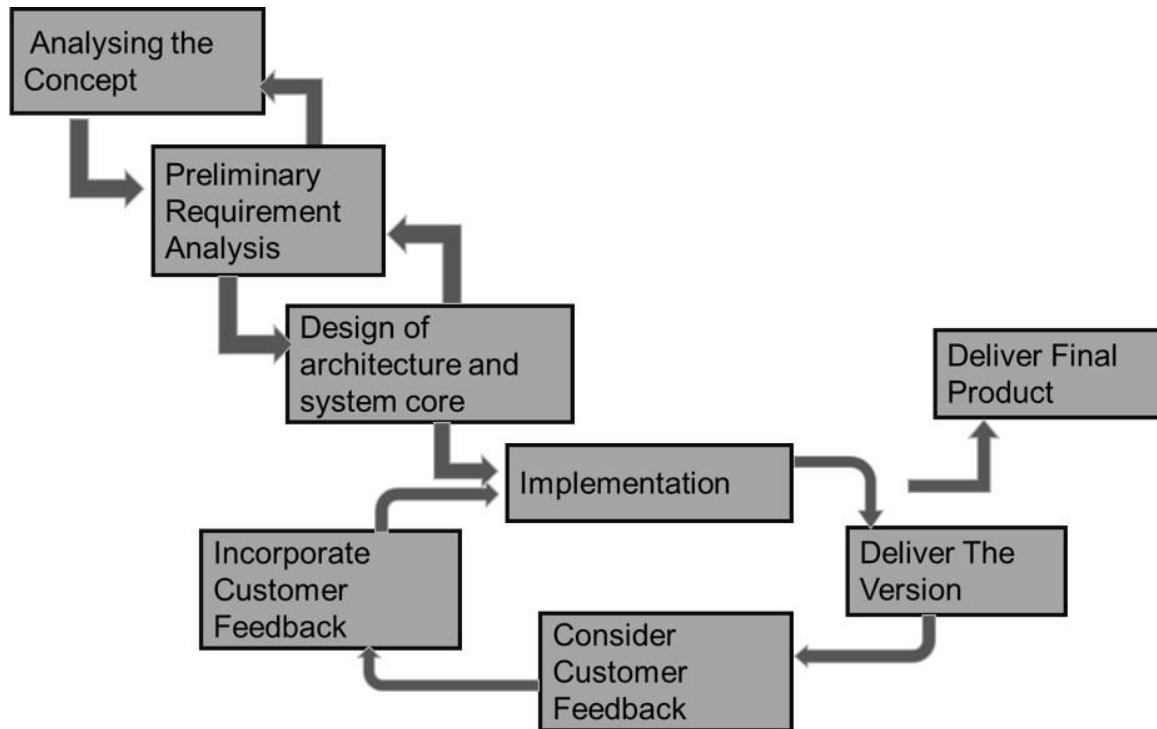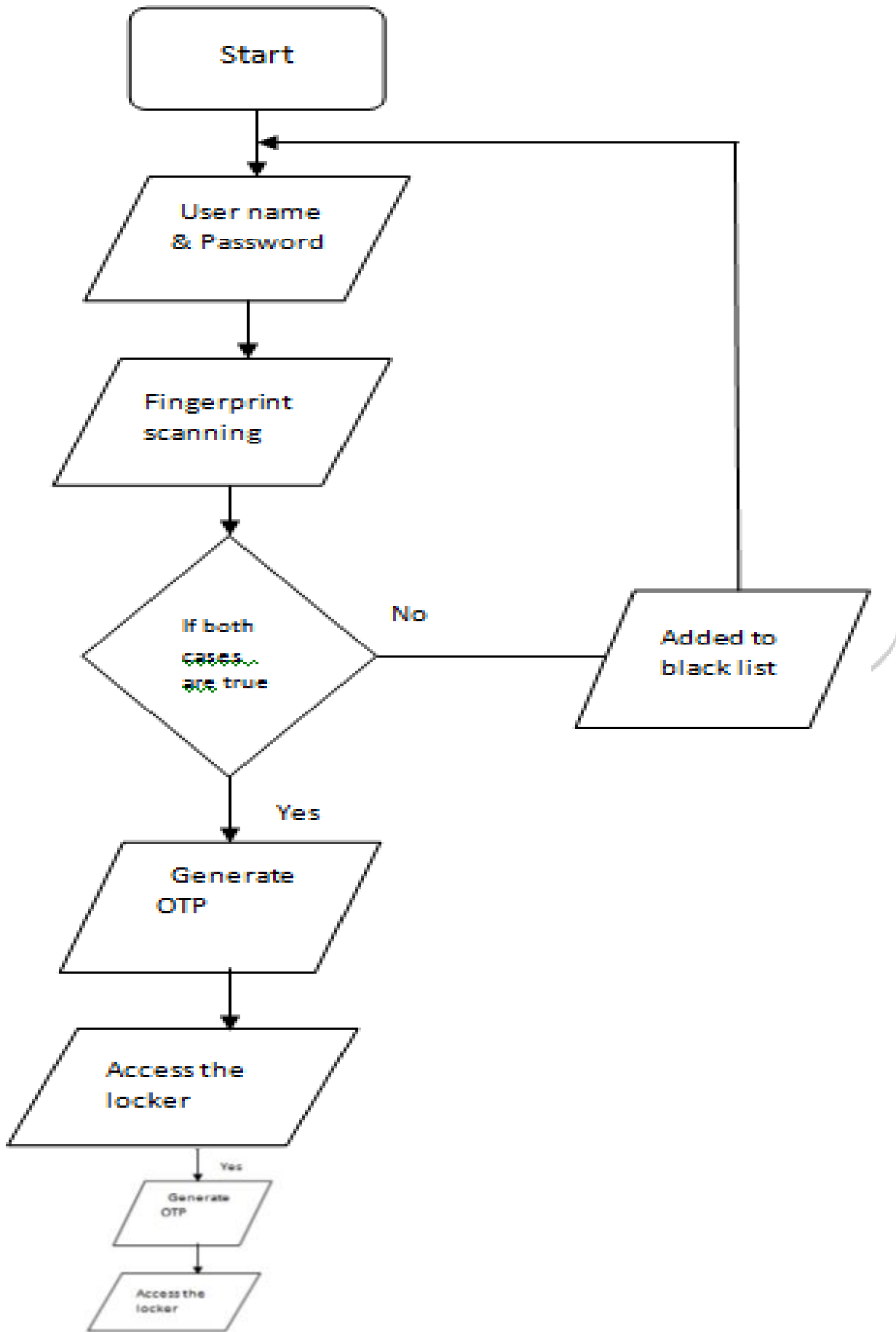

Figure: Development Model

The Evolutionary development model divides the development cycle into smaller, incremental waterfall models in which users are able to get access to the product at the end of each cycle. Feedback is provided by the users on the product for the planning 10 stage of the next cycle and the development team responds, often by changing the product, plan or process. Therefore, the software product evolves with time.

Access the locker

Start

User name & Password

Fingerprint scanning

If both cases are true

No

Added to black list

Yes

Generate OTP

Access the locker

Yes

Generate OTP

Access the locker

IX. APPLICATIONS

Bank security system

Home security system

1. Bank security system

2. Home security system

3. Industrial security system

X. CONCLUSION

This project is the combination of hardware, software and IoT technology. As the design of locker is user-friendly people of any age group can use it according to their requirements. This smart lock will give relief to hostel students from bag safety related problems. This proposed work shows the feasibility of developing smart locker for hostel students based on IoT. This system is implemented to overcome the problem of forgetting password faced while using of traditional locker. Here we are going to solve hostellers problem by module capturing image of person if suspicious unlocking of locker detected, generating OTP for locker unlocking in case of giving access to third person for locker unlocking through android application and a fingerprint scanner is used to secure the locker.

XI. REFERENCES

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