A PRELIMENERY REPORT ON

CARD-LESS ATM USING TWO TIER AUTHENTICATION (FACE RECOGNITION AND OTP)

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE
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BACHELOR OF ENGINEERING (COMPUTER ENGINEERING)

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CERTIFICATE

This is to certify that the Project report entitles

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Rudra Bhadane
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ABSTRACT

Automated Teller Machine (ATM) transactions are found safe, reliable and inevitable lately for fulfilling our financial commitments. Traditional approach for using ATMs mandates involvement in revolving credit. The recent version of the ATM (Automated Teller Machine) system uses an ATM card and PIN (Pin Identification Number) for authentication and validation. Due to various risk factors this ATM system is prone to many security issues such as ATM card theft, skimming done by identity thieves to capture important information, Lebanese loop etc. So we have proposed a new system that uses face recognition authentication (not ATM cards) and One Time Password(OTP) verification for accessing user accounts along with PIN, all these features make the new system more secure and reliable than the existing system. Here the face recognition is done by the Convolution Neural Network(CNN) model of Machine Learning for Image processing.

We all know that, parallel to ATM usage, mobile phone's usage has also been an inevitable trend. Establishing a connection between these e-gadgets has ignited a simple and effective approach to withdraw cash without the involvement of revolving credit which can be mentioned as card less cash withdrawal. Face recognition and OTP is used for user authentication. The OTP in conjunction with Face detection comprises two levels of security.

Keywords: ATM, OTP, CNN, Machine Learning, Image processing

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CHAPTER 1

INTRODUCTION

1.1 Motivation

The recent versions of ATMs use pin based security. During the course of the transaction, We input the pin number which is encrypted on the client side and the data we input is decrypted on the server side. When this comparison gets satisfied, we can carry out the transaction. As the technology is evolving, the crackers can easily retrieve this data and hence there is increase in the number of frauds. The data is made available on the cloud, so that the transaction time can be reduced. When the data is available on the cloud, this data can be easily retrieved for fraudulent activity, which is the biggest drawback. Hence the only way to secure the datum is to replace the computer generated numbers with the biometric security.

1.2 Problem Definition

To design deep learning based Card-less ATM using two tier protection (OTP and face recognition).

CHAPTER 2

LITERATURE SURVEY

CARD-LESS ATM USING TWO TIER AUTHENTICATION (FACE RECOGNITION AND OTP)

S.N. Firme,Sahil Garat, Sumit Sonawane, Hrishikesh Datir, NileshDusane [1] proposed a two dimensional security level with OTP verification alongside face recognition to access the ATM. For any transaction the ATM requires client verification. At present the client makes use of smart-cards which are vulnerable to threats like copying or imitated with precision. The authors in this paper has provided a solution to deal with the pull back money by setting up association between e-device, without the inclusion of charge cards which can be imply to card less money withdrawal. The two dimensional verification system has a Biometric authentication facility setup on a cloud (Saas) with end to end encryption. For verification of a user face detection is used along side a OTP is send to the user. After coordination of both face detection and OTP user can access their record in ATM.

The ATM and Mobile Banking [2] combined together increases security by adding new feature and reduce the time of withdrawal money. There is no change required to the existing system but some addition required, which makes no impact on existing system. This research will increase the speed of cash withdrawal almost 3 times fast. It will also have positive impact on the customer's satisfaction, if proper functioning is ensured by the banks.

ATM card users have problems[3] such as card cloning, card expiring, card skimming, card damaging, cost of issuance and maintenance and accessing customer account by third parties. The motive of this project is to give a freedom to the user by changing the card to Biometric security system to access the bank account using AES algorithm.

The traditional conventional ATM authentication schemes available are mostly cryptographic based and this gives room to lots of vulnerabilities improvisation. This technique provides high output entropy keys and also locks original biometric data such that it is impossible to recover the biometric data even when the stored information in the system is open to an attacker.[4]

As the threats related to ATM cards are increasing, the researchers are interested in developing new technology for ATM access authentication. In 2019 some researchers proposed OTP based Cardless Transaction using ATM [5]. The proposed methodology is that, all the standard ATM transaction will be carried out by doing verification using a Personal Identification Number (PIN) and Bank

Identity (BPIN) and One Time Password (OTP). This method has more security than a biometric fingerprint and using an ATM card.

In several Biometric scan technologies: finger-scan, facial-scan and retinal-scan and others are discussed[6]. Facial technology is a relatively new entrant to the biometric field and offers significant promise. One of the continuing challenges for the security is to reduce the fraud and security issues. Here we are proposing card less security architecture for ATM using facial technology. Our proposed system provides unique authentication technique to improve security of ATM machine over present system.

In today's society, Technology Advancement have made life easier by providing us with higher levels of knowledge and innovation through the invention of different devices. However, each and every technological innovation hubs the potential of hidden threats to its users[7]. One of the major threat is theft of private or personal data, information, assets and properties. As digital data become more and more prevalent, users try to secure their information and keep it secret with highly encrypted passwords and ID cards. However, taking advantage of security flaws in ID cards result in cards being duplicated or counterfeited and being misused, the misuse of these security measures are also on the rise. This increasing battle with cyber security has led to the birth of biometric security systems which increases security with unique biometrics

There are many privacy risks due to security breaches of biometric templates[8]. We have proposed a hierarchical bloom filter based identification system for large-scale biometric systems that reduces storage requirements while providing rapid handling of queries and template security. The challenge of incorporating a hash-based bloom filter by introducing a mathematical framework with noisy biometric data that is adaptive to characteristics of biometric database. The proposed architecture is implemented using a face database containing 25,000 facial templates and achieves 92.05 percent reduction in storage size with 99.82 percent reduction in average query time without sacrificing accuracy of result.

Facial Recognition Technology (FRT) [9] addresses several complimentary needs of identifying and verifying an individual's identity and emerged as a solution. The biometric system requirements are fulfilled by FTR, which tries to recognize the status of an individual person by using features distinctive from the

body and different functionalities that are more and more familiar with the operation of visual surveillance. It highlights the limitations of the technology and the problematic, potentials of the technology. The report also identifies the sub-tasks that the FRT seems to be ready to deploy, the areas with specified obstacles, and how to overcome them by the developments of future technology and operating procedures of sound. The report also addresses specific issues that appear to interact with technology. The report's research are further broken down into different genres to understand further the performance, operation, policy concerns, evaluation, and political and moral operations.

ATM's and Credit cards are used with the end goal of cash exchanges which assumes a fundamental job in the nature of currency exchange[10]. There are some issues of existing validation plan, for example, secret key and PIN number caused the spillage of data put away in ATM card which lead to the lost of cash in ledger and private databases and creates a mental pressure in customers. To conquer this unaccuracy of theft in cash exchanges, we have proposed the thought of utilizing fingerprints of clients as secret phrase , which also includes conventional PIN number. After approved confirmation, the user will have the option to continue for exchange else after three progressive wrong inputs, the ATM card will be obstructed for 24 hours and a message will be sent to the registered versatile number.

CHAPTER 3

SOFTWARE REQUIREMENT SPECIFICATIONS

3.1 Introduction

3.1.1 Project Scope

The basic aim of this research work is to design develop a card less ATM. If that can be achieved and implemented, it could lead to the following objectives.

1. Enhance and ease the use of ATM by banking customers.
2. ATM fraud and criminal activities can be reduced or eliminate completely.
3. It can eliminate financial burden and pressure placed on customers for issuance and maintenances of ATM card.
4. It will also reduce stress emanated from complaints related to ATM cards at the bank staff and customers.

3.1.2 User Classes and Characteristics

- Registration
- Login
- Face Capturing, Face Detection Face Recognition and Matching
- Authentication using OTP and Matching

3.1.3 Assumptions and Dependencies

Assume Bank server and Database

3.2 Functional Requirements

3.2.1 Image Preprocessing

Image Preprocessing is the term for image operations at the lowest level of abstraction. The image information content is not increased by these operations, but they can be reduced if the information measure is an entropy. An image data might be supressed with undesired distortion, to improve these images is the aim of image Preprocessing. Enhancement of the some image feature may help for futher processing and analysis task. Redundancy is used in image Preprocessing. The Real image corresponding Neighboring pixels have the same or similar brightness value. The distorted pixel from the image, can have average value of the neighboring pixels restored.

3.2.2 Segmentation and Analysis

The partition of an image into meaningful regions concerning a particular application is done in our system. The segmentation is based on the analysis of observations taken from an image such as grey level, color, texture, depth, or motion. Identification of objects in a scene for object-based measurements such as size and shape.

3.2.3 Feature Extraction

The process in which relevant features within an image are detected and represented for further processing is called Feature extraction.

Marking the transition from pictorial to non-pictorial data representation, feature extraction is a neccesary step in Computer vision and image processing. The resulting representation can be used as an input to several pattern recognition and

classification techniques such as labeling, classification, or to recognize the semantic contents of the image or its objects.

3.2.4 Image Classification

Image classification helps to classify images with the help of data we extracted from other images. Categorizing all the digital image pixels into several classes is the main aim of the classification process. Identifying and portraying the image to get the data i.e. grey values and feature extraction for the future classification of the images by creating more classes is the main objective of the image classification, which can be used to create a signature file.

Image classification is training the computer and making it to classify the given image into the specified classes by certain image properties and training set we used to train.

3.2.5 Post Processing

In post processing the knowledge extracted from the prior step could be processed further. We can simply and evaluate the extracted knowledge. It can further be visualized and be documented for the end user. Various techniques can be used for the same. The processed knowledge can be interpreted to incorporate in the system.

3.3 Nonfunctional Requirements

3.3.1 Performance Requirements

- The performance of the system lies in the way it is handled. Every user must be given proper guidance regarding how to use the system. The other factor which affects the performance is the absence of any of the suggested requirements.

3.3.2 Security Requirements

- The software doesn't require any kind of sensitive information. The software adheres the specific standard and maintains the privacy of user.

3.3.3 Software Quality Attributes

- Portability- The software should be completely portable to all the operating platforms/systems.
- Reliability - The software should operate in all lighting conditions. Irrespective of the brightness level of the user's monitor, the program should always detect the image.
- Usability - This software should always be easy to use for all the types of users with minimal instructions.

3.4 System Requirements

3.4.1 Software Requirements

- Python Frameworks
- Python Librarires (e.g. Opencv)
- Standard IDE: Python IDLE
- Framework: Django

3.4.2 Hardware Requirements

Personal Computers with minimum capacity:

- Processor: Pentium 200 Mhz
- RAM : 2 GB
- Disk : 100 GB
- Form modules are designed to operate in a batch processing, run under LAN and PC based platforms and take full advantage of the graphical user interface and 32 bit processing power available with Windows 7 and above.

3.5 System Implementation Plan

PROJECT TITLE : Deep Learning based Card-Less ATM using OTP and Face Recognition Techniques

WBS NUMBER	TASK TITLE	DURATION IN WEEK	PCT OF TASK COMPLETE
1	Requirement Gathering	2	100%
2	Requirement Analysis	2	100%
3	Planning	1	90%
4	Data Collection & Cleaning	1	15%
5	Feature Extraction	1	0%
6	Algorithm Design	2	0%
7	Model Building	2	0%
8	Testing Phase I	1	0%
9	Testing Phase II	1	0%
10	Required Changes	1	0%
11	Finalize	1	0%

Figure 3.1: Project Implementation Plan

CHAPTER 4
SYSTEM DESIGN

4.1 System Architecture

After analyzing the problem faced by people in the existing technology, we have come up with this project to solve the problem of complexity and provide easiest way to secure the ATM transaction.

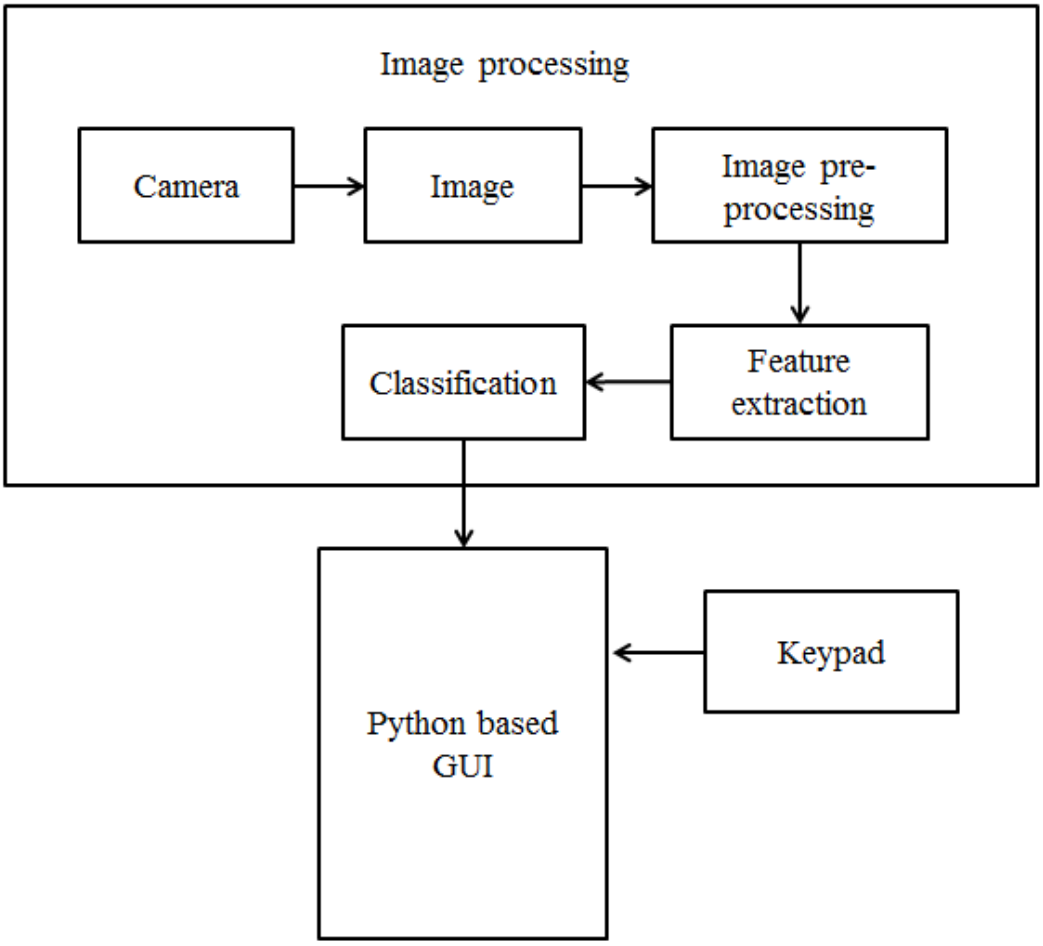

Figure 4.1: System Architecture

System Architechture of proposed system is as shown in figure above. The user authentication will be done using laptop/PC camera. Whenever a person enters in ATM, camera will capture the user's image and displaying all information about him. GUI (Graphical User Interface) is developed for user and system interactions. An Camera, which along with face recognition comprises two levels of security. When face and OTP are matched then customer's account will open in ATM machine. User name, debited money, authentication status etc, will be displayed using GUI.

4.2 Data Flow Diagrams

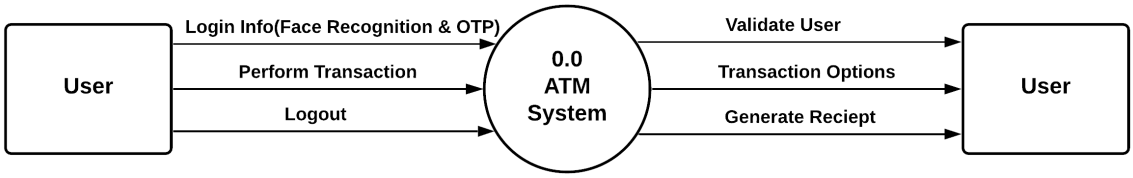

Figure 4.2: Data Flow Diagram Level 0

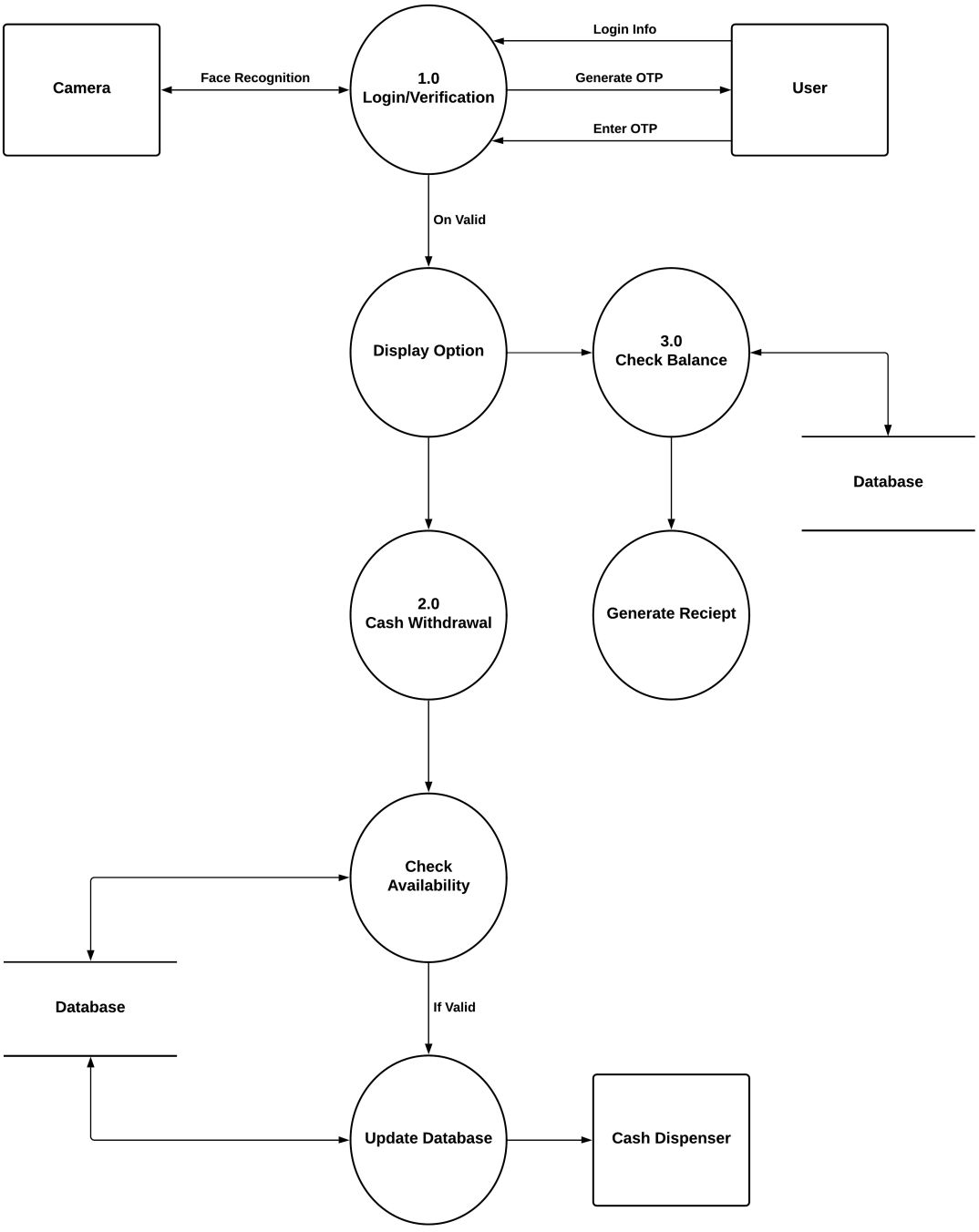

Figure 4.3: Data Flow Diagram Level 1

4.3 Use Case Diagram

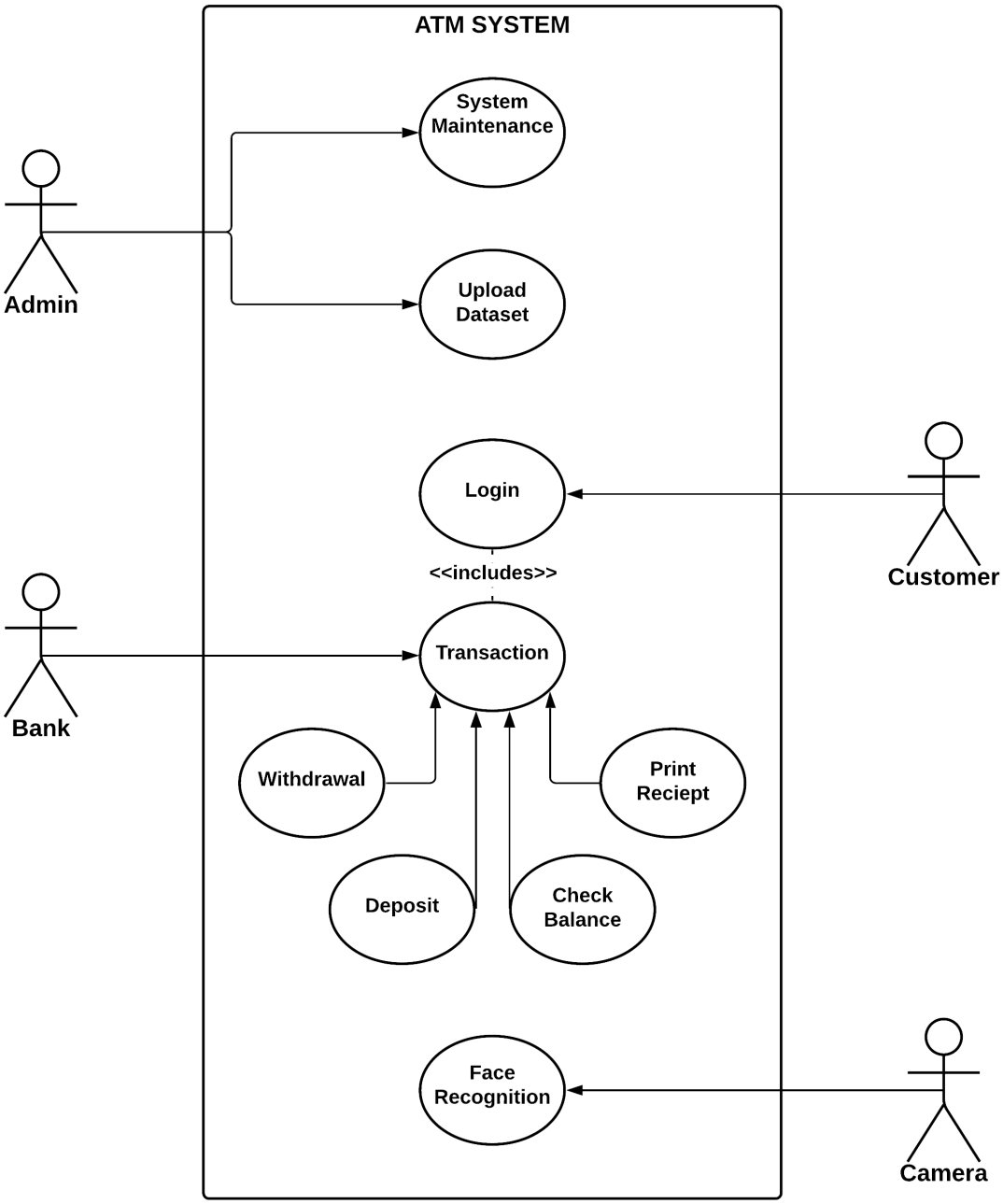

Figure 4.4: Use Case Diagram

4.4 Class Diagram

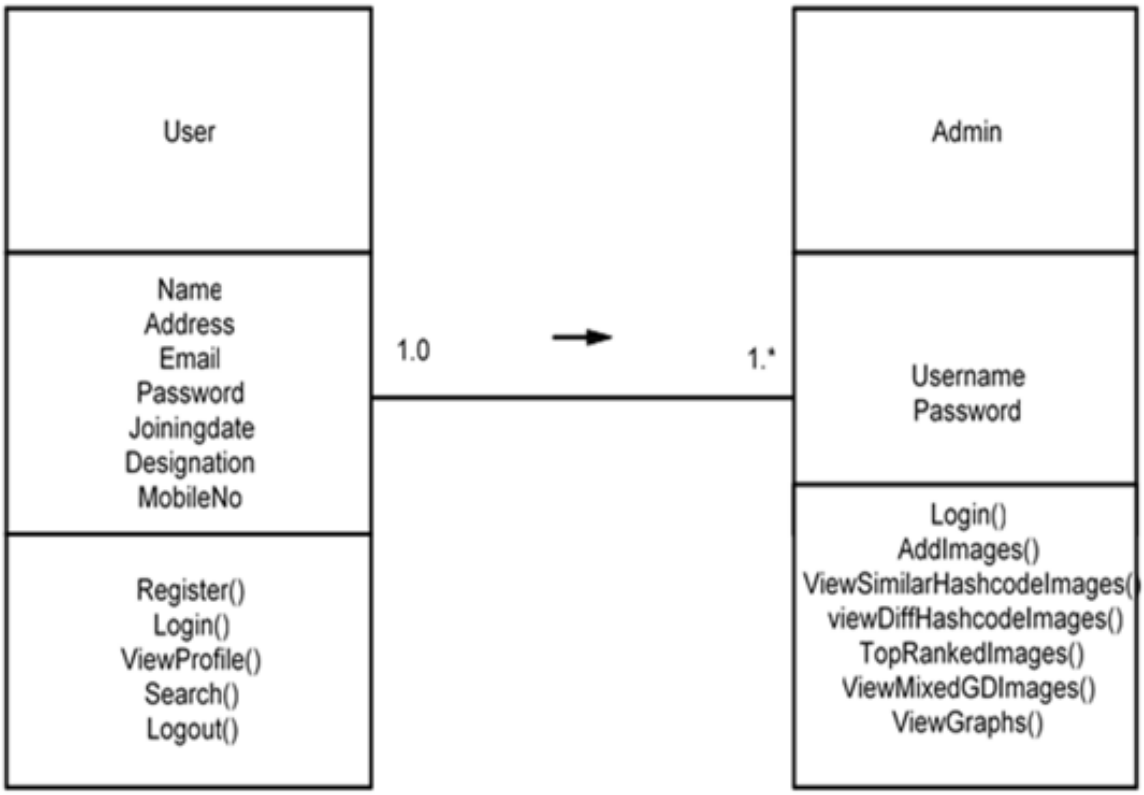

Figure 4.5: Class Diagram

4.5 Sequence Diagram

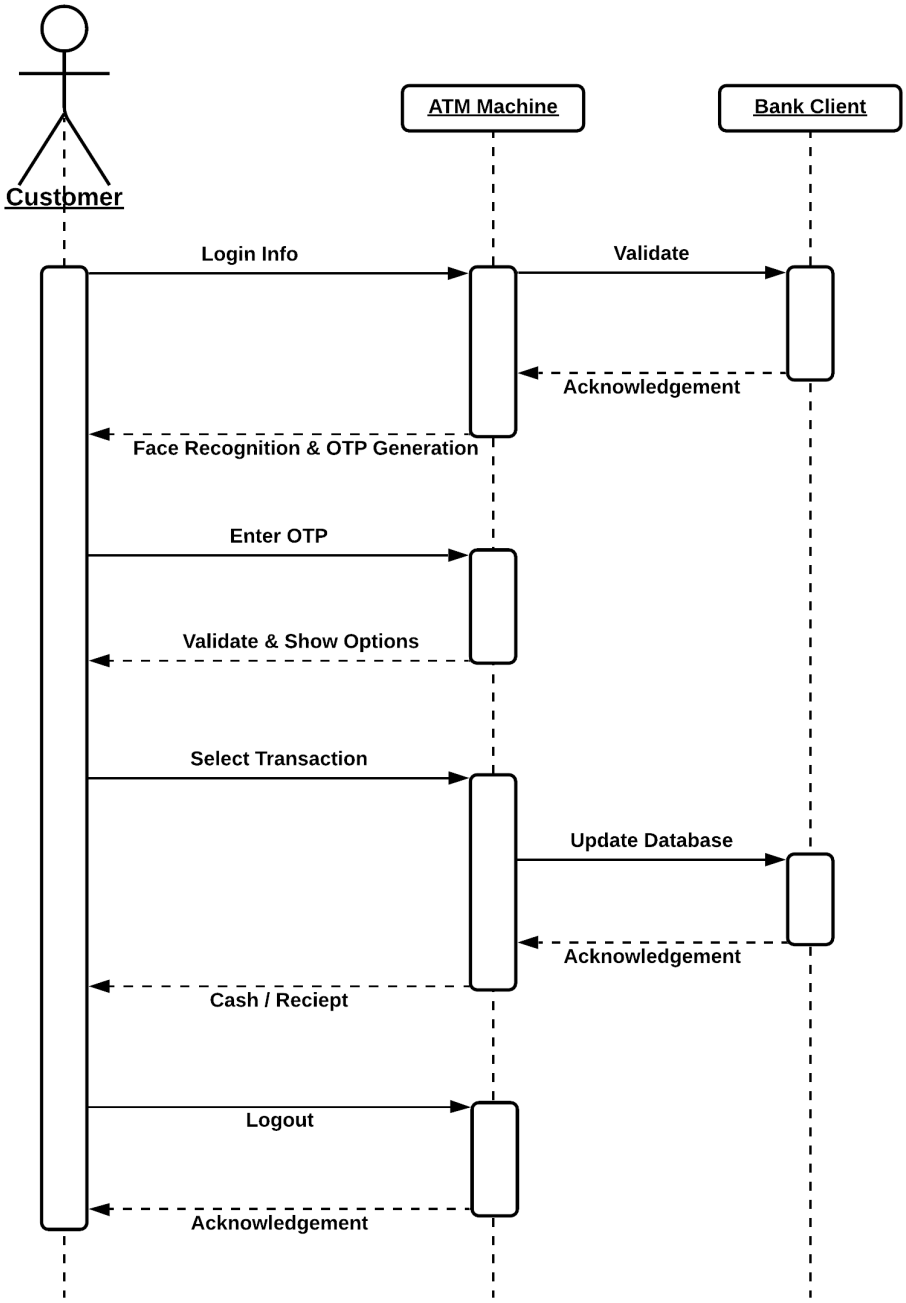

Figure 4.6: Sequence Diagram

4.6 Activity Diagram

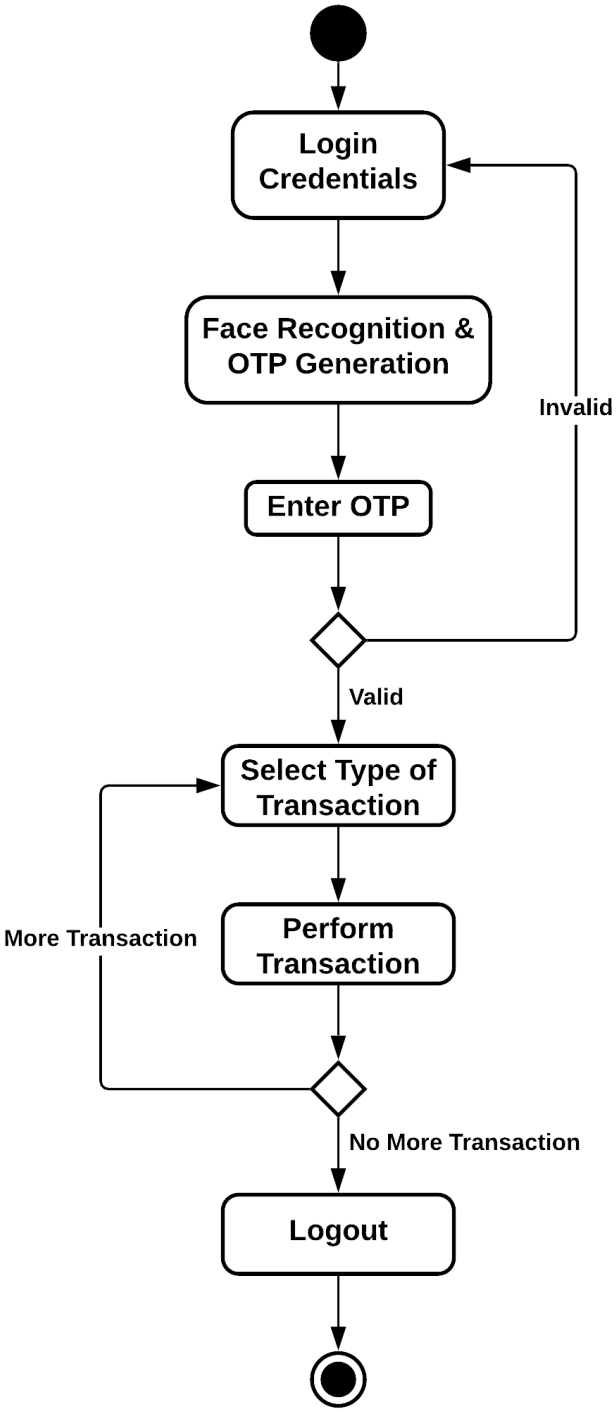

Figure 4.7: Activity Diagram

CHAPTER 5
OTHER SPECIFICATIONS

5.1 Advantages

- Face recognition and One Time Password will prove to be more secure than ATM card.
- Face recognition will enhance the security as one cannot hack the technology.
- With faster processing the process of cash withdrawal will also speedup.
- User can make transaction using OTP anywhere and at any time he need not have to carry ATM card as he/she will be carrying mobile all the time.

5.2 Limitations

- If there are some network issues then the user may receive the OTP at a later time.

5.3 Applications

- • ATM machine
- • Home security system
- • Electronic voting machine

CHAPTER 6
CONCLUSION AND FUTURE WORK

The adoption of the ATM as an electronic banking channel has positively impacted the banking system worldwide because it's very effective and convenient for bank customers. The advent of ATM fraud has however been a menace for several banks everywhere on the planet and lots of banks now aim to eradicate the fraud costs to the bank. The proposed system can provide a practical and workable solution that addresses the wants of the regulatory agency of the banks. The adopted technology of the proposed system is also cheaper to deploy than the face detection authentication technique because it utilizes the components of the existing system. The model also can provide for top withdrawal limits to cater for the stress of a cash-focused customer base demands. In general, it'll positively impact the banking system and therefore the society by reducing the rising levels of crimes that are related to ATM transactions.

CHAPTER 7

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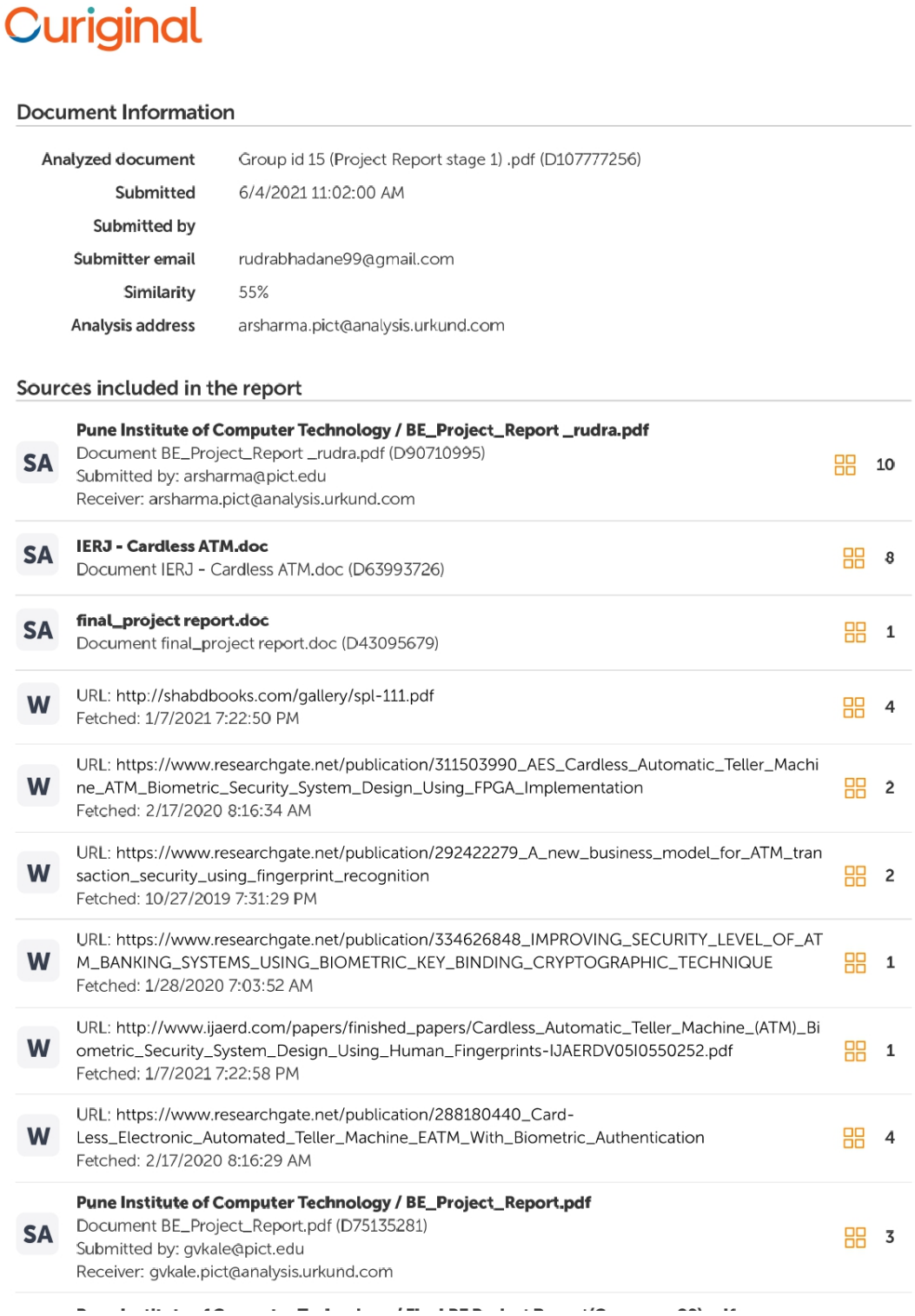

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Figure 7.1: Plagiarism Report