

BANK TRANSACTION USING FACIAL IDENTIFICATION SYSTEM

Submitted in partial fulfillment of the requirements for the award
of Bachelor of Engineering Degree in

Computer Science and Engineering

By

Rahul Daripa

& Soumya

Pratim Singha

(Reg. No. 37110615)

(Reg.No.37110731)



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF COMPUTING
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
JEPPIAAR NAGAR, RAJIV GANDHI SALAI,
CHENNAI – 600119 TAMILNADU.**

March 2021



SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY



(DEEMED TO BE UNIVERSITY)

(Established under Section 3 of UGC Act, 1956)
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600119
www.sathyabamauniversity.ac.in

SCHOOL OF
COMPUTING BONAFIDE
CERTIFICATE

This is to certify that this Professional Training Report is the bonafide work of
RAHUL DARIPA (Reg.No.37110615)&& SOUMYA PRATIM SINGHA(Reg.No.37110731) who underwent the professional training in “**BANK TRANSACTION USING FACIAL IDENTIFICATION SYSTEM**” under our supervision from Feb 2021 to March 2021.

Internal Guide
Mrs. Dr.P.Jeyanthi., (Ph.D)

Head of the Department
Dr. S.VIGNESHWARI, M.E., Ph.D.,

Submitted for Viva voce Examination held on

Internal Examiner

External Examiner

DECLARATION

I, RAHUL DARIPA (Reg. No. 37110615) and SOUMYA PRATIM SINGHA(Reg.No.37110731) hereby declare that the Professional Training Report on **“BANK TRANSACTION USING FACIAL IDENTIFICATION SYSTEM”** done by me under the guidance of Mrs. Dr,P.Jeyanthi., (Ph.D)., at Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Computer Science and Engineering.

DATE:

PLACE:

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. S. VIGNESHWARI M.E., Ph.D.**, Head of the Department and **Dr. T. Shasikala, M.E., Ph.D.**, DEAN of the Computer Science and engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Mrs. Dr.P.Jeyanthi (Ph.D.)** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-Teaching staff members of the Department of Computing who were helpful in many ways for the completion of my project.

ABSTRACT

The objective of this project is to develop a robust automated algorithm for indoor room identification in higher level security purpose with high recognition rates in varying environment. First, Haar cascade based algorithm has been applied for fast and simple face detection from the input image. The face image is then being converted into grayscale image. After that, the iris candidates are extracted from the intensity valleys from the detected face. Costs of each iris candidates are calculated. Finally the iris candidates are paired up and the cost of each possible pairing is computed by a combination of mathematical models.

INTRODUCTION

Over the last decade, we have seen an increase in the use of technology in many business sectors to simplify and better engage customers. This is especially true in the banking and finance sector. Since the start of the digital revolution facial recognition has been gaining prominence over touch and type based interactions due to the convenience it offers without compromising on the security of transactions. Despite an increase in the use of EMV cards (Europay, MasterCard, Visa) coupled with password creation policies, there has been a surge in banking fraud cases. As a result of the billions that are lost by major banking institutions, there has been a call to switch to biometric facial recognition to curb this issue. It means that banking software will rely on face scans which it then compares with similar ones that were uploaded by the bank's personnel into their system so as to verify the customer's identity. The aim is to authenticate the identity and only allow a transaction to go through if the account owner's identity is positively identified. This customer ID authentication process is known as KYC (Know Your Customer).

1.1 DOMAIN

DESCRIPTION DATA

MINING

Data Mining?

Data mining is looking for hidden, valid, and potentially useful patterns in huge data sets. Data Mining is all about discovering unsuspected/ previously unknown relationships amongst the data.

It is a multi-disciplinary skill that uses machine learning, statistics, AI and database technology.

The insights derived via Data Mining can be used for marketing, fraud detection, and scientific discovery, etc.

Data mining is also called as Knowledge discovery, Knowledge extraction, data/pattern analysis, information harvesting, etc.

There are a vast array of data mining methods. In this book, wData mining is a big area of data sciences, which aims to discover patterns and features in data, often large data sets. It includes regression, classification, clustering, detection of anomaly, and others. It also includes preprocessing, validation, summarization, and ultimately the making sense of the data sets.

The evolution of the Internet and the social media has resulted in the huge explosion of the data volumes and complexity, the so-called big data nowadays. Consequently, data mining has also expanded beyond the traditional data modeling such as regression and statistical models. For example, the aim of clustering is dividing n observations into some

different clusters, based on certain clustering measures or objectives. Classification is dividing the data set into different classes with different labels such as normal or abnormal, yes or no.

Types of Data

Data mining can be performed on following types of data

Relational databases

Data warehouses

Advanced DB and information repositories

Object-oriented and object-relational databases

Transactional and Spatial databases

Heterogeneous and legacy databases

Multimedia and streaming database

Text databases

Text mining and Web mining

Data Mining Techniques

1. **Classification:** This analysis is used to retrieve important and relevant information about data, and metadata. This data mining method helps to classify data in different classes.

2. Clustering:

Clustering analysis is a data mining technique to identify data that are like each other. This process helps to understand the differences and similarities between the data.

3. Regression:

Regression analysis is the data mining method of identifying and analyzing the relationship between variables. It is used to identify the likelihood of a specific variable, given the presence of other variables.

4. Association Rules:

This data mining technique helps to find the association between two or more items. It discovers a hidden pattern in the data set.

5. Outlier detection:

This type of data mining technique refers to observation of data items in the dataset which do not match an expected pattern or expected behavior. This technique can be used in a variety of domains, such as intrusion, detection, fraud or fault detection, etc. Outlier detection is also called Outlier Analysis or Outlier mining.

6. Sequential Patterns:

This data mining technique helps to discover or identify similar patterns or trends in transaction data for certain period.

7. Prediction:

Prediction has used a combination of the other data mining techniques like trends, sequential patterns, clustering, classification, etc. It analyzes

past events or instances in a right sequence for predicting a future event.

Benefits of Data Mining:

Data mining technique helps companies to get knowledge-based information.

Data mining helps organizations to make the profitable adjustments in operation and production.

The data mining is a cost-effective and efficient solution compared to other statistical data applications.

Data mining helps with the decision-making process.

Facilitates automated prediction of trends and behaviors as well as automated discovery of hidden patterns.

It can be implemented in new systems as well as existing platforms

It is the speedy process which makes it easy for the users to analyze huge amount of data in less time.

Types of Data Mining

Data mining has two primary processes: supervised and unsupervised learning.

Supervised Learning

The goal of supervised learning is prediction or classification. The easiest way to conceptualize this process is to look for a single output

variable. A process is considered supervised learning if the goal of the model is to predict the value of an observation. One example is spam

filters, which use supervised learning to classify incoming emails as unwanted content and automatically remove these messages from your inbox.

Common analytical models used in supervised data mining approaches are:

Linear Regressions

Linear regressions predict the value of a continuous variable using one or more independent inputs. Realtors use linear regressions to predict the value of a house based on square footage, bed-to-bath ratio, year built, and zip code.

Logistic Regressions

Logistic regressions predict the probability of a categorical variable using one or more independent inputs. Banks use logistic regressions to predict the probability that a loan applicant will default based on credit score, household income, age, and other personal factors.

Time Series

Time series models are forecasting tools which use time as the primary independent variable. Retailers, such as Macy's, deploy time series models to predict the demand for products as a function of time and use the forecast to accurately plan and stock stores with the required level of

inventory.

Classification or Regression Trees

Classification Trees are a predictive modeling technique that can be used to predict the value of both categorical and continuous target variables. Based on the data, the model will create sets of binary rules to split and group the highest proportion of similar target variables together. Following those rules, the group that a new observation falls into will become its predicted value.

Neural Networks

- A neural network is an analytical model inspired by the structure of the brain, its neurons, and their connections. These models were originally created in 1940s but have just recently gained popularity with statisticians and data scientists. Neural networks use inputs and, based on their magnitude, will “fire” or “not fire” its node based on its threshold requirement. This signal, or lack thereof, is then combined with the other “fired” signals in the hidden layers of the network, where the process repeats itself until an output is created. Since one of the benefits of neural networks is a near-instant output, self-driving cars are deploying these models to accurately and efficiently process data to autonomously make critical decisions.

K-Nearest Neighbor

The K-nearest neighbor method is used to categorize a new observation based on past observations. Unlike the previous methods, k-nearest neighbor is data-driven, not model-driven. This method makes no underlying assumptions about the data nor does it employ complex processes to interpret its inputs. The basic idea of the k-nearest neighbor model is that it classifies new observations by identifying its closest K neighbors and assigning it the majority's value. Many recommender systems nest this method to identify and classify similar content which will later be pulled by the greater algorithm.

Summary:

1. Data Mining is all about explaining the past and predicting the future for analysis.
2. Data mining helps to extract information from huge sets of data. It is the procedure of mining knowledge from data.
3. Data mining process includes business understanding, Data Understanding, Data Preparation, Modelling, Evaluation, Deployment.
4. Important Data mining techniques are Classification, clustering, Regression, Association rules, Outlier detection, Sequential Patterns, and prediction
5. R-language and Oracle Data mining are prominent data mining tools.
6. Data mining technique helps companies to get knowledge-based information.
7. The main drawback of data mining is that many analytics software is difficult to operate and requires advance training to work on.

8. Data mining is used in diverse industries such as Communications, Insurance, Education, Manufacturing, Banking, Retail, Service providers, eCommerce, Supermarkets Bioinformatics.

Machine Learning

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves. The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions in the future based on the examples that we provide. The primary aim is to allow the computers learn automatically without human intervention or assistance and adjust actions accordingly.

Machine Learning Methods

Machine learning algorithms are often categorized as supervised or unsupervised.

Supervised machine learning algorithms can apply what has been learned in the past to new data using labeled examples to predict future events. Starting from the analysis of a known training dataset, the learning algorithm produces an inferred function to make predictions about the output values. The system is able to provide targets for any new input after sufficient training. The learning algorithm can also compare its output with the correct, intended output and find errors in

order to modify the model accordingly.

In contrast, **unsupervised machine learning algorithms** are used when the information used to train is neither classified nor labeled. Unsupervised learning studies how systems can infer a function to describe a hidden structure from unlabeled data. The system doesn't figure out the right output, but it explores the data and can draw inferences from datasets to describe hidden structures from unlabeled data.

Semi-supervised machine learning algorithms fall somewhere in between supervised and unsupervised learning, since they use both labeled and unlabeled data for training – typically a small amount of labeled data and a large amount of unlabeled data. The systems that use this method are able to considerably improve learning accuracy. Usually, semi-supervised learning is chosen when the acquired labeled data requires skilled and relevant resources in order to train it / learn from it. Otherwise, acquiring unlabeled data generally doesn't require additional resources.

Reinforcement machine learning algorithms is a learning method that interacts with its environment by producing actions and discovers errors or rewards. Trial and error search and delayed reward are the most relevant characteristics of reinforcement learning. This method allows machines and software agents to automatically determine the ideal behavior within a specific context in order to maximize its performance. Simple reward feedback is required for the agent to learn which action is best; this is known as the reinforcement signal.

Advantages of Machine Learning

Machine Learning undoubtedly helps people to work more creatively and efficiently. Basically, you too can delegate quite complex or monotonous

work to the computer through Machine Learning - starting with scanning, saving and filing paper documents such as invoices up to organizing and editing images.

In addition to these rather simple tasks, self-learning machines can also perform complex tasks. These include, for example, the recognition of error patterns. This is a major advantage, especially in areas such as the manufacturing industry: the industry relies on continuous and error-free production. While even experts often cannot be sure where and by which correlation a production error in a plant fleet arises, Machine Learning offers the possibility to identify the error early this saves down times and money. Self-learning programs are now also used in the medical field. In the future, after "consuming" huge amounts of data (medical publications, studies, etc.), apps will be able to warn a in case his doctor wants to prescribe a drug that he cannot tolerate. This "knowledge" also means that the app can propose alternative options which for example also take into account the genetic requirements of the respective patient.

Applications of Machine Learning

1. Virtual Personal Assistants

Siri, Alexa, Google Now are some of the popular examples of virtual personal assistants. As the name suggests, they assist in finding information, when asked over voice. All you need to do is activate them and ask "What is my schedule for today?", "What are the flights from

Germany to London”, or similar questions. For answering, your personal

assistant looks out for the information, recalls your related queries, or send a command to other resources (like phone apps) to collect info. You can even instruct assistants for certain tasks like “Set an alarm for 6 AM next morning”, “Remind me to visit Visa Office day after tomorrow”. Machine learning is an important part of these personal assistants as they collect and refine the information on the basis of your previous involvement with them. Later, this set of data is utilized to render results that are tailored to your preferences. Virtual Assistants are integrated to a variety of platforms. For example: Smart Speakers: Amazon Echo and Google Home Smartphones: Samsung Bixby on Samsung S8 Mobile Apps: Google Allo

2. Predictions while Commuting

Traffic Predictions: We all have been using GPS navigation services. While we do that, our current locations and velocities are being saved at a central server for managing traffic. This data is then used to build a map of current traffic. While this helps in preventing the traffic and does congestion analysis, the underlying problem is that there are less number of cars that are equipped with GPS. Machine learning in such scenarios helps to estimate the regions where congestion can be found on the basis of daily experiences.

Online Transportation Networks: When booking a cab, the app estimates the price of the ride. When sharing these services, how do they minimize the detours? The answer is machine learning. Jeff Schneider, the engineering lead at Uber ATC reveals in a an interview that they use ML to define price surge hours by predicting the rider demand. In the entire

cycle of the services, ML is playing a major role.

3. Videos Surveillance

Imagine a single person monitoring multiple video cameras! Certainly, a difficult job to do and boring as well. This is why the idea of training computers to do this job makes sense. The video surveillance system nowadays are powered by AI that makes it possible to detect crime before they happen. They track unusual behaviour of people like standing motionless for a long time, stumbling, or napping on benches etc. The system can thus give an alert to human attendants, which can ultimately help to avoid mishaps. And when such activities are reported and counted to be true, they help to improve the surveillance services. This happens with machine learning doing its job at the backend.

4. Social Media Services

From personalizing your news feed to better ads targeting, social media platforms are utilizing machine learning for their own and user benefits. Here are a few examples that you must be noticing, using, and loving in your social media accounts, without realizing that these wonderful features are nothing but the applications of ML. People You May Know: Machine learning works on a simple concept: understanding with experiences. Facebook continuously notices the friends that you connect with, the profiles that you visit very often, your interests, workplace, or a group that you share with someone etc. On the basis of continuous learning, a list of Facebook users are suggested that you can become friends with. Face Recognition: You upload a picture of you with a friend and Facebook instantly recognizes that friend. Facebook checks the poses and projections in the picture, notice the unique features, and

then match them with the people in your friend list. The entire process at the backend is complicated and takes care of the precision factor but

seems to be a simple application of ML at the front end. Similar Pins: Machine learning is the core element of Computer Vision, which is a technique to extract useful information from images and videos. Pinterest uses computer vision to identify the objects (or pins) in the images and recommend similar pins accordingly.

5. Email Spam and Malware Filtering

There are a number of spam filtering approaches that email clients use. To ascertain that these spam filters are continuously updated, they are powered by machine learning. When rule-based spam filtering is done, it fails to track the latest tricks adopted by spammers. Multi Layer Perceptron, C 4.5 Decision Tree Induction are some of the spam filtering techniques that are powered by ML. Over 325, 000 malwares are detected everyday and each piece of code is 90–98% similar to its previous versions. The system security programs that are powered by machine learning understand the coding pattern. Therefore, they detect new malware with 2–10% variation easily and offer protection against them.

6. Online Customer Support

A number of websites nowadays offer the option to chat with customer support representative while they are navigating within the site. However, not every website has a live executive to answer your queries. In most of the cases, you talk to a chatbot. These bots tend to extract information from the website and present it to the customers. Meanwhile, the chatbots advance with time. They tend to understand the user queries better and serve them with better answers, which is possible due to its

machine learning algorithms.

7. Search Engine Result Refining

Google and other search engines use machine learning to improve the search results for you. Every time you execute a search, the algorithms at the backend keep a watch at how you respond to the results. If you open the top results and stay on the web page for long, the search engine assumes that the the results it displayed were in accordance to the query. Similarly, if you reach the second or third page of the search results but do not open any of the results, the search engine estimates that the results served did not match requirement. This way, the algorithms working at the backend improve the search results.

8. Product Recommendations

You shopped for a product online few days back and then you keep receiving emails for shopping suggestions. If not this, then you might have noticed that the shopping website or the app recommends you some items that somehow matches with your taste. Certainly, this refines the shopping experience but did you know that it's machine learning doing the magic for you? On the basis of your behaviour with the website/app, past purchases, items liked or added to cart, brand preferences etc., the product recommendations are made.

9. Online Fraud Detection

Machine learning is proving its potential to make cyberspace a secure place and tracking monetary frauds online is one of its examples. For example: Paypal is using ML for protection against money laundering. The company uses a set of tools that helps them to compare millions of transactions taking place and distinguish between legitimate or

illegitimate transactions taking place between the buyers and sellers.

1.2 PROBLEM DEFINITION

The biometric facial recognition software with banking software is more conventional methods. In fact, using passwords comes with a rather serious caveat. People create passwords based on what they know. So it is easy for a hacker to employ a number of tactics to crack the password. Another major flaw is that people can have too many passwords eg. for social media accounts, emails, and e-wallets as well. Also, creating a complex password can make it easier to forget and when a banking customer requests for a temporary code via email to reset it, then a hacker can intercept the inbox. Using facial recognition means that the banking customer has only one face which can allow them access to all their bank accounts.

PROJECT DESCRIPTION

Facial recognition is one of numerous ways banks can decrease friction in their customers' experience and increase efficiency and accessibility. This project make Identity Verification and Account Withdrawals Allowing customers to make withdrawals from their bank accounts. The biometric facial-recognition software helps minimize fraud where online hackers unlawfully use passwords and other data to steal from banking institutions. The software verifies a person's identity before processing any transaction. our goal is to provide an extremely frictionless, personalized experience with a focus on security.

LITERATURE SURVEY

1. Facial-Recognition Payment: An Example of Chinese Consumers

Authors: Wen Kun Zhang ; Min Jung Kang, IEEE Access, Year: 2019

The emergence and use of facial-recognition payment technology has brought new challenges. Although credit-card payment is quick and easy, it is easy to lose a card or forget the password. Because people use simple passwords and reuse them on different accounts and services, passwords can be shared and cracked. QR payment is inseparable from smart phones, smart phones may be lost, signals may be unstable, and batteries may be exhausted. However, facial-recognition technology, which detects and describes feature vectors without physical contact, directly contributes to overall efficiency, performance, and accuracy. Currently, studies of technical issues of facial-recognition technology and facial-recognition payment systems are very popular. There are many studies that emphasize the working principle of the facial-recognition system, the system's reliability, and the future development trend. However, for non-technical issues, such as from the perspective of consumers, research on the characteristics of facial-recognition payment and the factors affecting consumer's intent to use is rare. Therefore, the purpose of this study is to explore the factors influencing consumers' willingness to use facial-recognition payment systems. This study has selected security, visibility, and expected effort and social image as the feature variables of the facial-recognition payment system.

Results in this paper shows that the safety, security, visibility and social image will affect consumers' intent to use the system. It can also

influence consumers' intent to use through perceived usefulness. The amount of effort expected not only has direct influence on intent to use but also influences the intent to use by the mediating factor of perceived usefulness. In this article, Openness characteristic (consumer's personality) has a moderating effect on the relationship between security, expected effort and usage intention.

2. Secure multifactor authentication payment system using NFC

Authors: Anirudhan Adukkathayar ; Gokul S Krishnan ; Rajashree Chinchole, 2015 10th International Conference on Computer Science & Education (ICCSE)

The latest trend of making financial transactions is done by the use of cards or internet banking. A person may have multiple bank accounts across several banks which makes it difficult for him/her to manage the transactions i.e. he/she either has to carry several cards or use a bunch of bank websites for accomplishing his/her transaction purposes. This situation demands the need of a simple, secure and hi-tech system for achieving the purposes of making transactions. We propose such a system that uses the latest technologies like NFC and multifactor authentication which can be used on any NFC enabled Smartphone. The multi factor authentication system uses a 4-digit PIN as the knowledge factor, an NFC enabled Smartphone, instead of cards, as the possession factor and the face of the user as the inherence factor for the purpose of authentication. The proposed system which can be implemented as cross-platform mobile application, not only allows the

user to make secure transactions, but also allows him/her to make transactions from his/her multiple accounts.

3. Biometric Face Recognition Payment System

Authors: Surekha. R. Gondkar Saurab. Dr. C. S. Mala International Journal of Engineering Research & Technology NCESC - 2018 Conference Proceedings

Use of payment cards in various places such as shopping, restaurants, lodges and online payment for booking hotels, movie tickets, flight and train tickets etc are increasing day by day. So the problem is that a person has to carry payment cards along with him and keep the cards secure to use it all the time. This also lacked security. In the present work the biometric face recognition payments is used in all kinds of payments. Thus it avoids the need to memorize different passwords. Face recognition payment system is safe, secure and even easy to use. It is reliable and more efficient compared to other payment technologies. A general design of online payment system using face recognition is proposed. The methods adopted for face recognition are by finding the eigenfaces and Euclidean distance.

4. Facial Recognition in Banking – Current Applications Author:Niccolo Mejia,2019 Conference Proceedings

Facial recognition software is making its way into the mainstream, with consumer applications such as the ability to unlock one's smartphone with their face. The banking sector has been at the forefront of enterprise adoption of AI since machine learning became the hot topic of the business world in the early years of the decade; as such, it makes sense that facial recognition technology would start to make its way into

banking. There are a handful of companies offering facial recognition software to banks that at face value seem to have the requisite talent in their C-suite that we look for when vetting a company on their claims to

leveraging AI. These companies offer software with applications ranging from physical security to the ability for customers to make withdrawals with their faces. Facial recognition is one of numerous ways banks can decrease friction in their customers' experience and increase efficiency and accessibility. Some experts think that this is how banks can succeed in the future as AI and other technologies make more and more services accessible without any down time.

5. "Face Detection and Recognition for Bank Transaction ", International Journal of Emerging Technologies and Innovative Research

**Authors Sudarshan Dumbre ,Shamita Kulkarni ,Devashree
Deshpande ,P.V.Mulmule Journal of Emerging Technologies and
Innovative Research 2018**

There is a crucial need for improving security in banking region. With the birth of the Automatic Teller Machines, banking became a lot easier though with its own troubles of insecurity. Due to tremendous increase in the number of criminals and their activities, the ATM has become insecure. ATM systems today use no more than an access card and PIN for identity verification. An attempt is made for developing a system that integrates facial recognition technology into the identity verification process and use of RFID card for handling multiple accounts in same card with Raspberry pi controller. The development of such a system would serve to protect consumers and financial institutions alike from intruders and identity thieves. This paper proposes an automatic teller machine security model that would combine a RFID card, a PIN, and

electronic facial recognition that will go as far as with holding the fraudsters' card. If this technology becomes widely used, faces would be

protected as well as PINs. However, it is obvious that manes biometric features cannot be replicated, this proposal will go a long way to solve the problem of Account safety making it possible for the actual account owner alone have access to his accounts. The combined biometric features approach is to serve the purpose both the identification and authentication.

6. Continuous User Identity Verification Using Biometric Traits for Secure Internet Services

Authors: 1Dr.SHAIK ADBUL MUZZER, 2GOSALA SUBHASIN

Nowadays, it becomes serious concern to provide more security to web services. So, secure user authentication is the fundamental task in security systems. Traditionally, most of the systems are based on pairs of username and password which verifies the identity of user only at login phase. Once the user is identified with username and password, no checks are performed further during working sessions. But emerging biometric solutions substitutes the username and password with biometric data of user. In such approach still single shot verification is less efficient because the identity of user is permanent during whole session. Hence, a basic solution is to use very short period of timeouts for each session and periodically request the user to input his credentials over and over. But this is not a proper solution because it heavily affects the service usability and ultimately the satisfaction of users. This paper explores the system for continuous authentication of user using his credentials such as biometric traits. The use of continuous biometric authentication system acquires credentials without explicitly

notifying the user or requiring user interaction that is, transparently which is necessary to guarantee better performance and service usability.

7. Skin color based Face detection Method:

Author: Devendra Singh Raghuvanshi, Dheeraj Agrawal

Detection of skin color in color images is a very popular and useful technique for face detection. Color is an important feature of human faces. Using skin-color as a feature for tracking a face has several advantages. Color processing is much faster than processing other facial features. In the skin color detection process, each pixel was classified as skin or non-skin based on its color components. In situations where color description plays an integral role, the HSV color model is often preferred over the RGB model. The first step of face detection is to segment the color image into skin and non-skin region. Different color space has different ranges of pixels which represents skin region and non-skin region.

8. Face Detection system based on retinal connected neural network (RCNN):

Author: . Rowley, Baluja and Kanade

It first applies a set of neural network-based filters to an image. It uses an arbitrator to combine the outputs. The filters examine each location in the image at several scales, looking for locations that might contain a face. The arbitrator then merges detections from individual filters and eliminates overlapping detections. This method produces good detection rates (77.9% and 90.3%) with an acceptable number of false positives. Depending on the application, the system can be made more or less conservative by varying the arbitration heuristics or thresholds used. We have also applied the same algorithm for the detection of car

tires and human eyes.

9. Combining Skin Color based Classifiers and HAAR Feature using

author: N.Gobinathan, Abinaya and Geetha. P

D. Gobinathan have presented a hybrid means for face recognition in shade images. The well-known HAAR feature-based encounter detector developed by Viola as well as Jones (VJ) that was designed for gray-scale pictures was along with a skin-color filtration system, which supplies complementary facts in shade images. The image was passed by way of a HAAR Feature based encounter detector, which ended up being adjusted in a way that it ended up being operating in a point in its ROC curve which has a low quantity of missed people but a top number involving false detections. Their recommended method features eliminated a number of these false detections. They have likewise used a color pay out algorithm in order to reduce the results of illumination. Their experimental results about the Bao shade face databases have showed that this proposed method was better than the unique VJ algorithm.

10.Face Detection and Recognition for Bank Transaction

Authors: Sudarshan Dumbre¹ , Shamita Kulkarni² , Devashree Deshpande³ , Prof P.V.Mulmule⁴

There is a crucial need for improving security in banking region. With the birth of the Automatic Teller Machines, banking became a lot easier though with its own troubles of insecurity. Due to tremendous increase in the number of criminals and their activities, the ATM has become insecure. ATM systems today use no more than an access card and PIN for identity verification. An attempt is made for developing a system that integrates facial recognition technology into the identity verification

process and use of RFID card for handling multiple accounts in same

card with Raspberry pi controller. The development of such a system would serve to protect consumers and financial institutions alike from intruders and identity thieves. This paper proposes an automatic teller machine security model that would combine a RFID card, a PIN, and electronic facial recognition that will go as far as with holding the fraudsters' card. If this technology becomes widely used, faces would be protected as well as PINs. However, it obvious that manes biometric features cannot be replicated, this proposal will go a long way to solve the problem of Account safety making it possible for the actual account owner alone have access to his accounts. The combined biometric features approach is to serve the purpose both the identification and authentication.

Objective

Facial Recognition software has a liveness detection which prevents hackers from using a picture of the customer for impersonation purposes. It also applies to other biometric modalities such as fingerprints where the liveness detection does exactly that – it assesses the 'liveness' of the facial image as it is known. The recognition system also allows customers to access their bank accounts from computers. Facial recognition is one of numerous ways banks can decrease friction in their customers' experience and increase efficiency and accessibility.

SYSTEM ANALYSIS

EXISTING SYSTEM

In previous days they used only single level authentication like OTP generation. It was not more secured. Secure electronic transaction (SET) It involves many levels of encryption, using many combinations of symmetric , cryptography, asymmetric cryptography and hashing. It does not assume that each agent has his own private key so that the only problem which is remained is the distribution of the public keys, but allows cardholders to decide their asymmetric key.

Disadvantages

1. User must have credit card
2. It is not cost-effective when the payment is small
3. None of anonymity and it is traceable
4. Network effect - need to install client software (an e-wallet).
5. Cost and complexity for merchants to offer support, contrasted with the comparatively low cost and simplicity of the existing SSL based alternative.
6. Client-side certificate distribution logistics.

Proposed System

This uses machine learning techniques to get a high degree of accuracy from what is called “training data”. Haar Cascades use the Adaboost learning algorithm which selects a small number of important features from a large set to give an efficient result of classifiers. Initially, the algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then we need to extract features from it. For this, haar features shown in below image are

used. They are just like our convolutional kernel. Each feature is a single

value obtained by subtracting sum of pixels under white rectangle from sum of pixels under black rectangle.

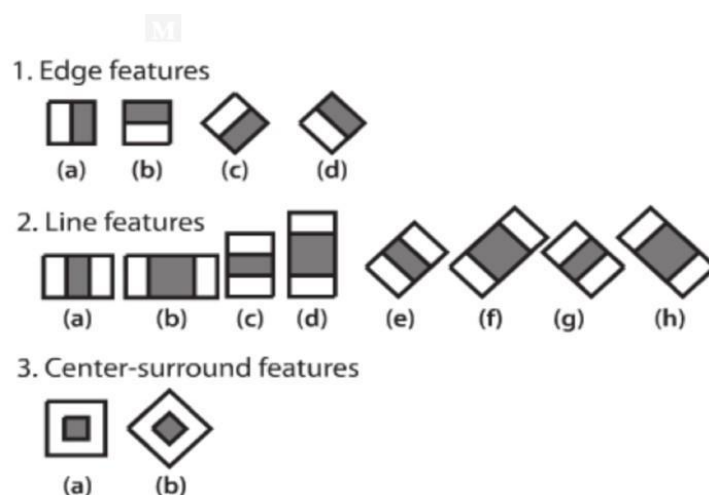
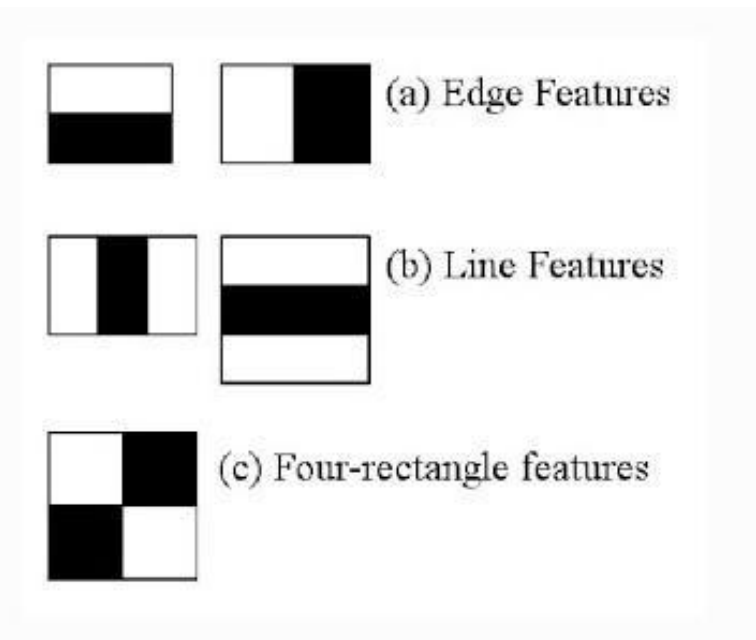


Figure 1 Haar features

Face Detection determines the locations and sizes of human faces in arbitrary (digital) images.

In **Face Recognition**, the use of Face Detection comes first to determine and isolate a face before it can be recognized.

ADVANTAGE

The key advantage of a Haar-like feature over most other features is its calculation speed.

Haar Cascade is a machine learning object detection algorithm used to identify objects in an image or video

Haar Cascades use the Adaboost learning algorithm which selects a small number of important features from a large set to give an efficient result of classifiers.

FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential. Three key considerations involved in the feasibility analysis are

1. Economic feasibility
2. Technical feasibility
3. Social feasibility

ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands being placed on the client. A feasibility study evaluates the project's potential for

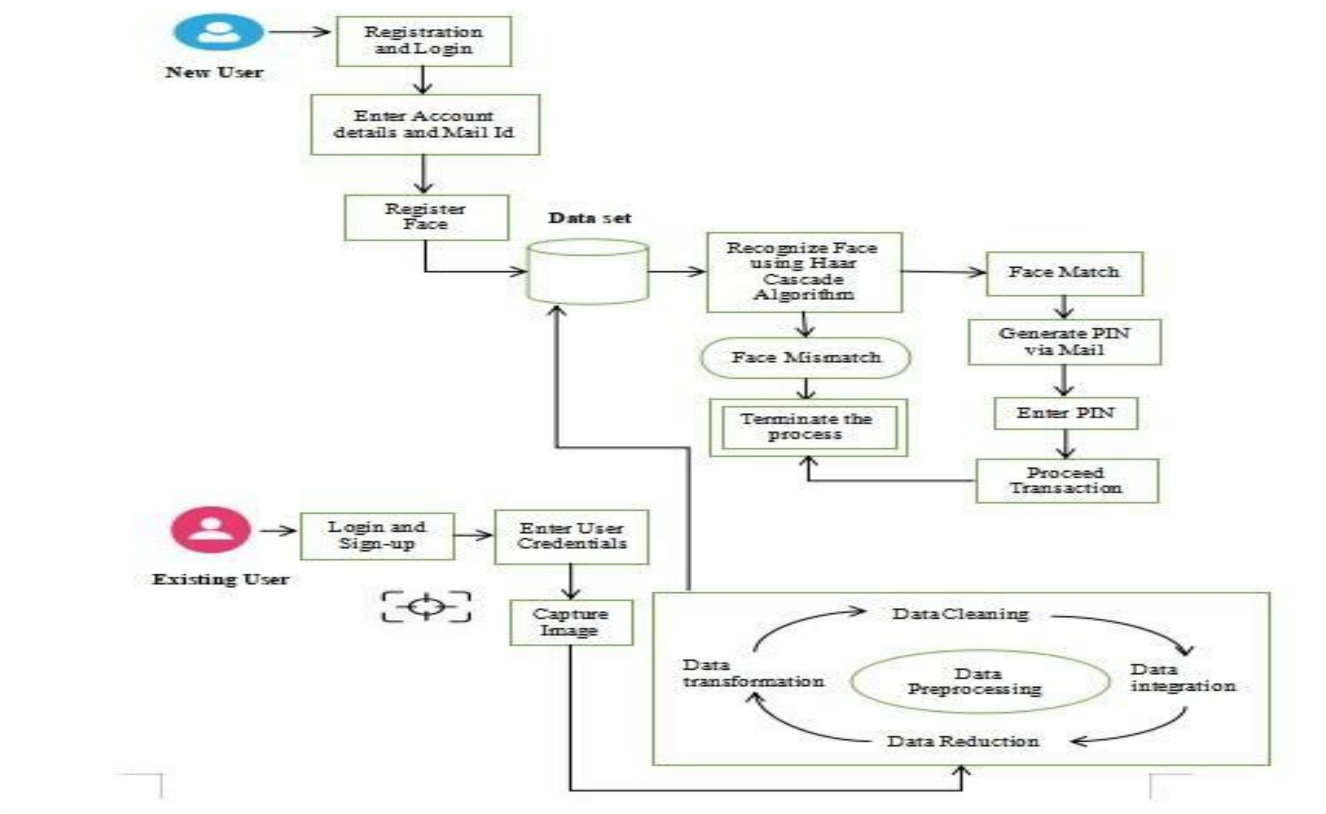
success.

SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

SYSTEM DESIGN

SYSTEM ARCHITECTURE

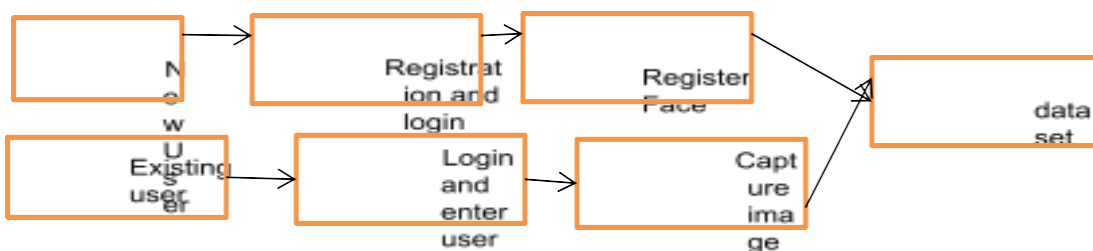




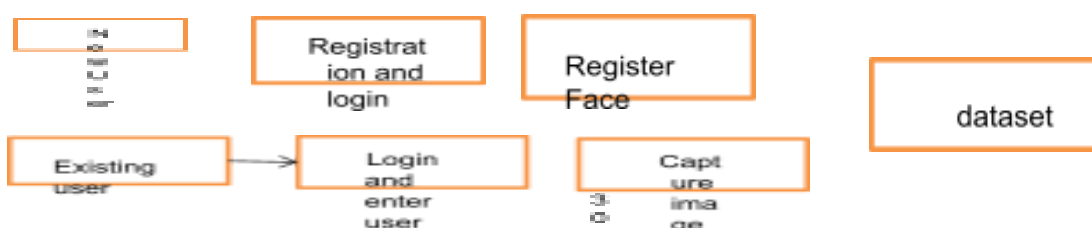
DATA FLOW DIAGRAM:

1. The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.
2. The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.
3. DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow and the transformations that are applied as data moves from input to output.
4. DFD is also known as bubble chart. A DFD may be used to represent a system at any level of abstraction. DFD may be partitioned into levels that represent increasing information flow and functional detail.

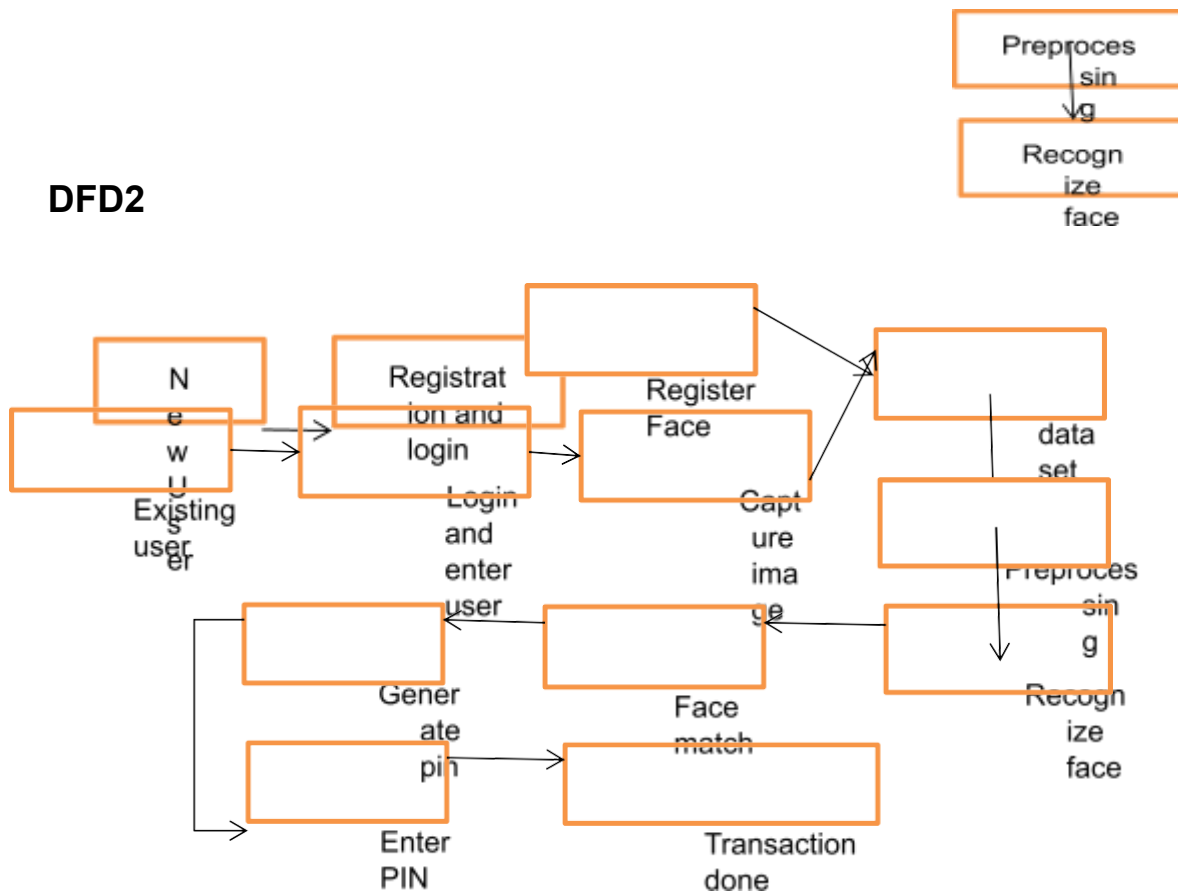
DFD-0



DFD-1



DFD2



UML DIAGRAMS

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.

The UML represents a collection of best engineering practices that have

proven successful in the modeling of large and complex systems.

The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

GOALS:

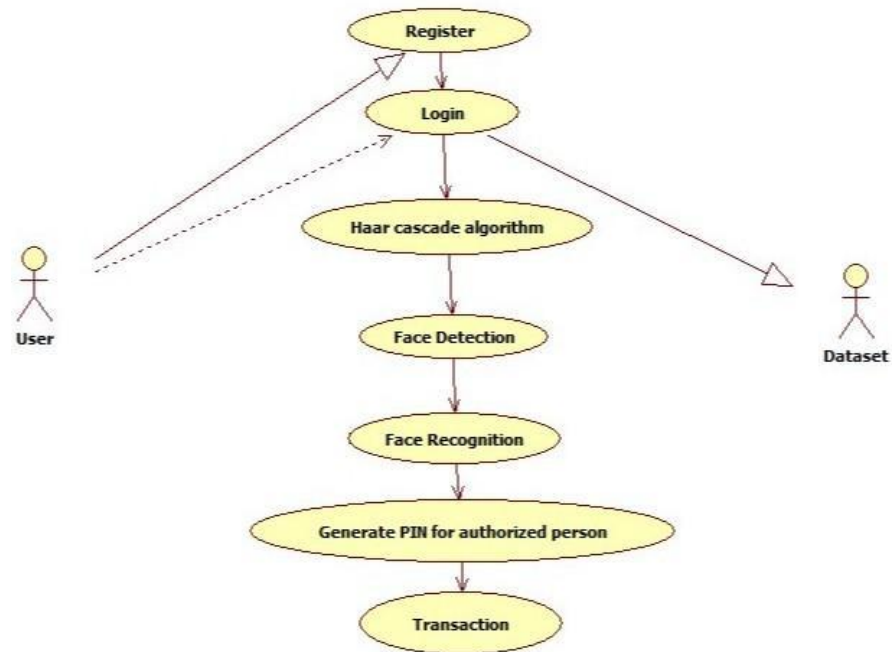
The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.
3. Be independent of particular programming languages and development process.
4. Provide a formal basis for understanding the modeling language.
5. Encourage the growth of OO tools market.
6. Support higher level development concepts such as collaborations, frameworks, patterns and components.
7. Integrate best practices.

USE CASE DIAGRAM:

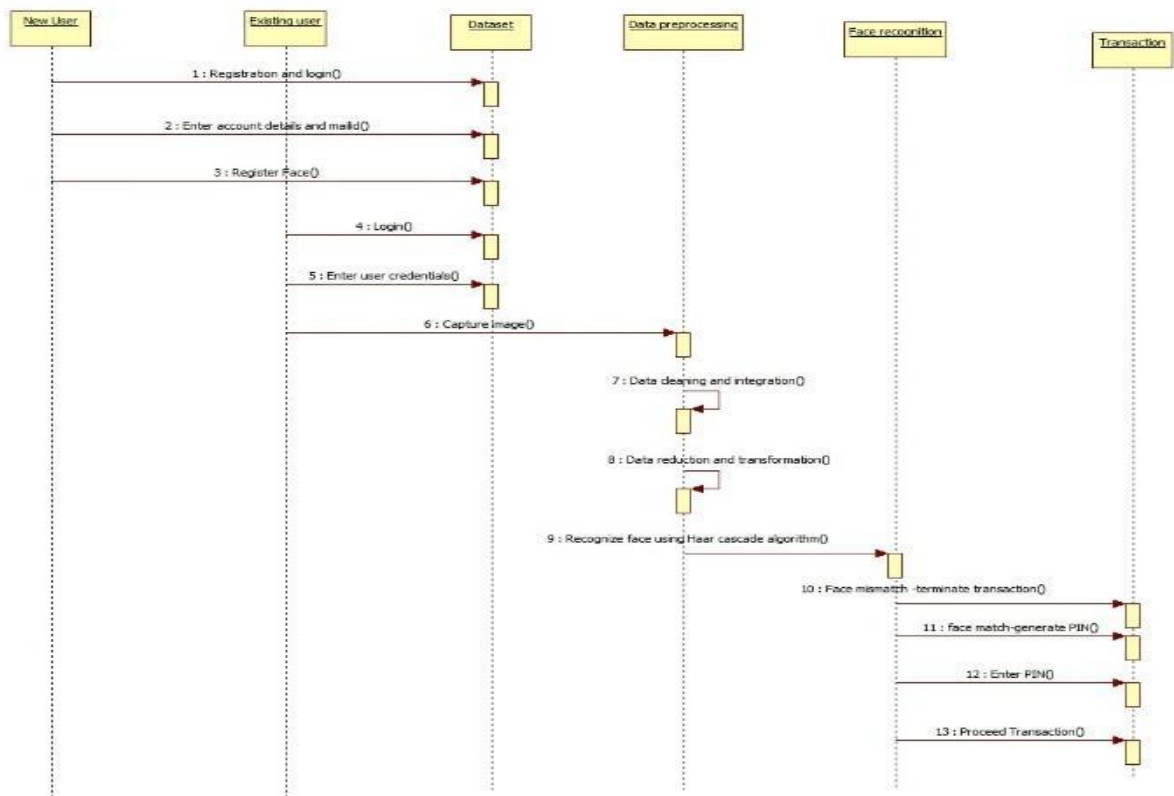
A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the

actors in the system can be depicted.



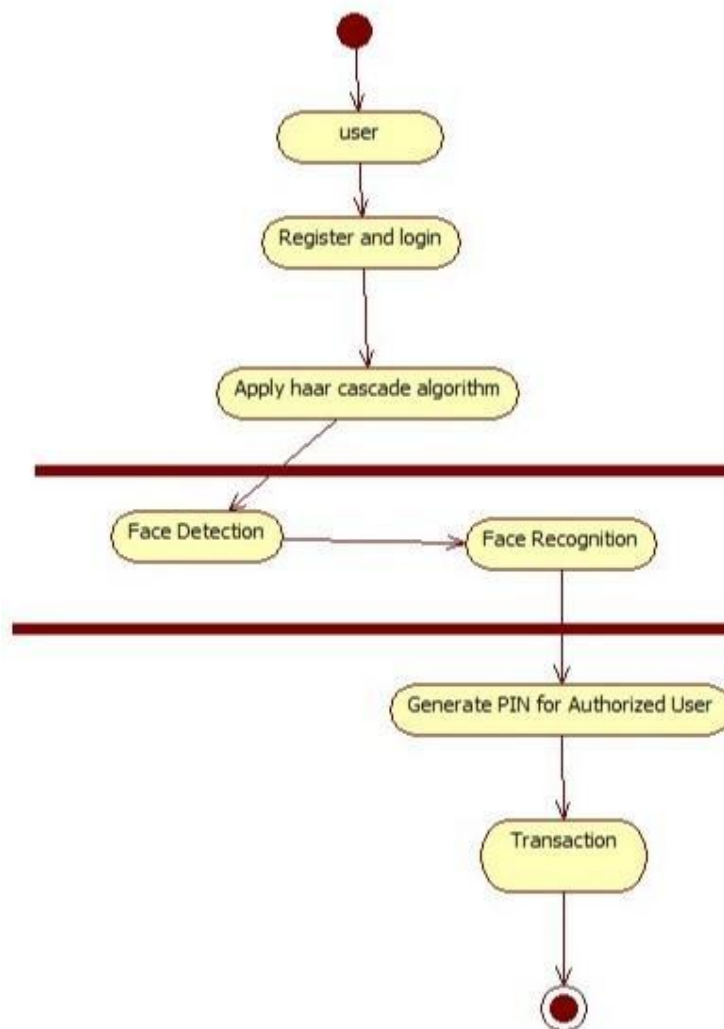
SEQUENCE DIAGRAM:

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams.



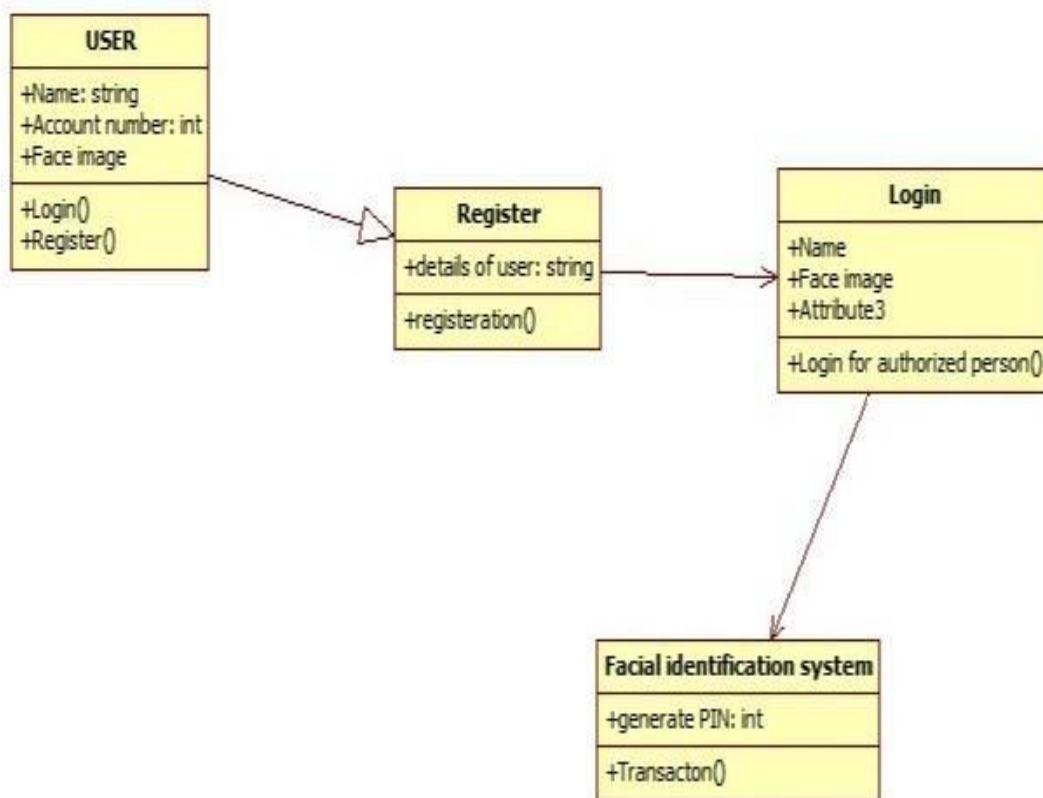
ACTIVITY DIAGRAM:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

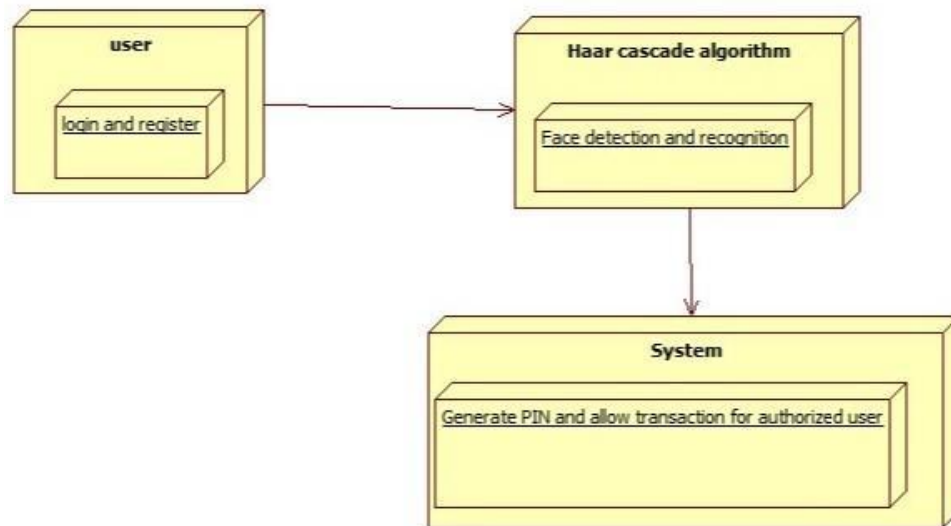


CLASS DIAGRAM

The purpose of class diagram is to model the static view of an application. Class diagrams are the only diagrams which can be directly mapped with object-oriented languages and thus widely used at the time of construction. Class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application.



DEPLOYMENT DIAGRAM



SYSTEM REQUIREMENTS

Hardware Specification

- ✓ PROCESSOR : PENTIUM IV
- ✓ RAM : 8 GB
- ✓ PROCESSOR : 2.4 GHZ
- ✓ MAIN MEMORY : 8GB RAM
- ✓ PROCESSING SPEED : 600 MHZ
- ✓ HARD DISK DRIVE : 1TB
- ✓ KEYBOARD :104 KEYS

Software Specification

- ✓ FRONT END :PYTHON
- ✓ IDE : ANACONDA
- ✓ OPERATING SYSTEM :WINDOWS 10

IMPLEMENTATION

MODULES

1. Data Preprocessing
2. Feature Extraction
3. Face Recognition

Data Preprocessing

1. It is a technique that is used to convert the raw data into a clean data set.
2. In other words, whenever the data is gathered from different sources it is collected in raw format which is not feasible for the analysis.

Feature extraction

1. It is the process of transforming the raw pixel values from an image, to a more meaningful and useful information that can be used in other techniques, such as point matching or machine learning.

Face Recognition

1. Face recognition technology: Ideal for access control, financial transactions and ATM machines. The face key recognition technology performs the following tasks:

- a. Locates a moving object within the camera view
- b. Determines if the moving object is face
- c. Compares live faces with samples from database.

LOGIN

The Login Module is a portal module that allows users to type a user name and face image to log in. You can add this module on any module tab to allow users to log in to the system.

REGISTER

Registration module user enter their details for registration into the system.

TRANSACTION

In this phase the transaction is proceed when the face is matched with the registered user otherwise the transaction is terminated.

SOFTWARE DESCRIPTION

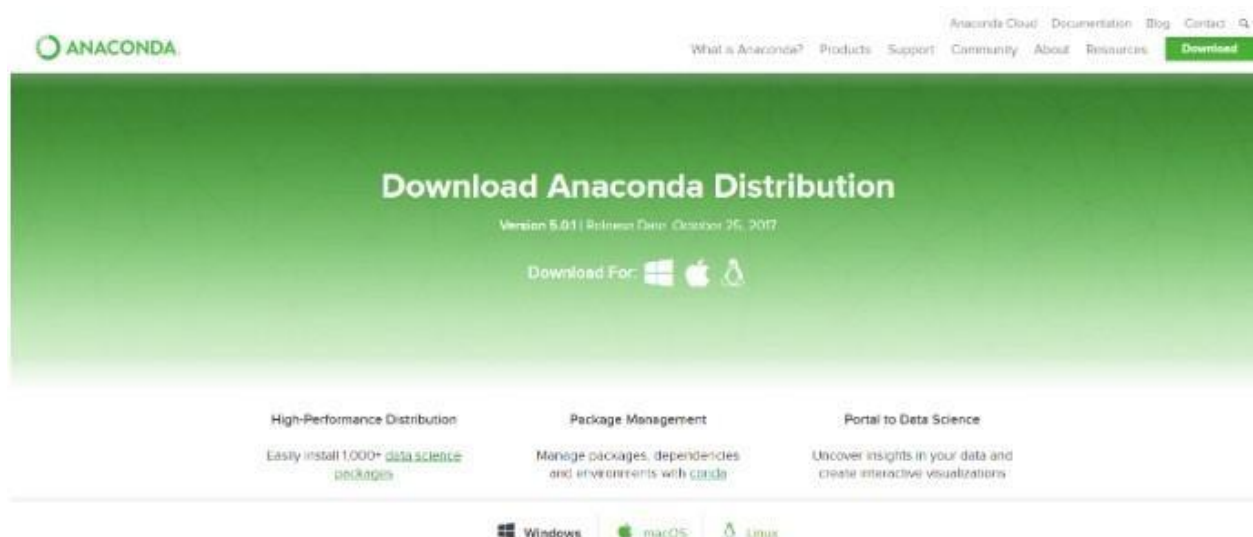
Installing Anaconda on Windows

DOWNLOADING AND INSTALLATION STEPS FOR Installing Anaconda on Windows

Follow the steps below to install the Anaconda distribution of Python on Windows.

Steps:

1. Download the Anaconda installer.



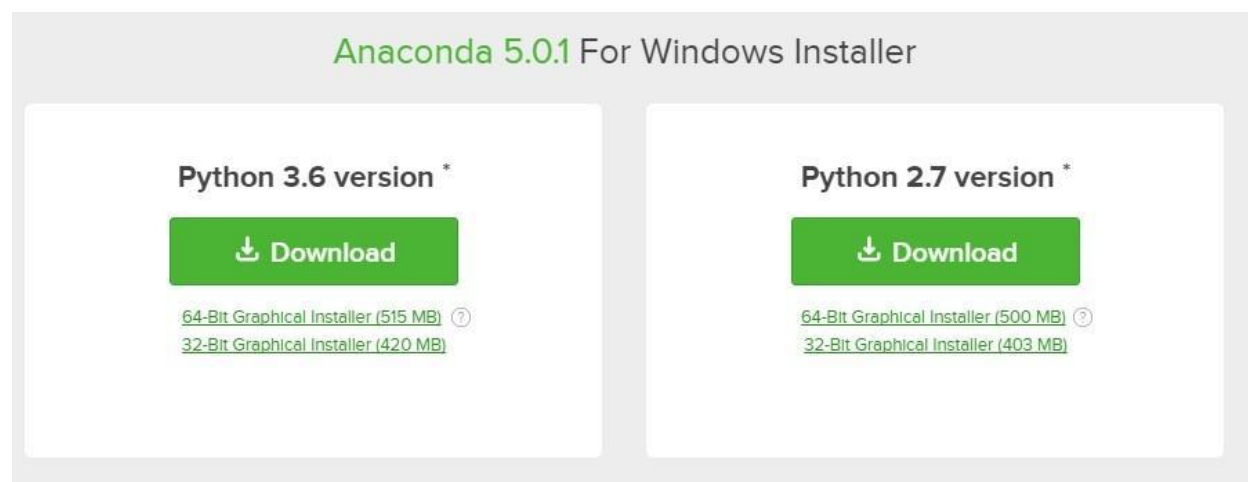
Select Windows

Select Windows where the three operating systems are listed.



Download

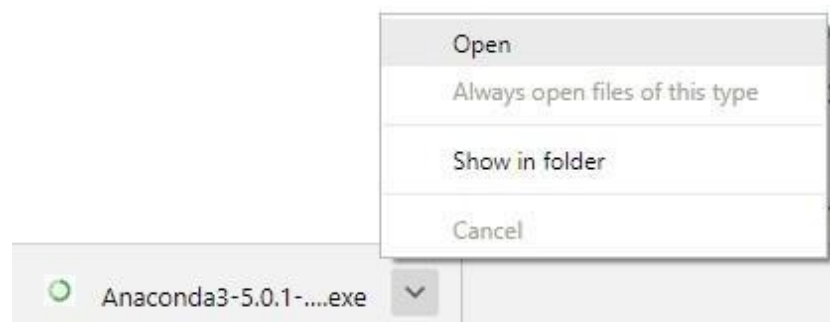
Download the most recent Python 3 release. At the time of writing, the most recent release was the Python 3.6 Version. Python 2.7 is legacy Python. For problem solvers, select the Python 3.6 version. If you are unsure if your computer is running a 64-bit or 32-bit version of Windows, select 64-bit as 64-bit Windows is most common.



2. Double click the installer to launch.

Open and run the installer

Once the download completes, open and run the .exe installer



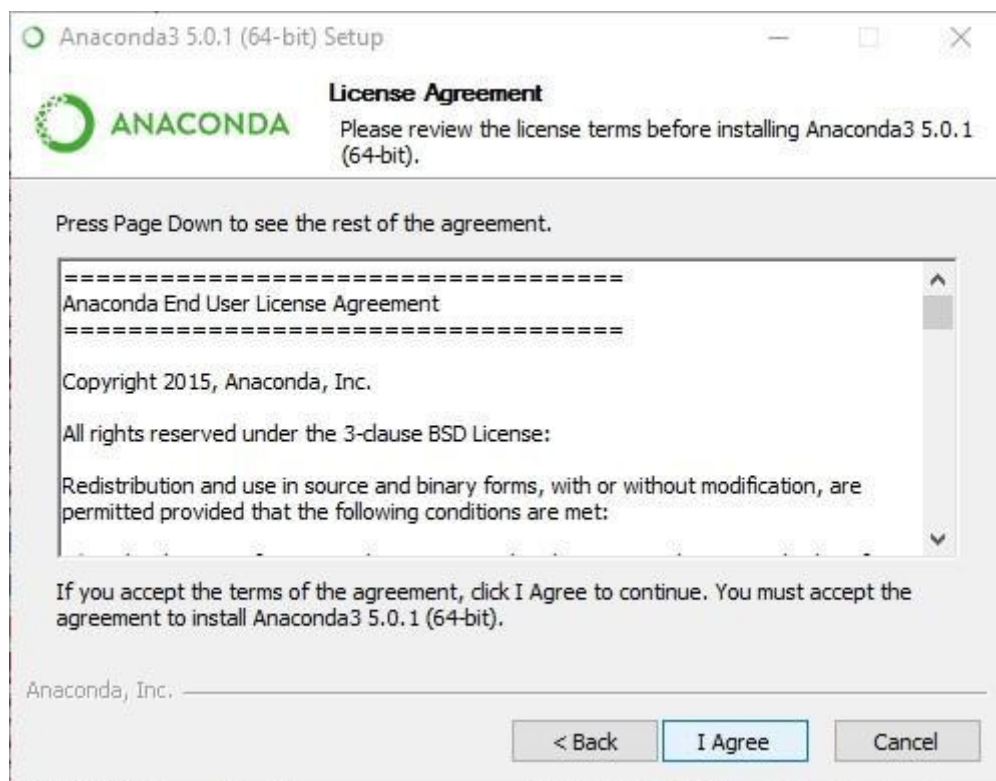
3. Click Next.

At the beginning of the install, you need to click **Next** to confirm the installation.



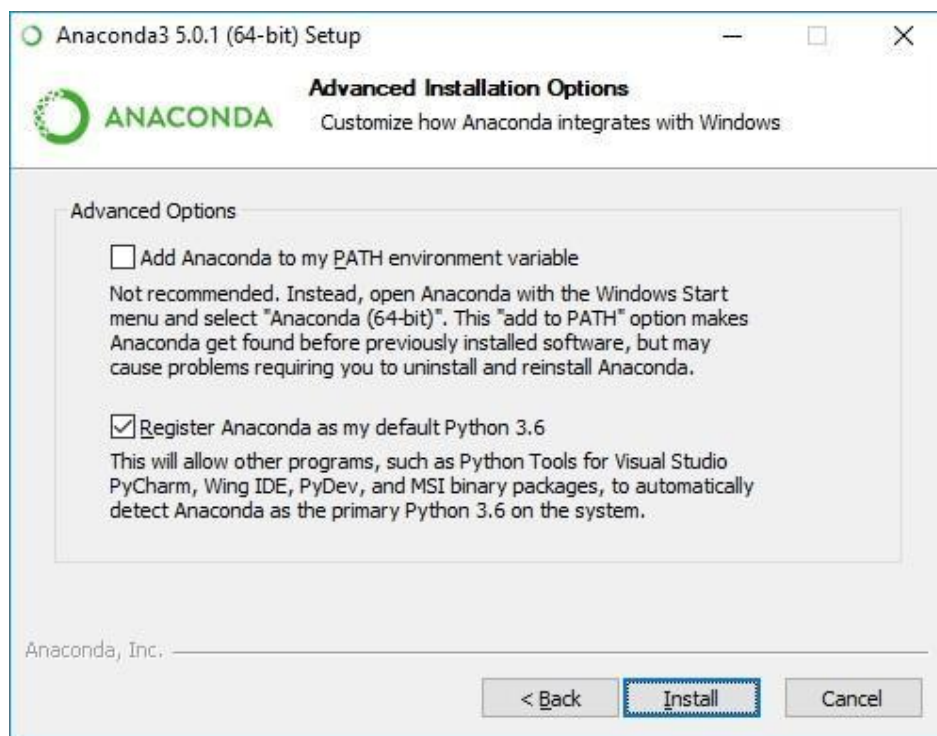
4. Read the licensing terms and click “I Agree”.

Then agree to the license.

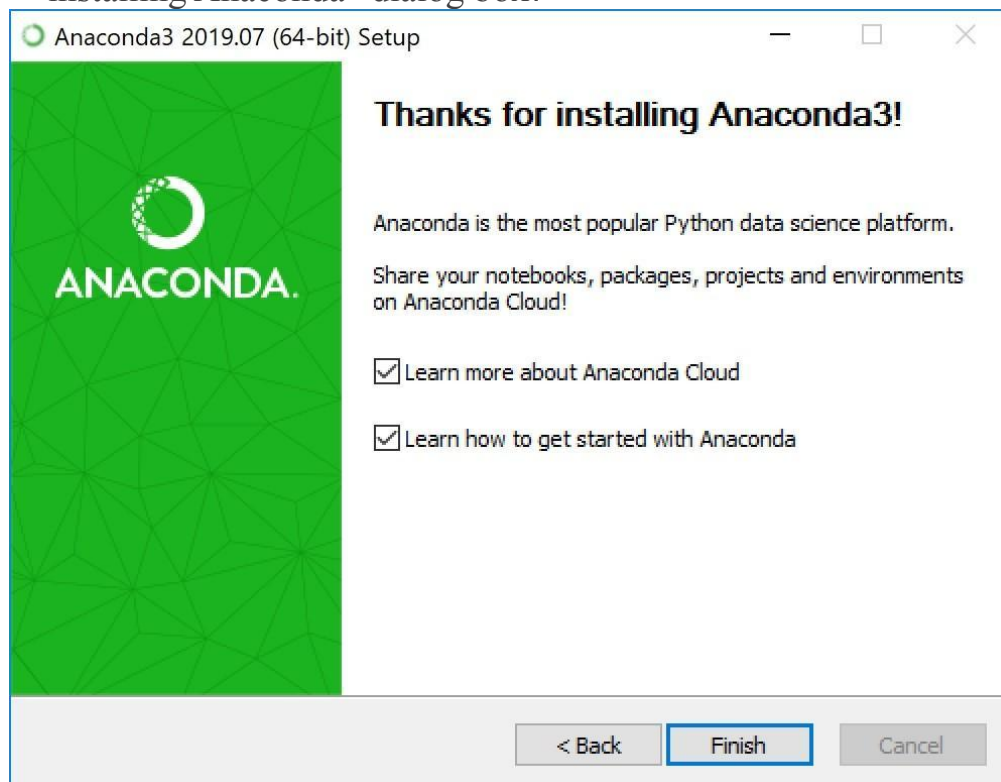


5. Select an install for “Just Me” unless you’re installing for all users (which requires Windows Administrator privileges) and click Next.

At the Advanced Installation Options screen, I recommend that you **do not check** "Add Anaconda to my PATH environment variable"



6. After a successful installation you will see the “Thanks for installing Anaconda” dialog box:



If you wish to read more about Anaconda Cloud and how to get started with Anaconda, check the boxes “Learn more about Anaconda Cloud” and “Learn how to get started with Anaconda”. Click the Finish button.

- Orange 3 App
- RStudio

Verifying your installation

You can confirm that Anaconda is installed and working with Anaconda Navigator or conda.

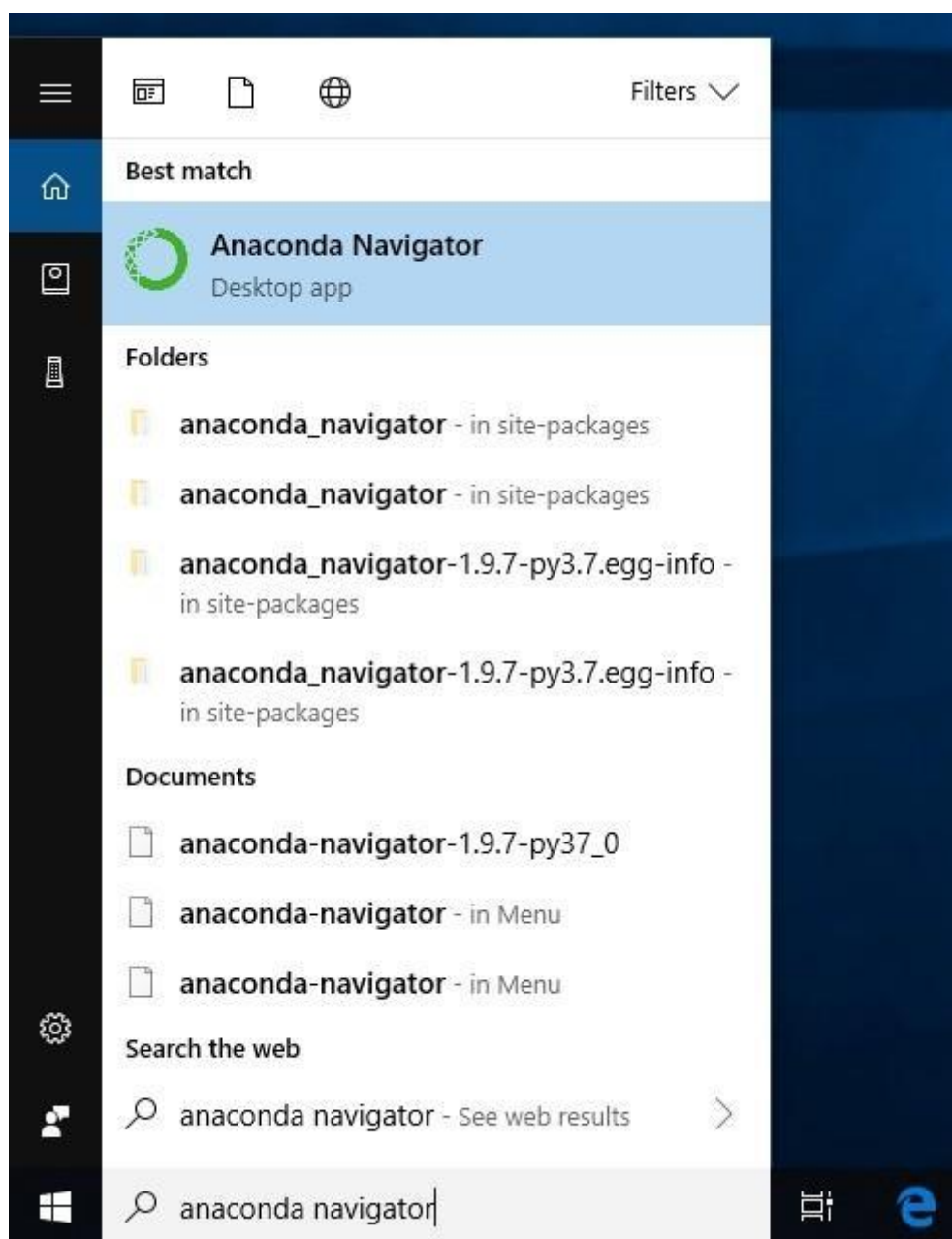
Anaconda Navigator

Anaconda Navigator is a graphical user interface that is automatically installed with Anaconda. Navigator will open if the installation was successful. If Navigator does not open, review our help resources.

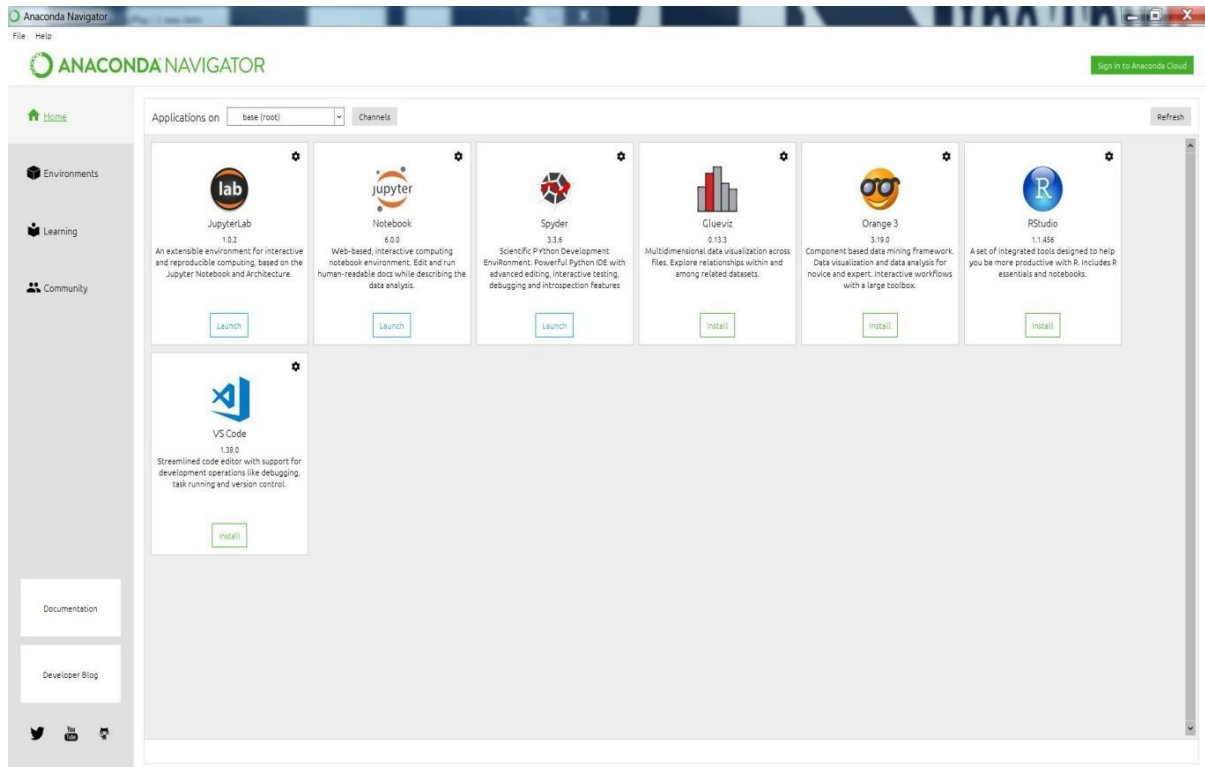
Windows: Click Start, search or select Anaconda Navigator from the menu.

macOS: Click Launchpad, select Anaconda Navigator. Or, use Cmd+Space to open Spotlight Search and type “Navigator” to open the program.

Linux: See next section.



Getting started with Navigator



The following applications are available by default in Navigator:

- JupyterLab
- Jupyter Notebook
- Spyder
- VSCode
- Glueviz

SQLite

SQLite is not directly comparable to client/server SQL database engines such as MySQL, Oracle, PostgreSQL, or SQL Server since SQLite is trying to solve a different problem.

Client/server SQL database engines strive to implement a shared repository of enterprise data. They emphasize scalability, concurrency, centralization, and control. SQLite strives to provide local data storage for individual applications and devices. SQLite emphasizes economy, efficiency, reliability, independence, and simplicity

SQLite3 can be integrated with Python using sqlite3 module, which was written by Gerhard Haring. It provides an SQL interface compliant with the DB-API 2.0 specification described by PEP 249. You do not need to install this module separately because it is shipped by default along with Python version 2.5.x onwards.

To use sqlite3 module, you must first create a connection object that represents the database and then optionally you can create a cursor object, which will help you in executing all the SQL statements.

Python sqlite3 module APIs

Following are important sqlite3 module routines, which can suffice your requirement to work with SQLite database from your Python program. If you are looking for a more sophisticated application, then you can look into Python sqlite3 module's official documentation.

sqlite3.connect(database [,timeout ,other optional arguments])

This API opens a connection to the SQLite database file. You can use `":memory:"` to open a database connection to a database that resides in RAM instead of on disk. If database is opened successfully, it returns a

connection object.

When a database is accessed by multiple connections, and one of the processes modifies the database, the SQLite database is locked until that transaction is committed. The timeout parameter specifies how long the connection should wait for the lock to go away until raising an exception. The default for the timeout parameter is 5.0 (five seconds).

If the given database name does not exist then this call will create the database. You can specify filename with the required path as well if you want to create a database anywhere else except in the current directory.

connection.cursor([cursorClass])

This routine creates a cursor which will be used throughout of your database programming with Python. This method accepts a single optional parameter cursorClass. If supplied, this must be a custom cursor class that extends sqlite3.

connection.close()

This method closes the database connection. Note that this does not automatically call commit(). If you just close your database connection without calling commit() first, your changes will be lost!

Connect To Database

Following Python code shows how to connect to an existing database. If the database does not exist, then it will be created and finally a database object will be returned.

```
#!/usr/bin/pytho
```

```
n import sqlite3
```

```
conn = sqlite3.connect('test.db')
```

```
print "Opened database successfully";
```

Here, you can also supply database name as the special

name :memory: to create a database in RAM. Now, let's run the above program to create our database test.db in the current directory. You can change your path as per your requirement. Keep the above code in sqlite.py file and execute it as shown below. If the database is successfully created, then it will display the following message.

```
$chmod +x sqlite.py
```

```
$/sqlite.py
```

Open database successfully

Python Language

Python is an object-oriented programming language created by Guido Rossum in 1989. It is ideally designed for rapid prototyping of complex applications. It has interfaces to many OS system calls and libraries and is extensible to C or C++. Many large companies use the Python programming language include NASA, Google, YouTube, BitTorrent, etc. Python programming is widely used in Artificial Intelligence, Natural Language Generation, Neural Networks and other advanced fields of Computer Science. Python had deep focus on code readability & this class will teach you python from basics.

Python Programming Characteristics

It provides rich data types and easier to read syntax than any other programming languages

It is a platform independent scripted language with full access to operating system API's

Compared to other programming languages, it allows more run-time

flexibility

It includes the basic text manipulation facilities of Perl and Awk

A module in Python may have one or more classes and free functions

Libraries in Python are cross-platform compatible with Linux, Macintosh, and Windows

For building large applications, Python can be compiled to byte-code

Python supports functional and structured programming as well as OOP

It supports interactive mode that allows interacting Testing and debugging of snippets of code

In Python, since there is no compilation step, editing, debugging and testing is fast.

Applications of Python Programming

Web Applications

You can create scalable Web Apps using frameworks and CMS (Content Management System) that are built on Python. Some of the popular platforms for creating Web Apps are: Django, Flask, Pyramid, Plone, Django CMS. Sites like Mozilla, Reddit, Instagram and PBS are written in Python.

Scientific and Numeric Computing

There are numerous libraries available in Python for scientific and numeric computing. There are libraries like: SciPy and NumPy that are used in general purpose computing. And, there are specific libraries like: EarthPy for earth science, AstroPy for Astronomy and so on. Also, the language is heavily used in machine learning, data mining and deep learning.

Creating software Prototypes

Python is slow compared to compiled languages like C++ and Java. It might not be a good choice if resources are limited and efficiency is a must. However, Python is a great language for creating prototypes. For example: You can use

Pygame (library for creating games) to create your game's prototype first. If you like the prototype, you can use language like C++ to create the actual game.

Good Language to Teach Programming

Python is used by many companies to teach programming to kids and newbies. It is a good language with a lot of features and capabilities. Yet, it's one of the easiest language to learn because of its simple easy-to-use syntax.

About Opencv Package

Python is a general purpose programming language started by Guido van Rossum, which became very popular in short time mainly because of its simplicity and code readability. It enables the programmer to express his ideas in fewer lines of code without reducing any readability.

Compared to other languages like C/C++, Python is slower. But another important feature of Python is that it can be easily extended with C/C++. This feature helps us to write computationally intensive codes in C/C++ and create a Python wrapper for it so that we can use these wrappers as Python modules. This gives us two advantages: first, our code is as fast as original C/C++ code (since it is the actual C++ code working in background) and second, it is very easy to code in Python. This is how OpenCV-Python works, it is a Python wrapper around original C++ implementation.

And the support of Numpy makes the task more easier. Numpy is a highly optimized library for numerical operations. It gives a MATLAB-style syntax. All the OpenCV array structures are converted to-and-from Numpy arrays. So whatever operations you can do in Numpy, you can combine it with OpenCV, which increases number of weapons in your arsenal. Besides that, several other libraries like SciPy, Matplotlib which supports Numpy can be used with this.

So OpenCV-Python is an appropriate tool for fast prototyping of computer vision problems.

Installing Anaconda on Windows

DOWNLOADING AND INSTALLATION STEPS FOR Installing Anaconda on Windows

Follow the steps below to install the Anaconda distribution of Python on Windows.

Steps:

6. Download the Anaconda installer.



Select Windows

Select Windows where the three operating systems are listed.

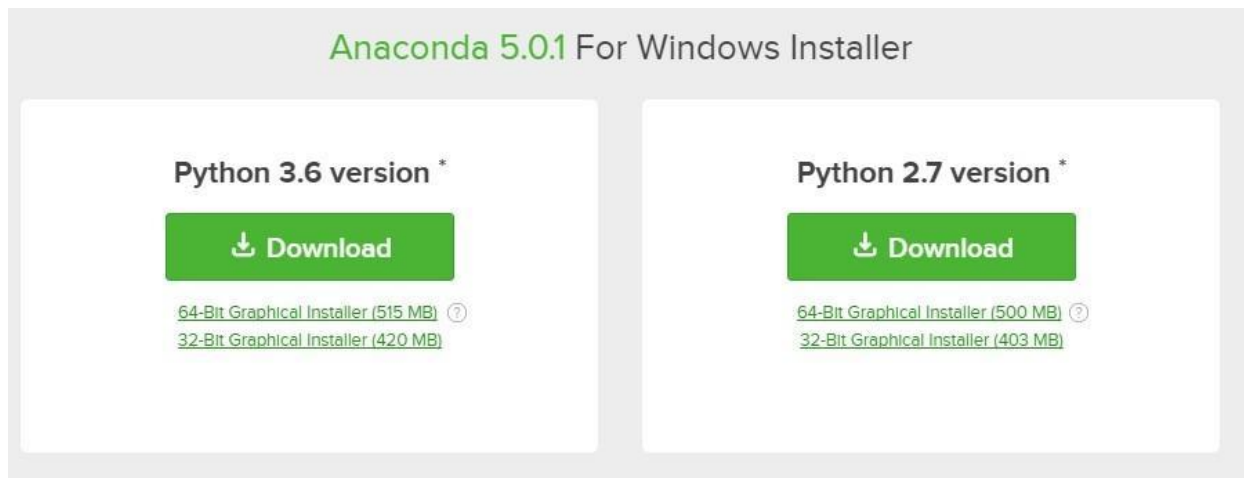


Download

Download the most recent Python 3 release. At the time of writing, the most recent

release was the Python 3.6 Version. Python 2.7 is legacy Python. For problem

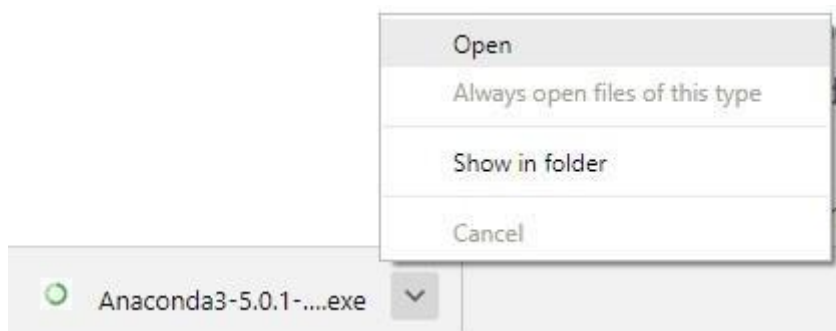
solvers, select the Python 3.6 version. If you are unsure if your computer is running a 64-bit or 32-bit version of Windows, select 64-bit as 64-bit Windows is most common.



7. Double click the installer to launch.

Open and run the installer

Once the download completes, open and run the .exe installer



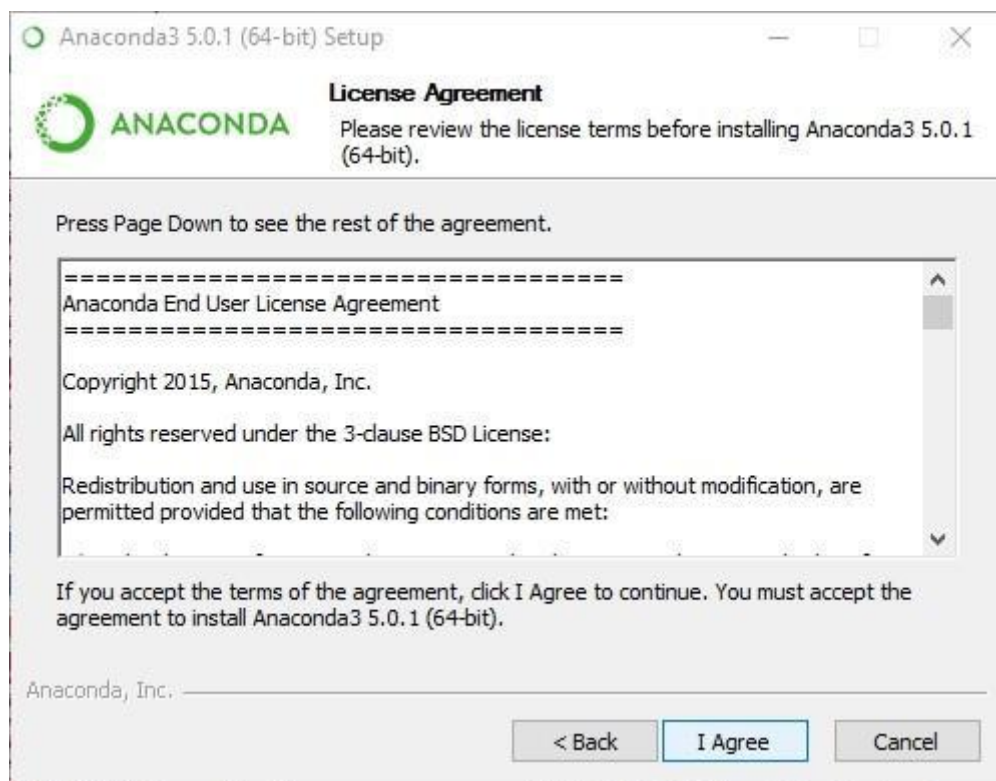
8. Click Next.

At the beginning of the install, you need to click **Next** to confirm the installation.



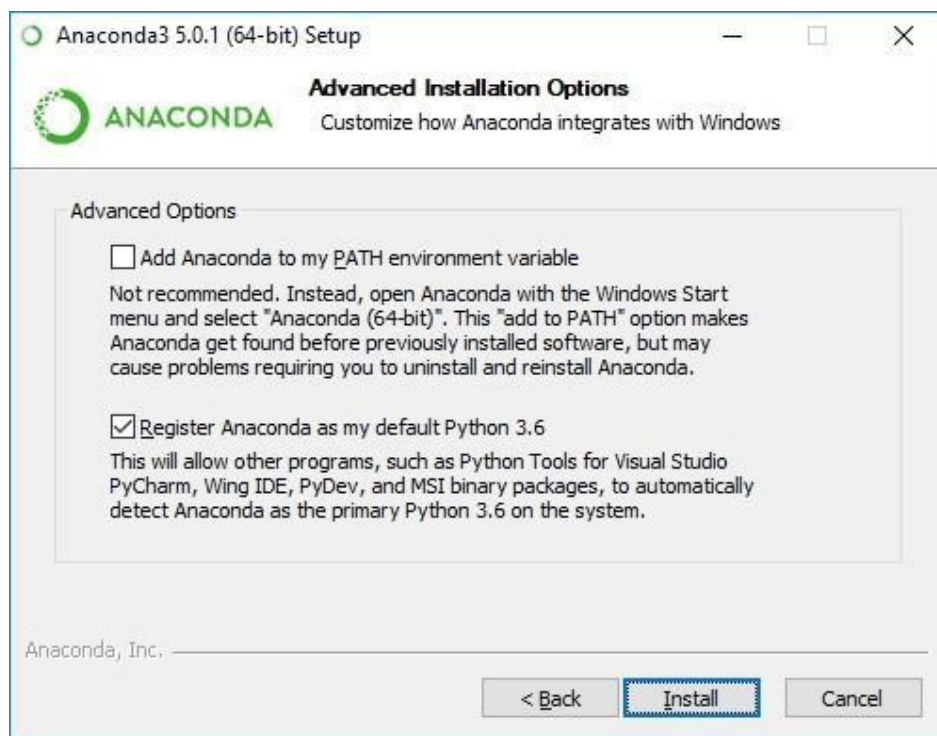
9. Read the licensing terms and click “I Agree”.

Then agree to the license.

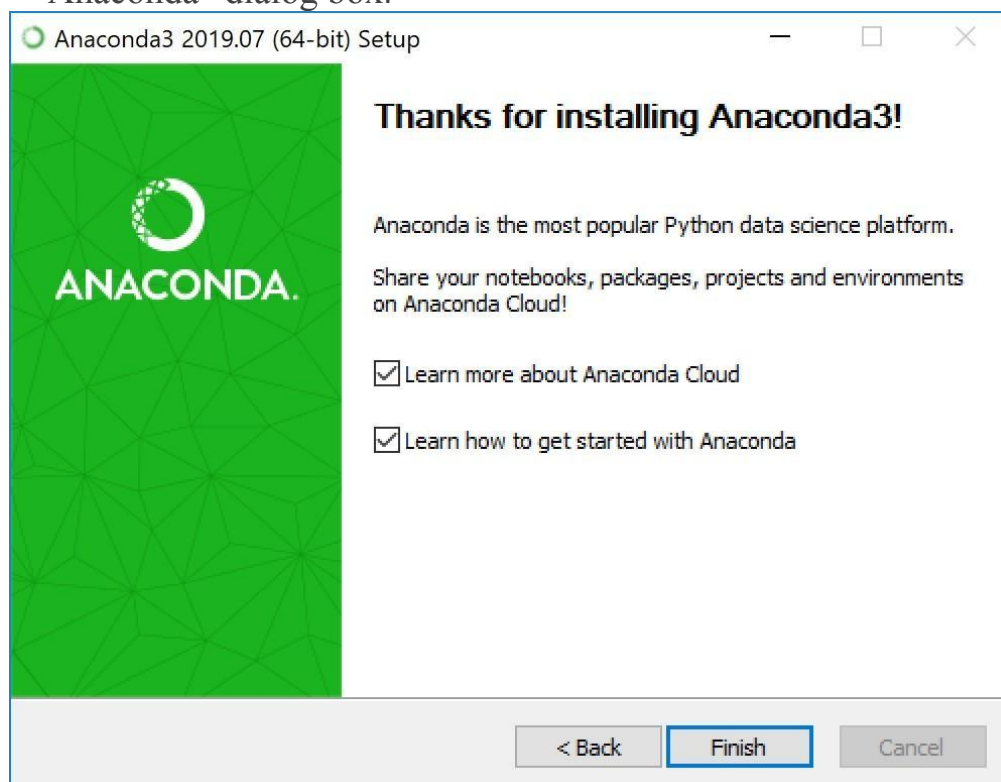


10. Select an install for “Just Me” unless you’re installing for all users (which requires Windows Administrator privileges) and click Next.

At the Advanced Installation Options screen, I recommend that you **do not check** "Add Anaconda to my PATH environment variable"



6. After a successful installation you will see the “Thanks for installing Anaconda” dialog box:



If you wish to read more about Anaconda Cloud and how to get started with Anaconda, check the boxes “Learn more about Anaconda Cloud” and “Learn how to get started with Anaconda”. Click the Finish button.

- Orange 3 App
- RStudio

Verifying your installation

You can confirm that Anaconda is installed and working with Anaconda Navigator or conda.

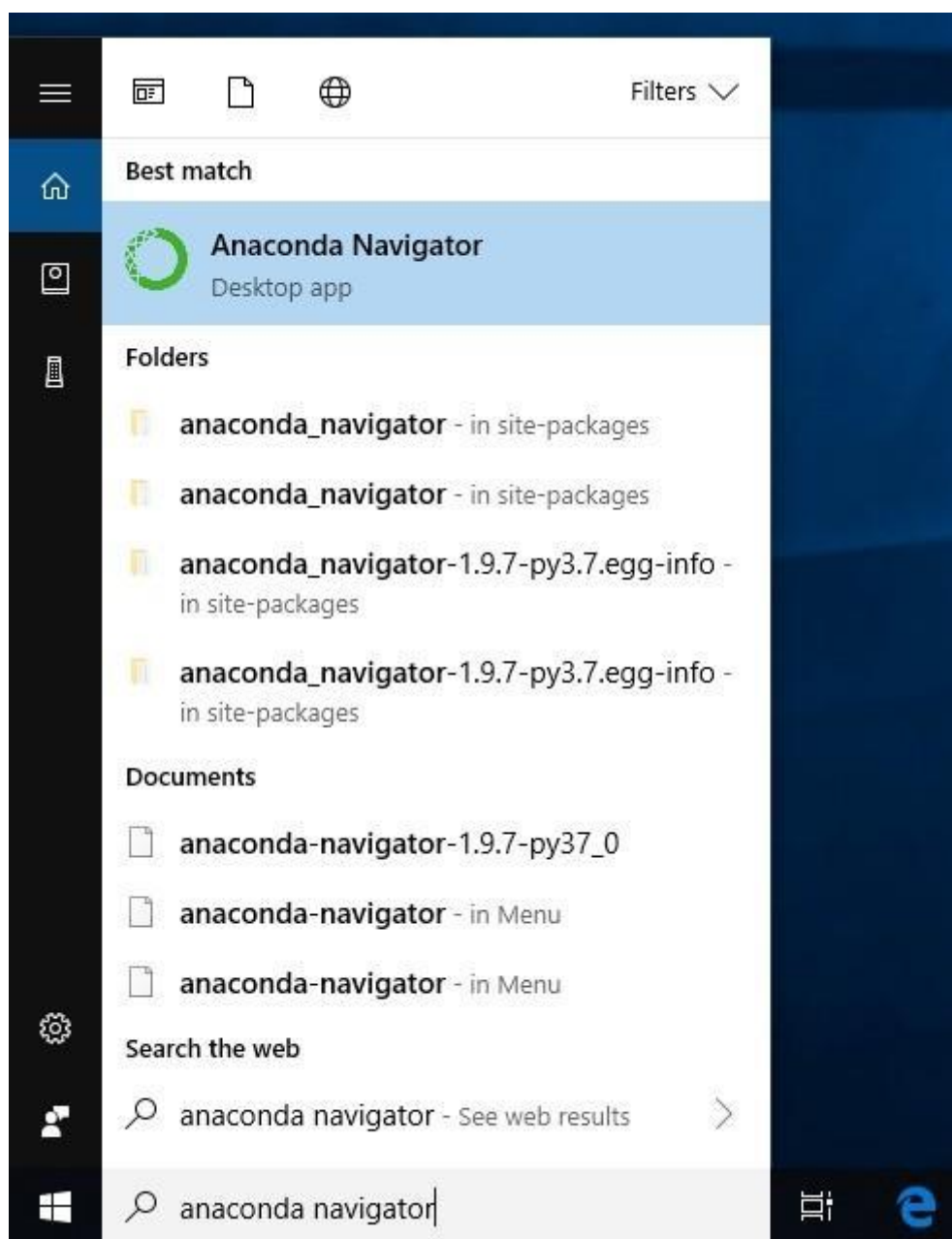
Anaconda Navigator

Anaconda Navigator is a graphical user interface that is automatically installed with Anaconda. Navigator will open if the installation was successful. If Navigator does not open, review our help resources.

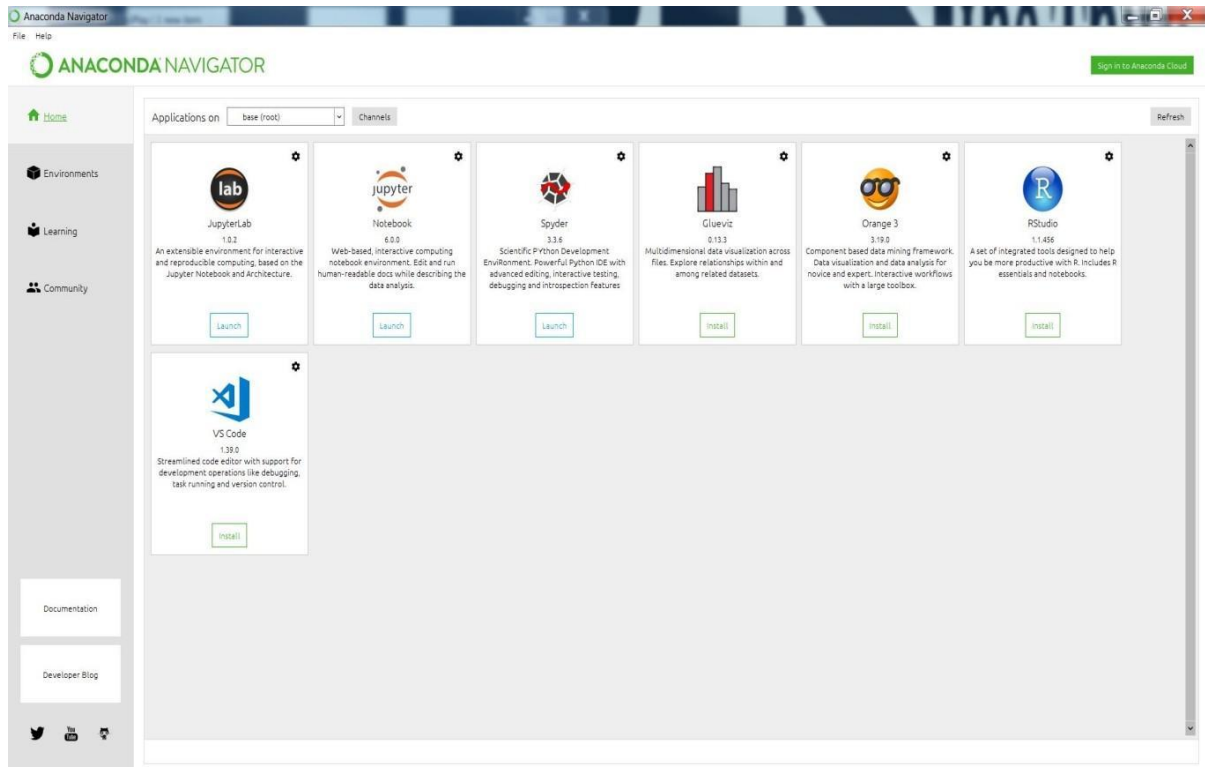
Windows: Click Start, search or select Anaconda Navigator from the menu.

macOS: Click Launchpad, select Anaconda Navigator. Or, use Cmd+Space to open Spotlight Search and type “Navigator” to open the program.

Linux: See next section.



Getting started with Navigator



The following applications are available by default in Navigator:

- JupyterLab
- Jupyter Notebook
- Spyder
- VSCode
- Glueviz

CODING

```
import cv2, sys, numpy, os
haar_file = 'F:\github\opencv-
master\data\haarcascades\haarcascade_frontalface_default.xml'

# All the faces data will be
# present this folder
datasets = 'datasets'

# These are sub data sets of folder,
# for my faces I've used my name you can
# change the label here
sub_data = 'saran'

path = os.path.join(datasets, sub_data)
if not os.path.isdir(path):
    os.mkdir(path)

# defining the size of images
(width, height) = (130, 100)

# '0' is used for my webcam,
# if you've any other
camera # attached use '1'
like this
face_cascade = cv2.CascadeClassifier(haar_file)
webcam = cv2.VideoCapture(0)

# The program loops until it has 30 images of the face.
count = 1
while count < 30:
    (_, im) = webcam.read()
    gray = cv2.cvtColor(im, cv2.COLOR_BGR2GRAY)
    faces = face_cascade.detectMultiScale(gray, 1.3, 4)
    for (x, y, w, h) in faces:
        cv2.rectangle(im, (x, y), (x + w, y + h), (255, 0, 0), 2)
        face = gray[y:y + h, x:x + w]
        face_resize = cv2.resize(face, (width, height))
        cv2.imwrite('%s/%s.png' % (path, count), face_resize)
    count += 1

cv2.imshow('OpenCV', im)
key = cv2.waitKey(10)
```

```
if key == 27:  
    break
```

```
webcam.release()
```

```

cv2.destroyAllWindows()

import cv2, sys, numpy, os
size = 4
haar_file = 'F:\github\opencv-
master\data\haarcascades\haarcascade_frontalface_default.xml'
datasets = 'datasets'

# Part 1: Create fisherRecognizer
print('Recognizing Face Please Be in sufficient Lights...')

# Create a list of images and a list of corresponding names
(images, lables, names, id) = ([], [], {}, 0)
for (subdirs, dirs, files) in os.walk(datasets):
    for subdir in dirs:
        names[id] = subdir
        subjectpath = os.path.join(datasets, subdir)
        for filename in os.listdir(subjectpath):
            path = subjectpath + '/' + filename
            lable = id
            images.append(cv2.imread(path, 0))
            lables.append(int(lable))
        id += 1
(width, height) = (130, 100)

# Create a Numpy array from the two lists above
(images, lables) = [numpy.array(lis) for lis in [images, lables]]

# OpenCV trains a model from the images
# NOTE FOR OpenCV2: remove '.face'
model = cv2.face.LBPHFaceRecognizer_create()
model.train(images, lables)

# Part 2: Use fisherRecognizer on camera stream
face_cascade = cv2.CascadeClassifier(haar_file)
webcam = cv2.VideoCapture(0)
while True:
    (_, im) = webcam.read()
    gray = cv2.cvtColor(im, cv2.COLOR_BGR2GRAY)
    faces = face_cascade.detectMultiScale(gray, 1.3, 5)
    for (x, y, w, h) in faces:
        cv2.rectangle(im, (x, y), (x + w, y + h), (255, 0, 0), 2)
        face = gray[y:y + h, x:x + w]
        face_resize = cv2.resize(face, (width, height))
        # Try to recognize the face
        prediction = model.predict(face_resize)

```

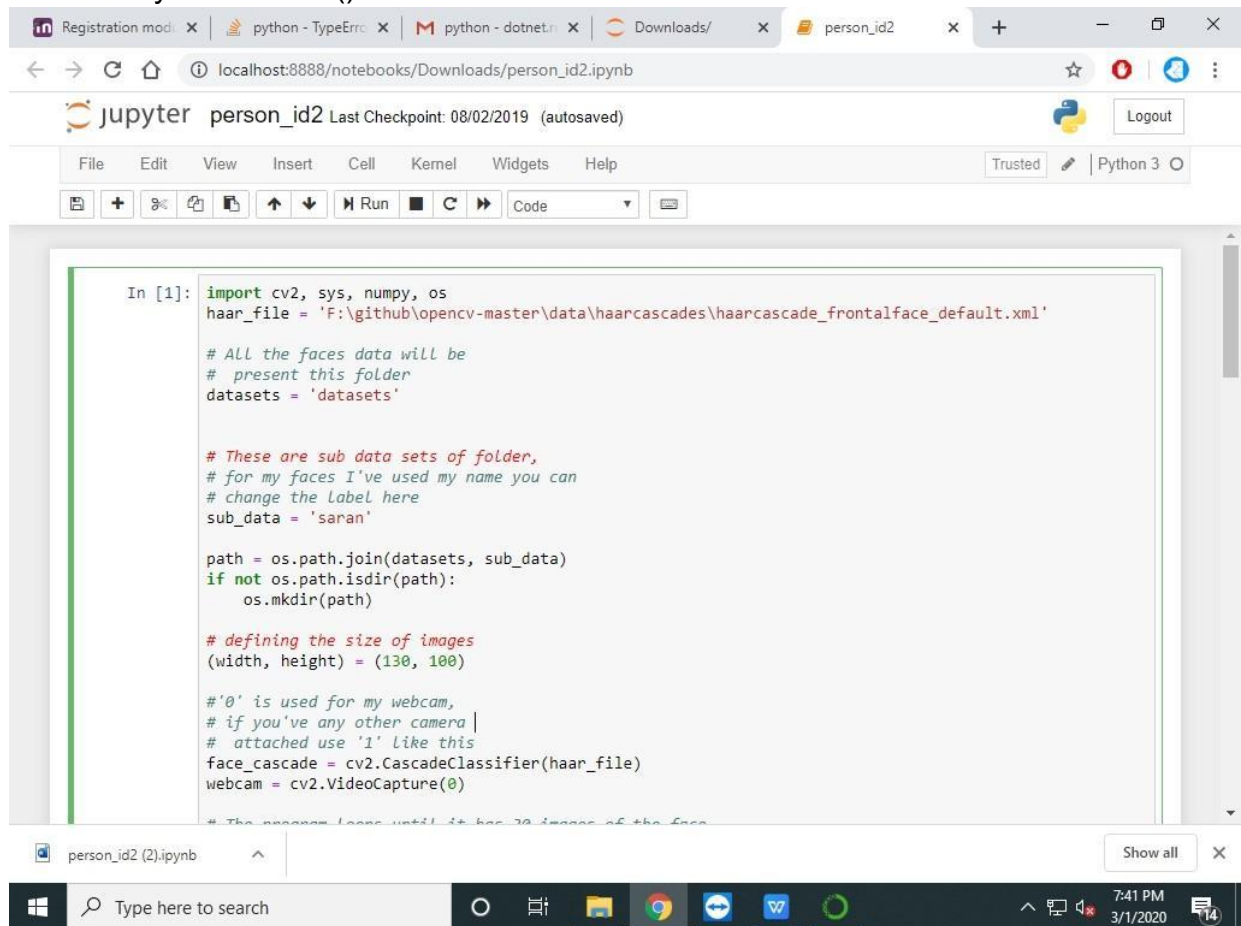
```
cv2.rectangle(im, (x, y), (x + w, y + h), (0, 255, 0), 3)
```

```

if prediction[1]<500:

    cv2.putText(im, '% s - %.0f %'
(names[prediction[0]], prediction[1]), (x-10, y-10),
cv2.FONT_HERSHEY_PLAIN, 1, (0, 255, 0))
    else:
        cv2.putText(im, 'not recognized',
(x-10, y-10), cv2.FONT_HERSHEY_PLAIN, 1, (0, 255, 0))
        cv2.imshow('OpenCV', im)
        key = cv2.waitKey(10)
        if key == 27:
            break
webcam.release()
cv2.destroyAllWindows()

```



Registration mod... x python - TypeErr... x python - dotnet... x Downloads/ x person_id2 x + -

localhost:8888/notebooks/Downloads/person_id2.ipynb

jupyter person_id2 Last Checkpoint: 08/02/2019 (autosaved) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

```
webcam.release()
cv2.destroyAllWindows()

In [1]: import cv2, sys, numpy, os
size = 4
haar_file = 'F:\github\opencv-master\data\haarcascades\haarcascade_frontalface_default.xml'
datasets = 'datasets'

# Part 1: Create fisherRecognizer
print('Recognizing Face Please Be in sufficient Lights...')

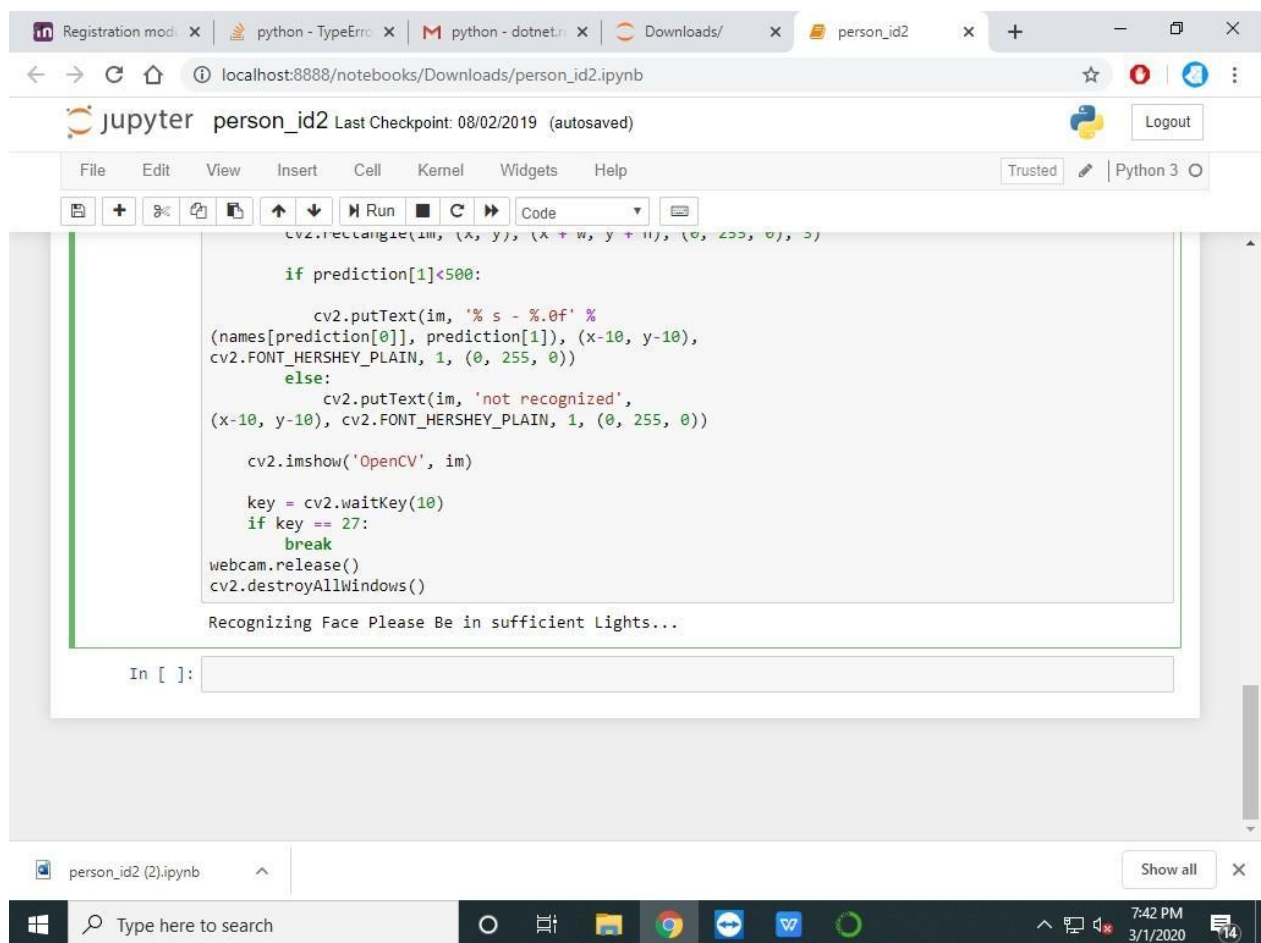
# Create a list of images and a list of corresponding names
(images, labes, names, id) = ([], [], {}, 0)
for (subdirs, dirs, files) in os.walk(datasets):
    for subdir in dirs:
        names[id] = subdir
        subjectpath = os.path.join(datasets, subdir)
        for filename in os.listdir(subjectpath):
            path = subjectpath + '/' + filename
            lable = id
            images.append(cv2.imread(path, 0))
            labes.append(int(lable))
            id += 1
(width, height) = (130, 100)

# Create a Numpy array from the two lists above
(images, labes) = [numpy.array(lis) for lis in [images, labes]]

# OpenCV trains a model from the images
```

person_id2 (2).ipynb Show all

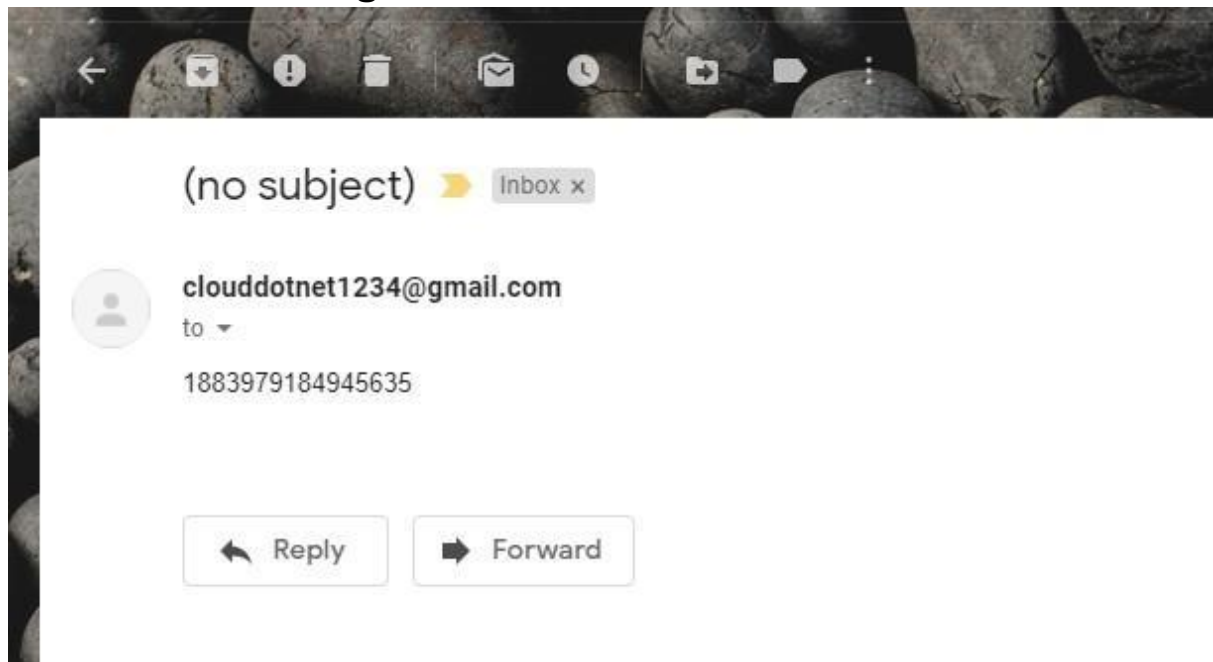
Type here to search 7:41 PM 3/1/2020



Registration:

```
Enter your name: gopal
Enter password123
Enter your Email Address: saransamy64@gmail.com
Enter your phone No: 9092098115
Set your pin...
Enter your PIN: 2902
Register successfully and here is your AccNO: 3049974284009242
```

Email Acknowledgement



Login and transaction using pin

```
Enter user name: ani
Enter password: 321
Enter account No: 5514028674478257
('ani', '321', 'dotnet.retech@gmail.com', '896574258', '5514028674478257', '1000', '4444')
would you like to transact the money: y
enter account no: 5514028674478257
enter account no: 640
enter receipient name: tharik
Enter amount: 200
would you like to proceed with authentication via (face or pin): pin
confirm your PIN: 4444
Transaction Done!
```

In []:

Transaction using face Authentication

```
Enter user name: shahana
Enter password: 123
Enter account No: 1883979184945635
('shahana', '123', 'saransamy85@gmail.com', '9092098115', '1883979184945635', '1000', '2902')
would you like to transact the money: y
enter account no: 1883979184945635
enter account no: 3049974284009242
enter receipt name: gopal
Enter amount: 750
would you like to proceed with authentication via (face or pin): face
Recognizing Face Please Be in sufficient Lights...
transaction done!

your current Balance: ('1000',)
```

TESTING

SOFTWARE TESTING

General

In a generalized way, we can say that the system testing is a type of testing in which the main aim is to make sure that system performs efficiently and seamlessly. The process of testing is applied to a program with the main aim to discover an unprecedented error, an error which otherwise could have damaged the future of the software. Test cases which brings up a high possibility of discovering an error is considered successful. This successful test helps to answer the still unknown errors.

TEST CASE

Testing, as already explained earlier, is the process of discovering all possible weak-points in the finalized software product. Testing helps to counter the working of sub-assemblies, components, assembly and the complete result. The software is taken through different exercises with the main aim of making sure that software meets the business requirement and user-expectations and doesn't fail abruptly. Several types of tests are used today. Each test type addresses a specific testing requirement.

Testing Techniques

A test p

lan is a document which describes approach, its scope, its resources and the schedule of aimed testing exercises. It helps to identify almost other test item, the features which are to be tested, its tasks, how will everyone do each task,

how much the tester is independent, the environment in which the test is taking

place, its technique of design plus the both the end criteria which is used, also rational of choice of theirs, and whatever kind of risk which requires emergency planning. It can be also referred to as the record of the process of test planning. Test plans are usually prepared with signification input from test engineers.

(I) UNIT TESTING

In unit testing, the design of the test cases is involved that helps in the validation of the internal program logic. The validation of all the decision branches and internal code takes place. After the individual unit is completed it takes place. Plus it is taken into account after the individual unit is completed before integration. The unit test thus performs the basic level test at its component stage and test the particular business process, system configurations etc. The unit test ensures that the particular unique path of the process gets performed precisely to the documented specifications and contains clearly defined inputs with the results which are expected.

(II) INTEGRATION TESTING

These tests are designed to test the integrated software items to determine whether if they really execute as a single program or application. The testing is event driven and thus is concerned with the basic outcome of field. The Integration tests demonstrate that the components were individually satisfaction, as already represented by successful unit testing, the components are apt and fine. This type of testing is specially aimed to expose the issues that come-up by the components combination.

(III) FUNCTIONAL TESTING

The functional tests help in providing the systematic representation that

functions tested are available and specified by technical requirement, documentation of the system and the user manual.

(IV) SYSTEM TESTING

System testing, as the name suggests, is the type of testing in which ensure that the software system meet the business requirements and aim. Testing of the configuration is taken place here to ensure predictable result and thus analysis of it. System testing is relied on the description of process and its flow, stressing on pre driven process and the points of integration.

(V) WHITE BOX TESTING

The white box testing is the type of testing in which the internal components of the system software is open and can be processed by the tester. It is therefore a complex type of testing process. All the data structure, components etc. are tested by the tester himself to find out a possible bug or error. It is used in situation in which the black box is incapable of finding out a bug. It is a complex type of testing which takes more time to get applied.

(VI) BLACK BOX TESTING

The black box testing is the type of testing in which the internal components of the software is hidden and only the input and output of the system is the key for the tester to find out a bug. It is therefore a simple type of testing. A programmer with basic knowledge can also process this type of testing. It is less time consuming as compared to the white box testing. It is very successful for software which are less complex are straight-forward in nature. It is also less costly than white box testing.

(V) ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

RESULTS AND DISCUSSION

In this study, we introduced a facial recognition system to provide a secured and reliable bank transaction. The introduction of the deep for facial authentication had proven to be effective in maximizing security level when performing banking transactions. It is expected that the security level of mobile banking to increase with the employment networks for face authentication.

CONCLUSION AND FUTURE WORK

Realized a reliable, real-time face recognition system on machine learning. According to the new technical era, some advancement has taken place and some techniques of facial recognition have achieved popularity. We are using Haar cascade algorithm for face recognition .Capture module deals with the configuration of video interface and performs the real-time video capture. Face Detection module analyses each captured frame and extracts valid faces from each frame. Face Identification deals with face recognition and verification of the detected face.In Future any fraudulent access by the fake user is eliminated with the help of radio frequency identification card

REFERENCES

1. Facial-Recognition Payment: An Example of Chinese Consumers, Wen Kun Zhang ; Min Jung Kang, IEEE Access, Year: 2019
2. Secure multifactor authentication payment system using NFC, Anirudhan Adukkathayar ; Gokul S Krishnan ; Rajashree Chinchole, 2015 10th International Conference on Computer Science & Education (ICCSE)\
3. Biometric Face Recognition Payment System , Surekha. R. Gondkar Saurab. Dr. C. S. Mala International Journal of Engineering Research & Technology NCESC - 2018 Conference Proceedings
4. Facial Recognition in Banking – Current Applications, Niccolo Mejia,2019 Conference Proceedings
5. "Face Detection and Recognition for Bank Transaction ", International Journal of Emerging Technologies and Innovative Research , Sudarshan Dumbre ,Shamita Kulkarni ,Devashree Deshpande ,P.V.Mulmule Journal of Emerging Technologies and Innovative Research 2018
6. Continuous User Identity Verification Using Biometric Traits for Secure Internet Services, Dr.SHAIK ADBUL MUZZER, 2GOSALA SUBHASIN 7.Skin color based Face detection Method, Devendra Singh Raghuvanshi,Dheeraj Agrawal
- 8.Face Detection system based on retinal connected neural network (RCNN), Rowley, Baluja and Kanade
- 9.Combining Skin Color based Classifiers and HAAR Feature using VJ Algorithm, N.Gobinathan, Abinaya and Geetha. P

10.Face Detection and Recognition for Bank Transaction, Sudarshan Dumbre¹ , Shamita Kulkarni² , Devashree Deshpande³ , Prof P.V.Mulmule⁴

