A major Project Final Report on

ATTENDANCE MONITORING WITH FACE RECOGNITION

Submitted in Partial Fulfillment of the Requirements for

The Degree of **BACHELOR OF ENGINEERING IN INFORMATION TECHNOLOGY**

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Submitted by:

Amrit Bhusal, 15488
Rudra Nepal, 15474
Lal Sharan Chalaune, 15463
Bikash Thapa Magar, 15458

Under the supervision of

Dr. Roshan Koju

Date:
22/Nov/2019

Department of Information Technology

NEPAL COLLEGE OF INFORMATION TECHNOLOGY

Balkumari, Lalitpur, Nepal

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ABSTRACT

The purpose of the project ATTENDANCE MONITORING WITH FACE RECOGNITION is to build a face recognition-based attendance monitoring system for institution like school/college to upgrade and enhance the current attendance system into more efficient and effective as compared to before. As different person has different face we can use the face to distinguish the identity of person. By using face recognition we can identify person by using his/her personal characteristics. There are different method to recognize face for our project we use a method called Histogram of Oriented Gradients (HOG for short). The software requirement for the project is python. Project will consists of two module teacher site and admin site. From the admin site the admin will record the information of faculty and student and create training set of student. Teacher can login the system to take the attendance of the student and even can view the total attendance of student. The project will use the flask as the server and use the MySQL as database. This project will thus overcome the flaws existed in the current and automate the manual task of taking attendance which is much time consuming.

Keyword: HOG, python, MySQL, flask, database

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List of Abbreviation

HOG: Histogram of oriented gradients

SVM: Support Vector Machine

EHD: Edge Histogram Descriptor

SRS: System Requirement Specifications

1. INTRODUCTION

This project deals with monitoring the attendance based on the face recognition. In this section, problem and motivation, objectives, project scope and limitation will be described in detail.

1.1 PROBLEM STATEMENT

In the early or previous attendance system the data collected about attendance is the major issue. This is mainly because as the attendance is not marked originally by the same person in other word the attendance can be some time marked by the third party. Example if some student does not want to attend the class but his/her friend help those students to mark the attendance which violate the accuracy of data .The second issue of early existing system is that it is much time consuming. And the third issue of early system is the accessibility of information to the authorized person. Example some parent want to track their children attendance regularity but there is no such provision in the existing system.

In computer vision recognizing faces is a challenging problem. The problem like illumination problem low quality image acquisition are the some of the issue so the project aims to design and implement system which will be less sensitive to illumination.

1.2 OBJECTIVE

To solve the drawbacks of the previous system stated in problem statement section 1.1, the system (project) needed and important to evolve. To secure the data accuracy of attendance based on face recognition we acquire there is need of the new system. The followings are the objectives of this project:

1. To create a Smart Attendance System with face recognition which is handy and easy to use.
2. To recognize the face of an individual accurately based on the face database.
3. Allow the attendance access to the individual parents.

1.3 PROJECT SCOPE AND LIMITATION

In the project attendance monitoring with face recognition, system will be developed that identify the person and the attendance of the identified person will be stored in the database.

The scope of the project are:

1. The person that are targeted by the purposed system are the student and faculty of school/college.
2. By modifying some features the purposed system can be used in any governmental and private organization to mark the attendance of employee.

The limitation of project are:

1. Only one person facial recognition can be done at a time.
2. This project must works under a Wi-Fi coverage area, as the database of the attendance system is needed to update constantly.
3. The image quality for the training affect the facial recognition process.

1.4. SIGNIFICATION OF STUDY

- **Face Identification:**

Face recognition systems identify people by their face images. Face recognition systems establish the presence of an authorized person rather than just checking whether a valid identification (ID) or key is being used or whether the user knows the secret personal identification numbers (Pins) or passwords.

- **Access Control:**

In many of the access control applications, such as office access or computer logon, the size of the group of people that need to be recognized is relatively small. The face pictures are also caught under natural conditions, such as frontal faces and indoor illumination. The face recognition system of this application can achieve high accuracy without much co-operation from user.

- **Image database investigations**:

Searching image databases of licensed drivers, benefit recipients, missing children, immigrants and police bookings.

- **General identity verification:**

Face recognition systems establish the presence of an authorized person rather than just checking whether a valid identification (ID) or key is being used or whether the user knows the secret personal identification numbers (Pins) or passwords.

- **Surveillance:**

Like security applications in public places, surveillance by face recognition systems has a low user satisfaction level, if not lower. Free lighting conditions, face orientations and other divisors all make the deployment of face recognition systems for large scale surveillance a challenging task.

2. LITERATURE REVIEW

In the section the similar project that is developed by others that is used to automate the attendance system is reviewed. There are many project done to automate the attendance and some them are discussed below:

1. ATTENDANCE SYSTEM USING NFC:

The first one we reviewed is Attendance system using NFC (Near field communication) technology. According to this system student is given a NFC tag that has unique Id which is provided by the college during the enrollment of student into the college. By moving or touching the NFC tag on the lecture mobile phone attendance of each student will be taken. Then after for validation and verification of data of the student the phone camera capture the image and send it to the college server. The main drawback of the system is that the NFC tag may not be personally tagged by the authorized person. So the unique information of the student like face recognition and biometric needed to be evolved for attendance [1].

PROS

- Simplify the attendance process as mark attendance by moving the tag on teacher or lecture phone.

CONS

- The NFC tag may not be personally tagged by the authorized person.
- So there must be other method to be sure the person is himself.

2. FINGERPRINT BASED ATTENDANCE SYSTEM:

Secondly we reviewed Fingerprint based attendance system which uses finger print to mark the attendance. The pattern of the finger print is obtained through finger print sensor then the result is compared with the stored database which is taken earlier for each person and attendance is marked by comparing the result. However in this project for parents who want to get the information of their children attendance are not provided the access to the information. But in

our proposed solution the information of student attendance is provided access to the parents as well [2].

PROS

- Attendance through finger print obtained through sensor
- Different person have unique finger print pattern.

CONS

- Parents are not allowed to excess the information.

3. FACE RECOGNITION FACED ATTENDANCE SYSTEM NEXT 2019:

Thirdly the face recognition based attendance system. This system uses a camera to capture the image of the student and recognize them. In this system only the original owner can mark the attendance. Similar project was done by us in the NEXT 2019 however the algorithm used in that system cannot recognize the person posing different position also there was not any module for the admin and teacher and was desktop based application but in purposed system we will use the algorithm that can recognize the person more reliably, the project will be web based with admin and teacher site, the admin trains the data from image and the attendance will be marked from the teacher site.

PROS

- Mark the attendance by recognizing the face.
- More reliable than other method of attendance taking process.

CONS OF THE PROJECT COMPARED TO PROPOSED SOLUTION:

- There was not any module for the admin and teacher and was desktop based application but in purposed system we will use the algorithm that can recognize the person more reliably.
- The Proposed project is web based with admin and teacher site, the admin trains the data from image and the attendance will be marked from the teacher site.

3. METHODOLOGY

We have planned to work following these methodologies for the application of knowledge, skills and technique to broad range of activities in order to meet the requirement of our project.

3.1. SOFTWARE DEVELOPMENT LIFECYCLE

The framework we will be using for developing this project is iterative model of software development life cycle. In this model, a simple and primitive implementation of very small set of software requirement is done at first, which is followed by the iterative enhancement in the primitive model until all requirements are fulfilled and the software is ready for deployed. The following sub section briefly describe various phase in iterative model of SDLC that was applied in the development of system.

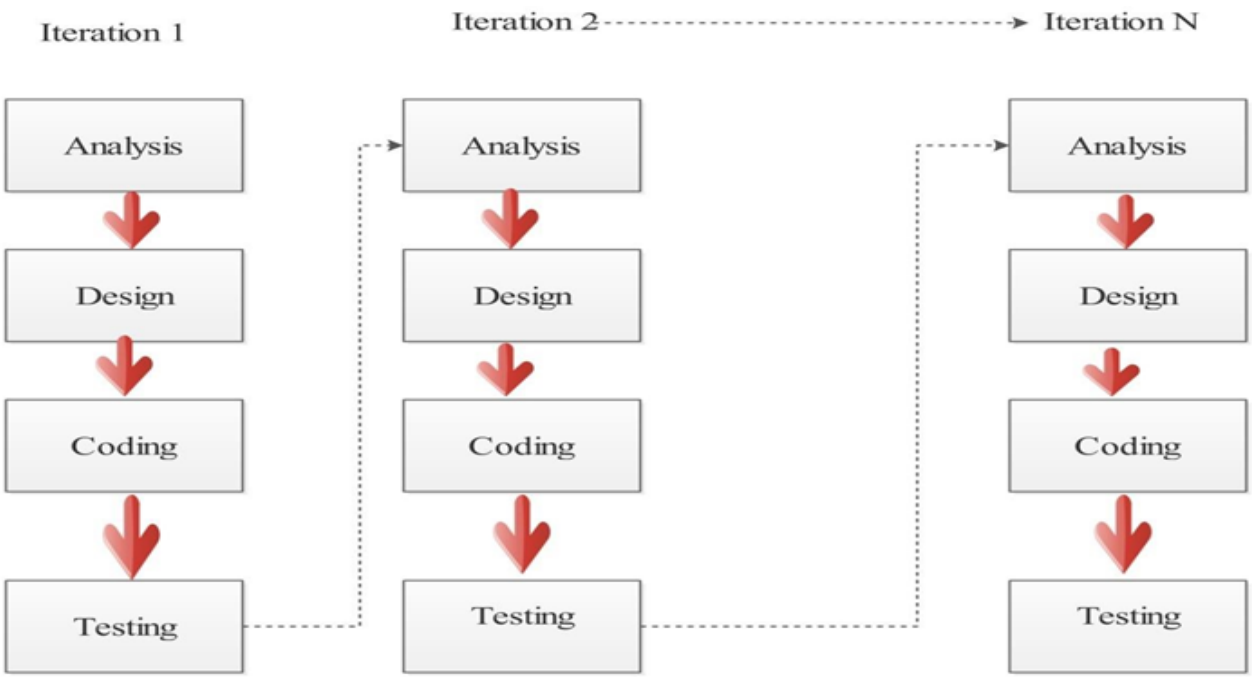

Figure 1: Iterative model of software development life cycle

3.1.1. REQUIREMENT ANALYSIS:

In this phase, analysis will be performed in order to find out the requirements of the system. The outcome of this phase would be a SRS which is an acronym for “system requirement specifications”

3.1.2. DESIGN PHASE:

In this phase the SRS would be translated into the system design. Context diagram DFD ED diagram, use case diagram, sequence diagram and class diagram will be developed.

3.1.3. CODING PHASE:

In this phase coding will be done according for the design and a working system will be developed by the end of the process.

3.1.4. TESTING PHASE:

In this phase the system will be tested with each testing list of changes to the system developed, is suggested and the change will be applied to the software and the software would be delivered as a successive increment until a satisfying system is achieved.

3.2. MANAGING INCREMENTS

Each stage of incremental model adds some functionality to the product and passes it on to the next stage. The first increment (generally known as a core product) was used for a detailed evaluation. This process resulted in creation of a plan for the next increment. The iteration process, which includes the delivery of the increments to the user, continues until the software is completely developed, i.e. iteratively enhance the requirements until the final software is implemented. Our project which implements the Incremental Model, comprises of three increments which are discussed as below:

- First iteration: In this phase we focused on analysis and design of our system with the help of the objectives of our project. This helped us to figure out every aspects of the project and

take them into consideration. We developed an initial project plan to help us in our future increments. The system architecture which is an essential part was developed during this initial iteration.

- Second iteration: In this phase we worked on face recognition part. The user interface which is essential for the project was also developed in this phase. For this we used sklearn, scipy, numpy, dlib,pillow.
- Third iteration: This is the stage of system deployment. In the third iteration we made a system that had the additional features that could facilitate the teacher to mark the attendance by recognizing the face was developed also the teacher site to view the attendance of the student interface was developed in this part.

Advantages of incremental model

• Generates working software quickly and early during the software life cycle.

• This model is more flexible less costly to change scope and requirements

• It is easier to test and debug during a smaller iteration.

• In this model customer can respond to each built.

• Easier to manage risk because risky pieces are identified and handled during iteration.

3.3. SOFTWARE SPECIFICATION

HTML:

It is the standard markup language used to create web Pages.HTML is written in the form of HTML elements consisting of tags enclosed in angle brackets (e.g. <html>). HTML tags most commonly come in pairs like <h1> and </h1>.

CASCADING STYLE SHEETS (CSS):

It is a style sheet language used for describing the look and formatting of a document written in a markup language .While most often used to style web pages and interfaces written in HTML the

Language can be applied to any kind of XML document. CSS is a cornerstone specification of the web and almost all web pages use CSS style sheets to describe their presentation

MYSQL:

MySQL is developed, distributed, and supported by Oracle Corporation. MySQL is a database system used on the web it runs on a server. MySQL is ideal for both small and large applications. It is very fast, reliable, and easy to use. It supports standard SQL. MySQL can be compiled on a number of platforms. The data in MySQL is stored in tables. A table is a collection of related data, and it consists of columns and rows. Databases are useful when storing information categorically.

PYTHON:

One of the main reasons of using the python language for our project is that it is easier language for machine learning as in python testing and debugging process is easier. Python syntax allows programmer to express concept in fewer line of code as compared to other language.

FLASK:

Web server will be created using flask. So flask provides a way to send command from webpage to server over the internet. Flask is a micro framework for python which allows us to run the python script through the webpage.

3.4. TOOLS TO BE USED

The tools used for documentation, designing and developing UI/UX, testing are listed below in table:

Table 1: Tools to be used

TOOLS	**PURPOSE**
Pycharm, Edraw Max	IDE for python. Edraw for design diagram.

Scipy, numpy, sklearn,dlib	For face recognition part of the project
Mysql workbench	For database

3.5. SYSTEM REQUIREMENT ANALYAIS

Requirement analysis, in software engineering encompasses those tasks that go into determining the need and conditions to meet for a new or altered product, taking account of possibly conflicting requirements of the various stakeholders, such as beneficiaries and users. It is the early stage activity of requirement engineering which encompasses all activities concerned with eliciting, analyzing, documenting, validating and managing system requirements.

SYSTEM REQUIREMENT SPECIFICATION

FUNCTIONAL REQUIREMENTS:

- Data entry method
  - Direct entry using keyboard.
  - All the teachers' details and the student data to create training model is entered through the keyword.
- Output to user
  - The method of displaying record to the user is simply by the browser.
- Interface required
  - Data entry window
  - Data editing window
  - Information viewing window
  - Window to capture the image

INPUT REQUIREMENTS:

- The input requirements are:
  - Student details to create training model
  - Teachers details
  - Administrator details

DATA STRUCTURE DESIGN

The descriptions of each data to be used in the system are as following:

DATA TYPE	SIZE
varchar(n)	variable length with limit
integer	4 bytes
Date and time	Standard

- Output requirements
    - The output requirement of the project is to enter the image of the person and if it is recognized than it have to mark the attendance of that person.

4. SYSTEM DESIGN AND ARCHITECTURE

4.1. SYSTEM DESIGN

System design is sequence of steps that enables the designer to describe all aspects of the Software to be built. We have made attempt to make sure that the system design conforms the user requirements of the system. For this we have frequently looked upon: Verification of input and output format makes sure that the user requirements are met make sure security requirement are met.

4.1.1. USE CASE DIAGRAM

It is a Diagram that describes the sequence of event of actor using a system to complete the process. The essence is discovering and recording functional requirements by writing stories of using a system to help fulfill various Stakeholder goals. Use case is narrative description of domain processes. A use case diagram shows a set of use cases and actors and their relationships.

Use case diagrams are especially important in organizing and modeling the behaviors of a system. Describes what a system does from the standpoint of an external observer.

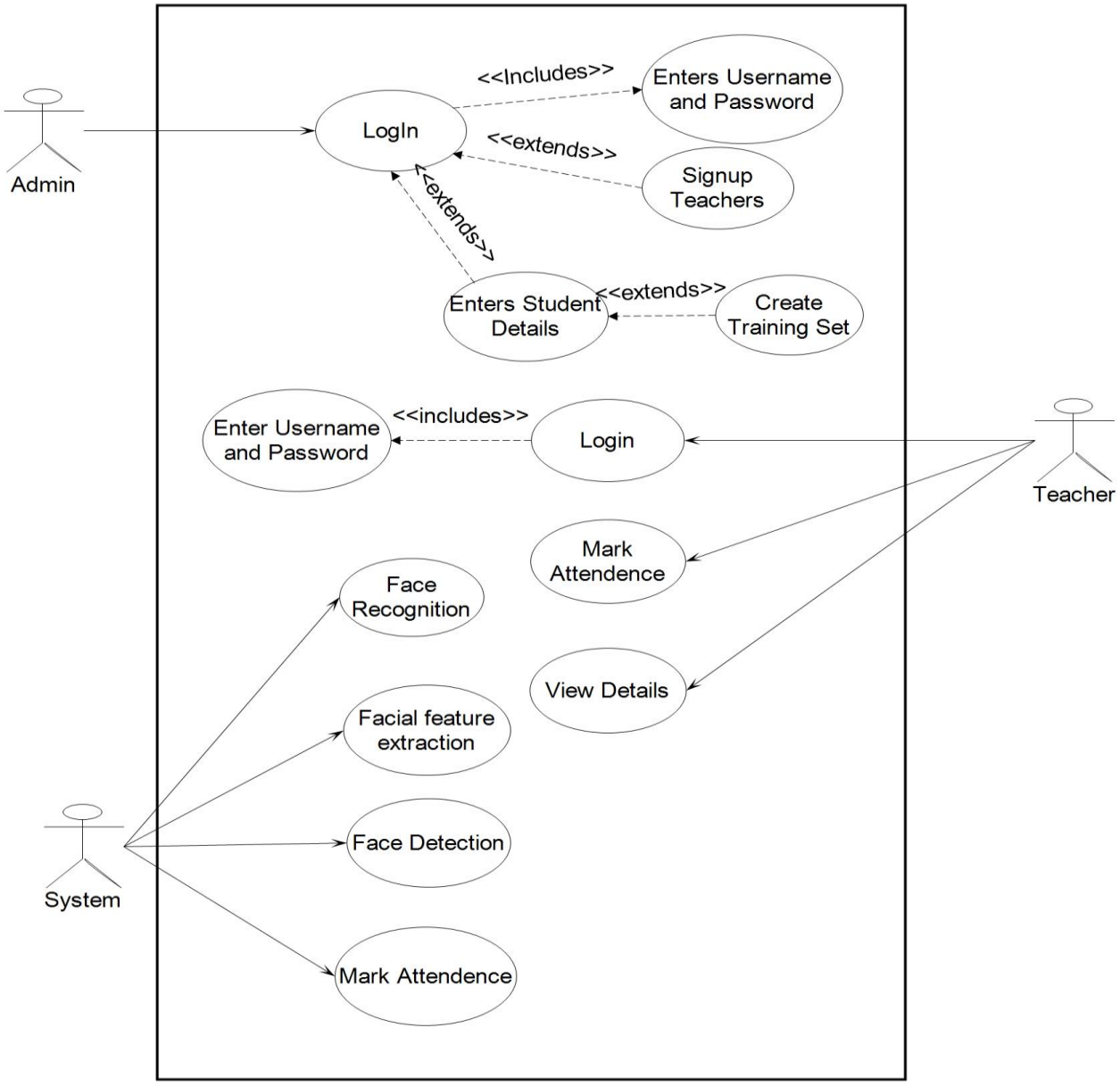

Figure 2: Use case diagram

4.1.2. FLOW CHART

The kind of diagram that represents the work flow or the process is called flow chart. A flowchart are also be defined as a diagrammatic representation of an algorithm, a step-by-step approach to solving a task.

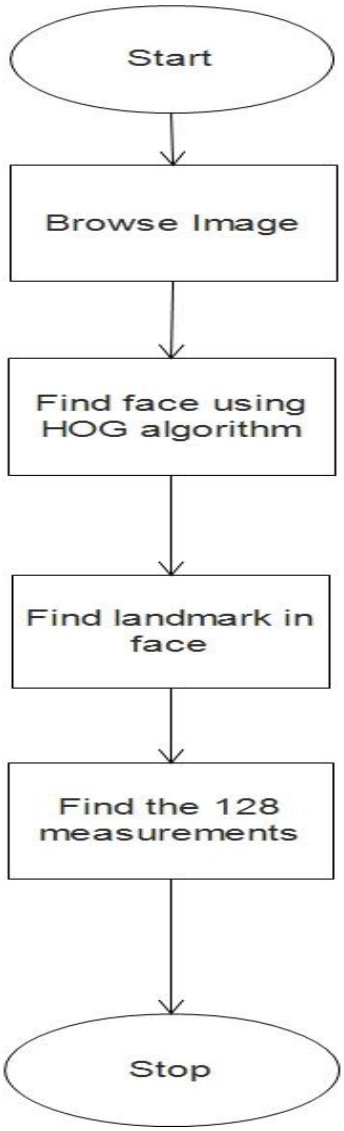

Figure 3: Flowchart of face detection

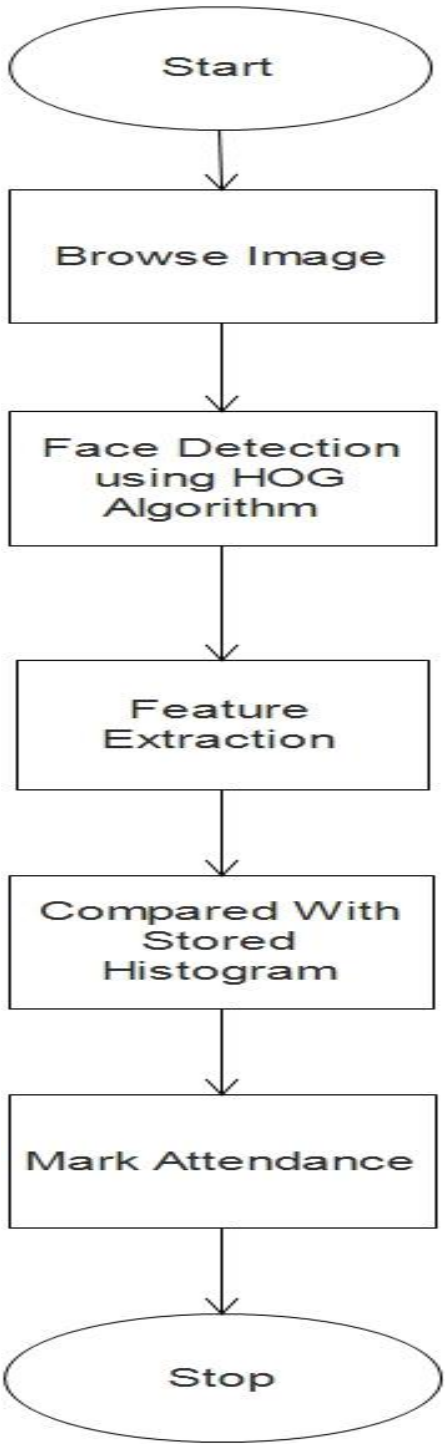

Figure 4 : Flowchart of face recognition

4.1.3. ACTIVITY DIAGRAM

An activity diagram shows the flows from activity to activity within a system. An activity shows a set of activities, the sequential or branching flow activity to activity, and object that act and acted upon. Activity diagram shows what activities can be done in parallel, and any alternate paths through the flow. Activity diagrams contain activities, transitions between the activities, decision points, and synchronization bars. Activities diagrams emphasize the flow of control among object.

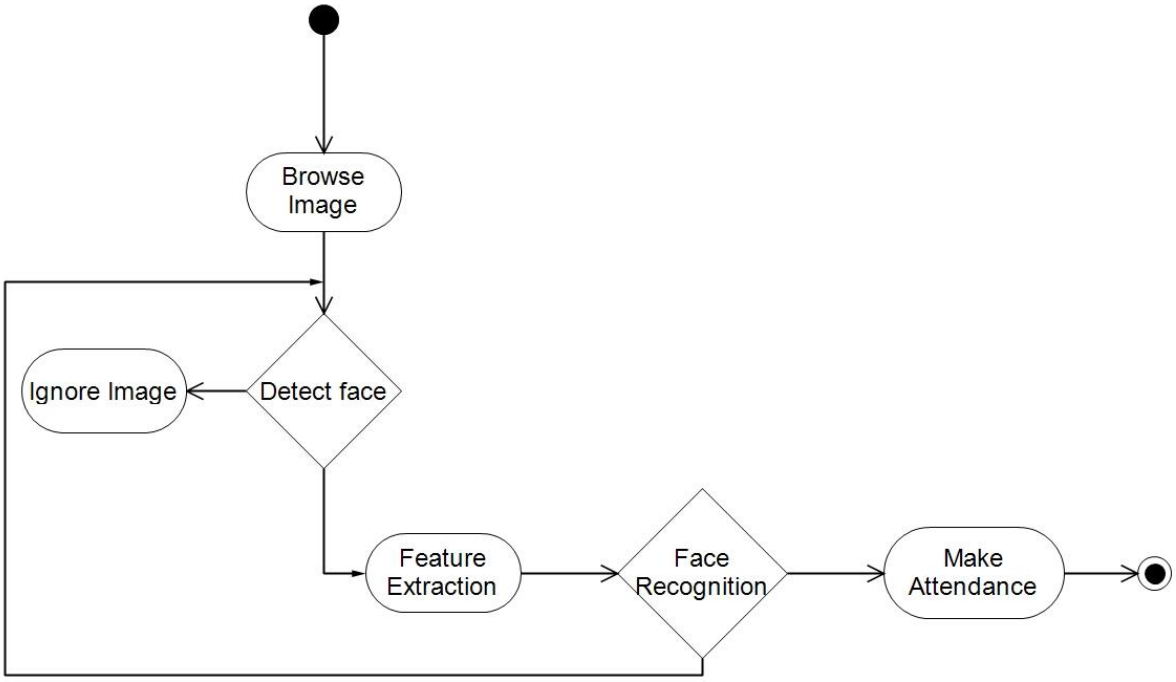

Figure 5 : Activity diagram for system

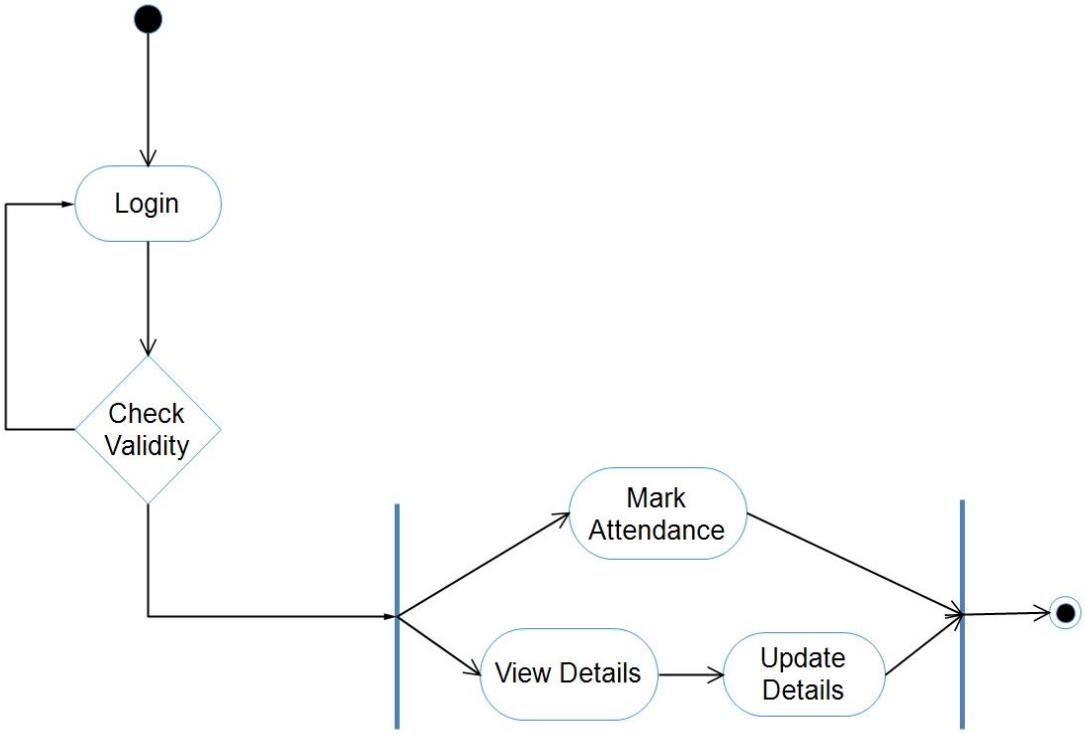

Figure 6 : Activity diagram for teacher

4.1.4. DOMAIN MODEL

The domain model illustrates conceptual classes or vocabulary in domain. Informally, a conceptual class is an idea, thing, or object. More formally, a conceptual class may be considered in terms of its symbol, intension, and extension.

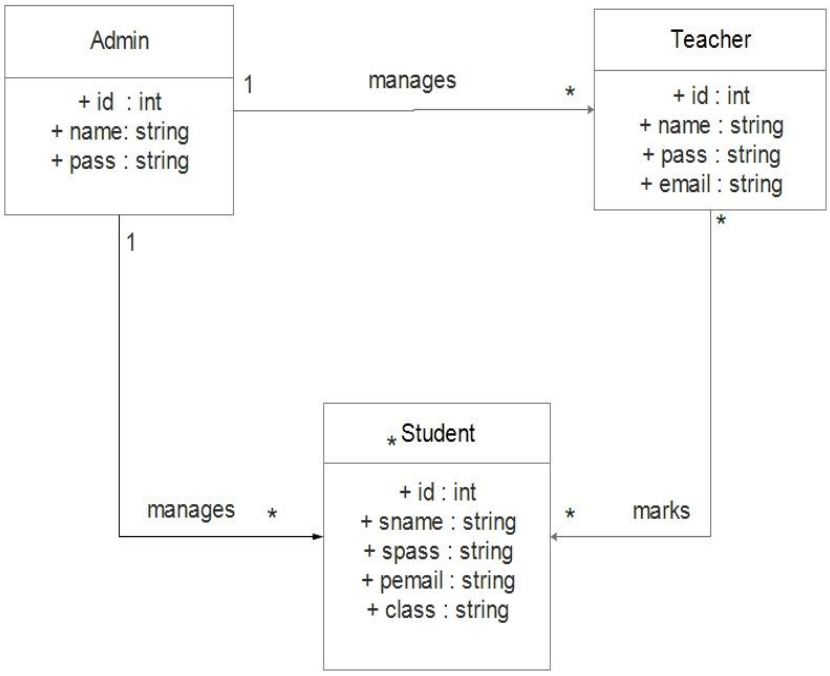

Figure 7 : Domain model

4.2. SYSTEM ARCHITECTURE:

Firstly the basic concept of the face detection and face recognition is discussed:

FACE DETECTION

A face detection is a technology used in different applications which identifies the human face from the digital images. Face detection is also the psychological process by which human locate to face in any visual scene. All the available face detection algorithm focus on the detection of frontal face in the image of human. It is very similar to the image detection where the pixel and pixel of the image are matched. The most common method of detection of face is based on the Eigen face technique: the eye are detected first by testing region in the every gray level image. Then after secondly the genetic algorithm is used to generate other face region like eyebrow mouth etc. Then after the face symmetry is measured [5].

FACE RECOGNITION

Face recognition is to identify person from a video source or video frame or the digital image.one of the common method to do this can be done by comparing the facial featured from the image. This method can be commonly used in security system in comparison to the other method such as eye iris, finger print recognition systems. Most of the face recognition algorithm identify the facial features by extracting all the landmark from image. Which include analyzing the relative position and size, shape of different part of the face such as eye, nose, and mouth. These features can be then used to search matching feature for other images.one of the very widely used and successful method of face recognition is template matching applied to set of facial features. Popular recognition algorithm are: principal component analysis using Eigen faces, linear discriminate analysis, hidden markov model, the multi-linear subspace learning using fisherface algorithm, neural motivated dynamic link matching [4].

PURPOSED SYSTEM

The system proposed is marking attendance using face recognition technique. The attendance will be recorded by using camera that will capture the image of the person and the face from captured image is detected and compared with the existing database as shown in the figure below. This project mainly has two main parts:

1. Development of face recognition part.
2. Development of attendance monitoring system.

The face will be recognized by using machine learning and the project follows the following basic pipeline:

1. Finds face in image.
2. Analyses facial features.
3. Compares with the known faces and mark the attendance.

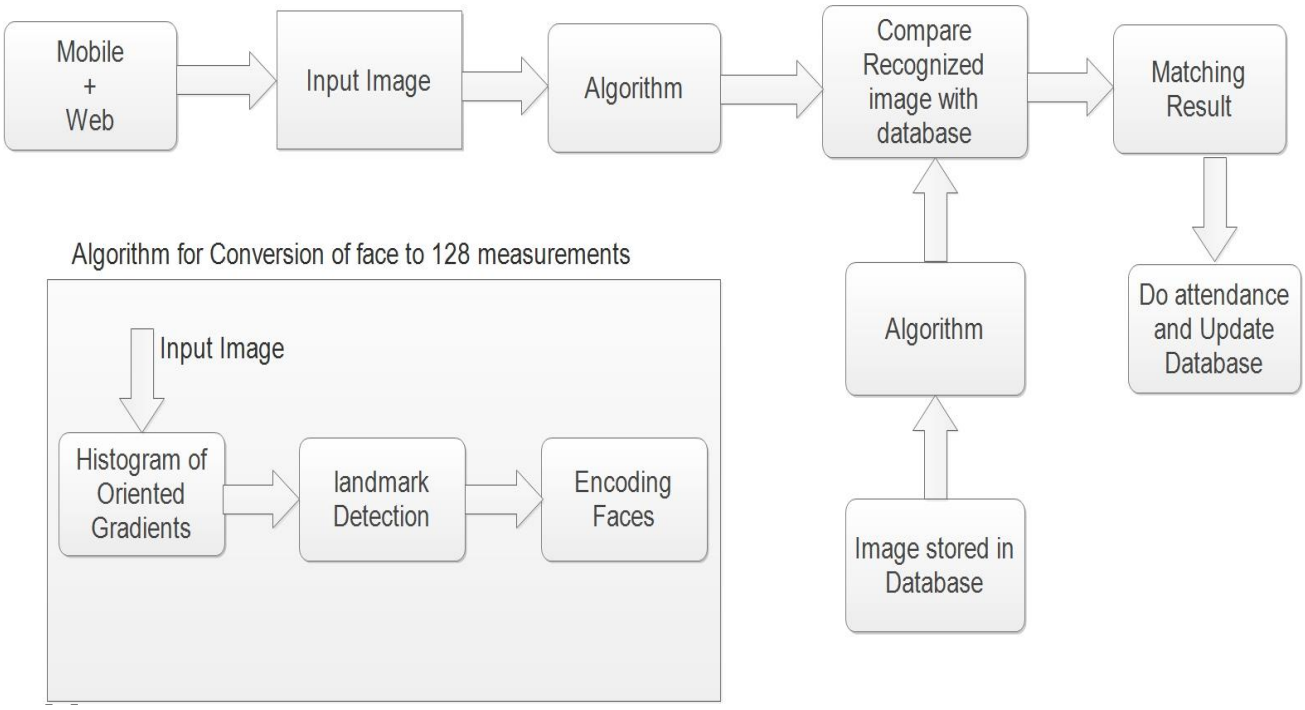

Figure 8 : System Block Diagram

1. Find face in the image:

The initial step for the purposed system includes detecting face using histogram of oriented gradients(HOG).one of the most successful face detection approach is HOG with SVM. HOG is a

kind of feature descriptor. HOG supports the SVM (Support vector machine) which is a kind of machine learning algorithm for classification, it recognize the hog descriptor. Image is sampled to multiple sizes to recognize a person. As we don't need color data to find faces so we create the black and white image to find the face in the image. Then we have to look at every single pixel in the image one at a time. For each of the pixel, we have to find the pixels that are directly surrounding it [3].

Figure 9 : Black and white image and image for HOG representation

We have to than figure out how dark the current pixel is compared to the pixels directly surrounding it. Then we draw an arrow showing in which direction the image is getting darker. If you repeat that process for every single pixel in the image, you end up with every pixel being replaced by an arrow. These arrows are called gradient and they show the flow from light to dark across the entire image. For doing this we divide the image into 16*16 pixel each. To find faces in the HOG images, all that have to done is find part of our image that looks the most similar to known HOG pattern that was extracted from training faces [6].

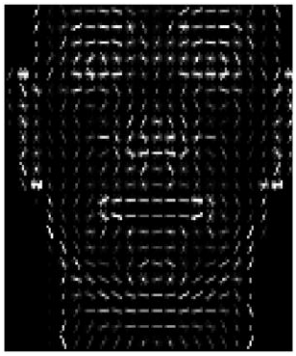

Figure 10 : HOG version of image

2. Analyses facial features.

The faces that are turned different directions look totally different in case of computer. To overcome this problem we warp each picture so that the eyes and lips are always in the sample place in the image. For this, we will use an algorithm called face landmark estimation. The basic idea for this is we will use 68 specific points (called landmarks) that exist on every face the top of the chin, the outside edge of each eye, the inner edge of each eyebrow, etc. Then this will train a machine learning algorithm to be able to find these 68 specific points on any face.

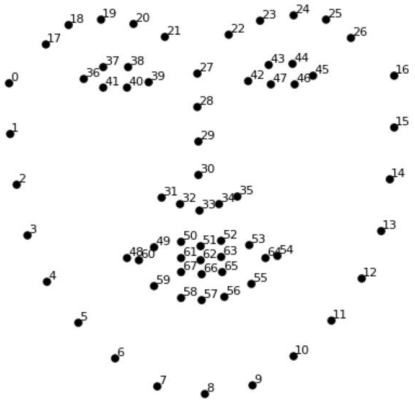

Figure 11 : Face landmark estimation

3. Encoding images

What we need is a way to extract a few basic measurements from each face. Then we could measure our unknown face the same way and find the known face with the closest measurements. For example, we might measure the size of each ear, the spacing between the eyes, the length of the nose, etc. The solution for this is to train a Deep Convolutional Neural. But instead of training the network to recognize pictures objects we are going to train it to generate 128 measurements for each face.

```
0000000 200 003   c   s   k   l   e   a   r   n   .   n   e   i   g   h
          0380    7363    6c6b    6165    6e72    6e2e    6965    6867
0000020   b   o   r   s   .   c   l   a   s   s   i   f   i   c   a   t
          6f62    7372    632e    616c    7373    6669    6369    7461
0000040   i   o   n  \n   K   N   e   i   g   h   b   o   r   s   C   l
          6f69    0a6e    4e4b    6965    6867    6f62    7372    6c43
0000060   a   s   s   i   f   i   e   r  \n   q  \0   ) 201   q 001   }
          7361    6973    6966    7265    710a    2900    7181    7d01
0000100   q 002   (   X  \v  \0  \0  \0   n   _   n   e   i   g   h   b
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0000120   o   r   s   q 003   K 001   X 006  \0  \0  \0   r   a   d   i
          726f    7173    4b03    5801    0006    0000    6172    6964
0000140   u   s   q 004   N   X  \t  \0  \0  \0   a   l   g   o   r   i
          7375    0471    584e    0009    0000    6c61    6f67    6972
0000160   t   h   m   q 005   X  \t  \0  \0  \0   b   a   l   l   _   t
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0000260   k   i   q  \t   X  \r  \0  \0  \0   m   e   t   r   i   c   _
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0000340   N   X  \a  \0  \0  \0   w   e   i   g   h   t   s   q  \r   X
          584e    0007    0000    6577    6769    7468    7173    580d
0000360  \b  \0  \0  \0   d   i   s   t   a   n   c   e   q 016   X  \v
          0008    0000    6964    7473    6e61    6563    0e71    0b58
0000400  \0  \0  \0   o   u   t   p   u   t   s   _   2   d   _   q 017
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0000420 211   X  \b  \0  \0  \0   c   l   a   s   s   e   s   _   q 020
          5889    0008    0000    6c63    7361    6573    5f73    1071
0000440   c   n   u   m   p   y   .   c   o   r   e   .   m   u   l   t
```

Figure 12 : Encoding data

4. Lastly all we have to do is find the person in our database of known people who has the closest measurements to our test image. You can do that by using any basic machine learning classification algorithm. For doing this we will use a simple linear SVM classifier. The person name from the encoding is identified by basic machine learning classification called support vector machine(SVM).SVM is a type of discriminative classifier formally defined by a separating hyper plane. In the given labelled data training this algorithm output an optimal hyper plane. It is very helpful when the number of dimensions are greater than sample in high dimensions space.it is memory efficient as it uses subset of training point as the decision function which is called support vector. The classifier take the measurement after it is trained from the new test image and tells which person name is the closer match. This svm is capable of doing both classification and regression. We mainly focus on svm as classifier.it is mainly based on the concept of decision plane which define decision boundaries [7].

So the summary of the whole algorithm used will be as

Firstly we encode a picture using the HOG algorithm to create a simplified version of the image. Using this simplified image, find the part of the image that most looks like a generic HOG encoding of a face.

Then we figure out the pose of the face by finding the main landmarks in the face. Once we find those landmarks, use them to warp the image so that the eyes and mouth are centered.

Pass the centered face image through a neural network that knows how to measure features of the face. Save those 128 measurements.

Looking at all the faces we've measured in the past, see which person has the closest measurements to our face's measurements. That's our match [3].

5. PROPOSED DELIVERABLES

The system proposed mainly aims to mark the attendance using face recognition technique. The attendance will be recorded by using camera that will capture the image of the person and the face from captured image is detected and compared with the existing database. Project will consists of two module teacher site and admin site. From the admin site the admin will record the information of faculty and student and create training set of student. Teacher can login the system to take the attendance of the student and even can view the total attendance of student.

ADMIN SITE

In the admin site the admin can login by giving user name and password after that he can register the student name, class and email and the most important thing is that the admin also create student training data. Each student training data is created by entering the student roll id and the student image. Then the system create the training model for that student and save it in the server. The training model created is about 8kb in size for each student. Similarly admin can sign up the teacher through the signup button.

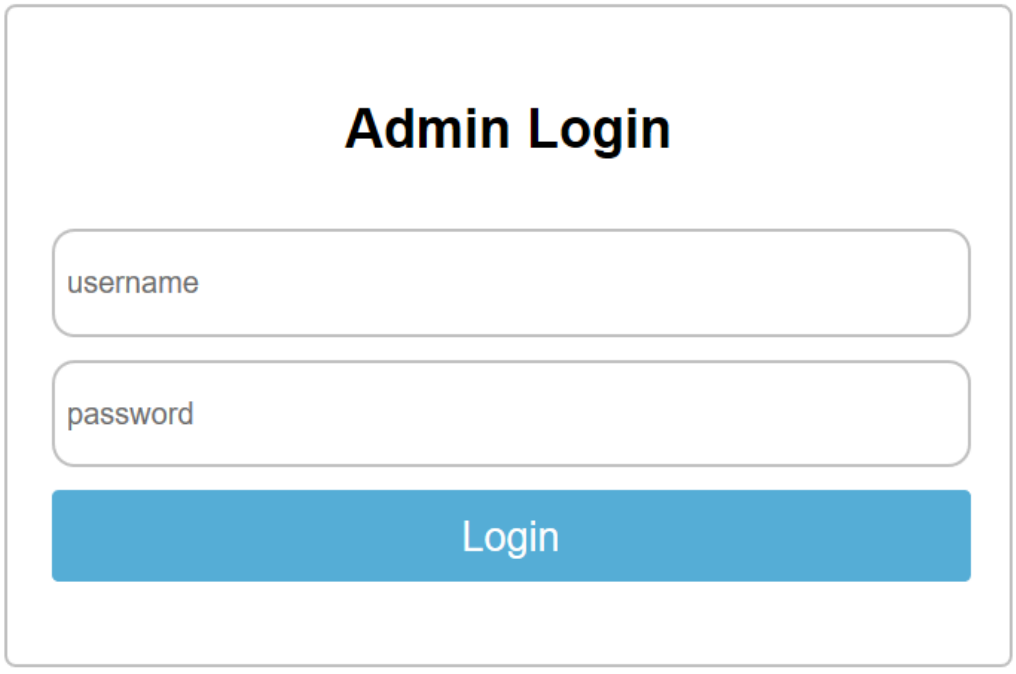


Figure 13 : Admin login

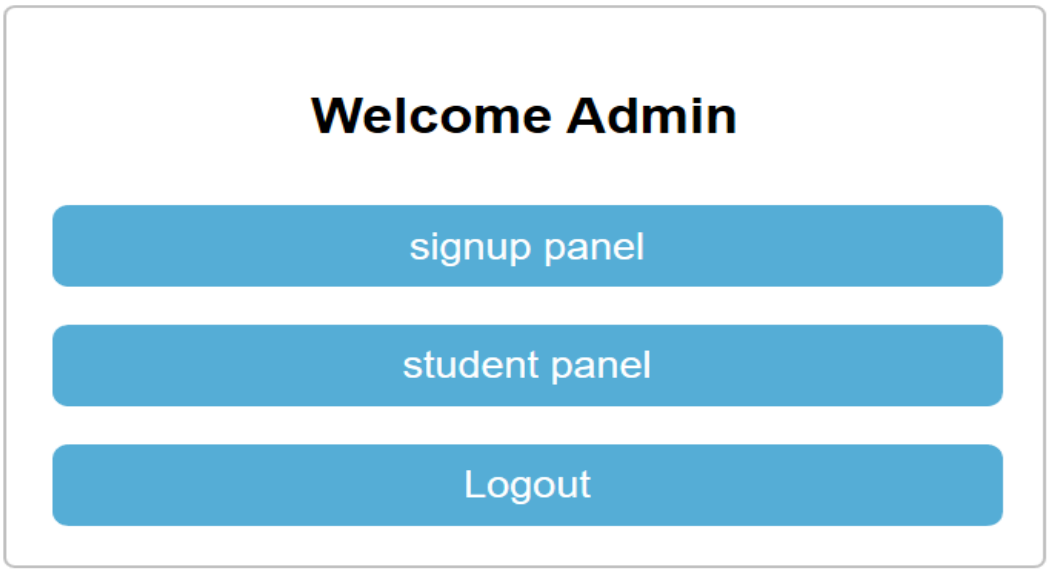


Figure 14 : Welcome page

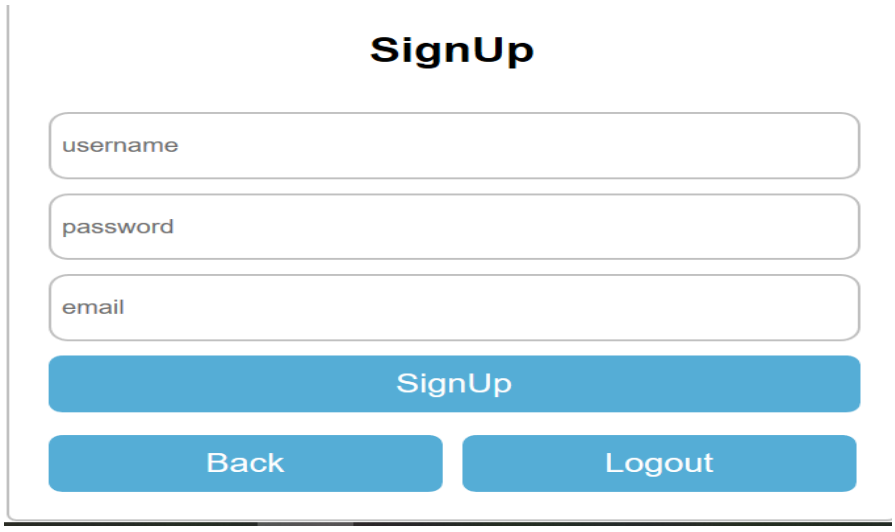


Figure 15: Teacher signup

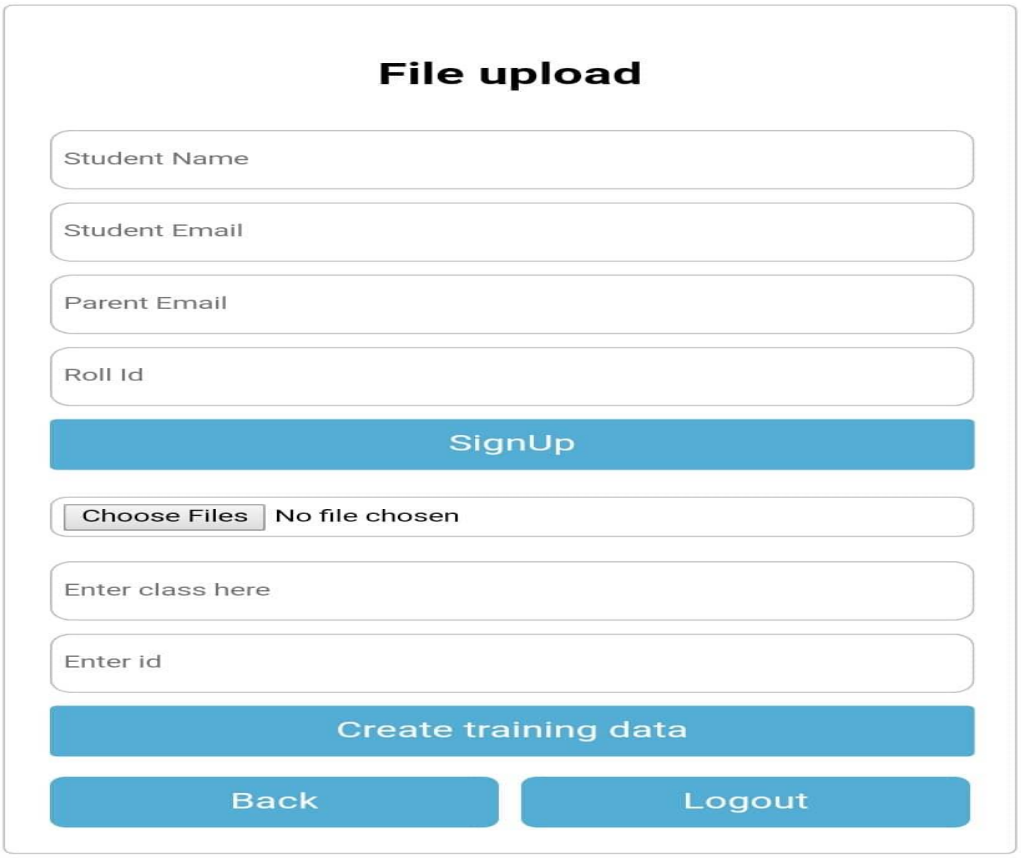


Figure 16 : Create training model

TEACHER SITE

Once the teacher enter the class than the teacher enters his name and password after that the tabs the attendance button the teacher than can passes his phone to the student to mark the attendance.

Student have to just click the image and enter his/her roll number and class to mark their attendance. Teacher can also view the attendance once the attendance is mark the attendance by clicking the view report button.

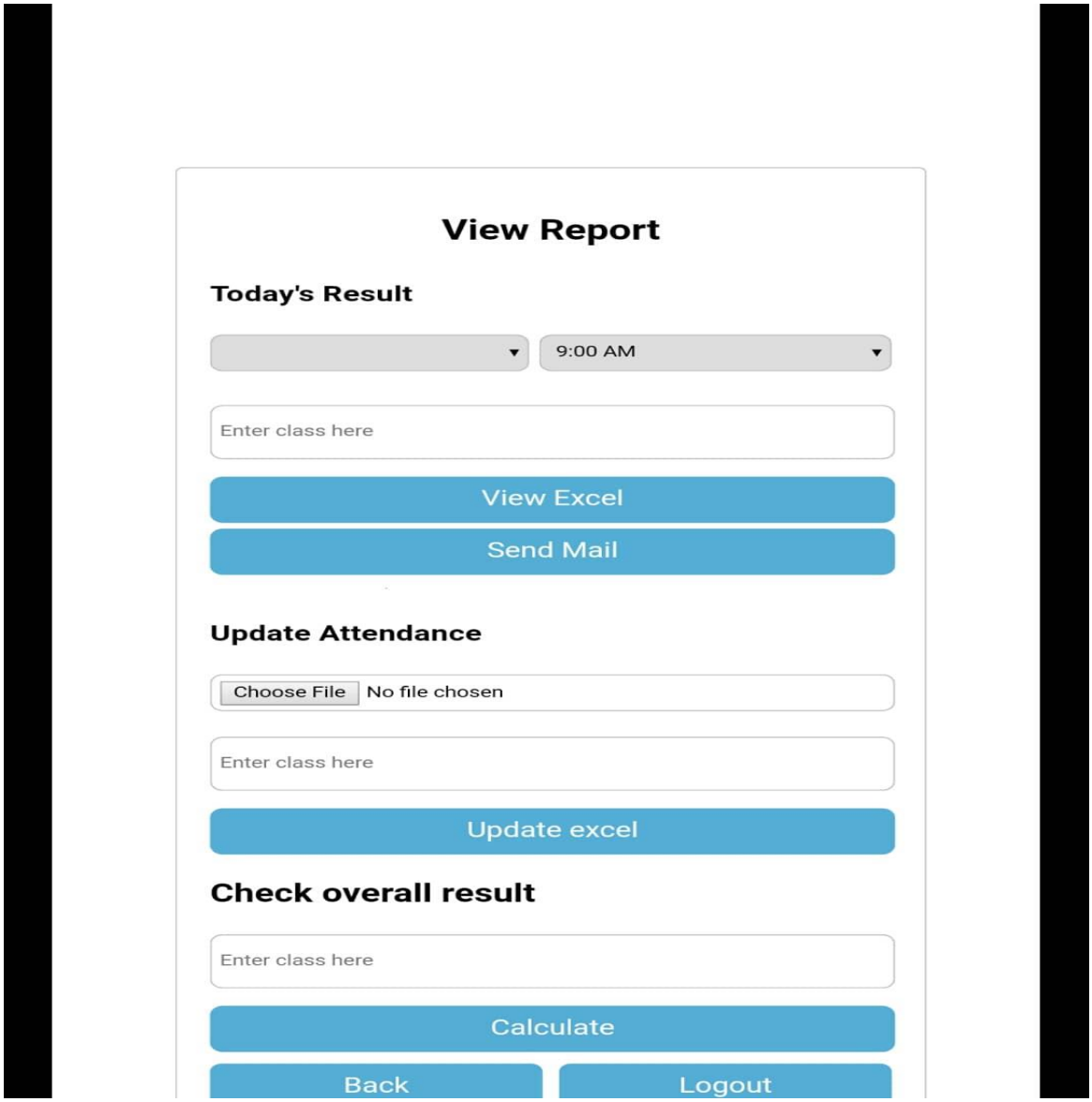


Figure 17 : View attendance page

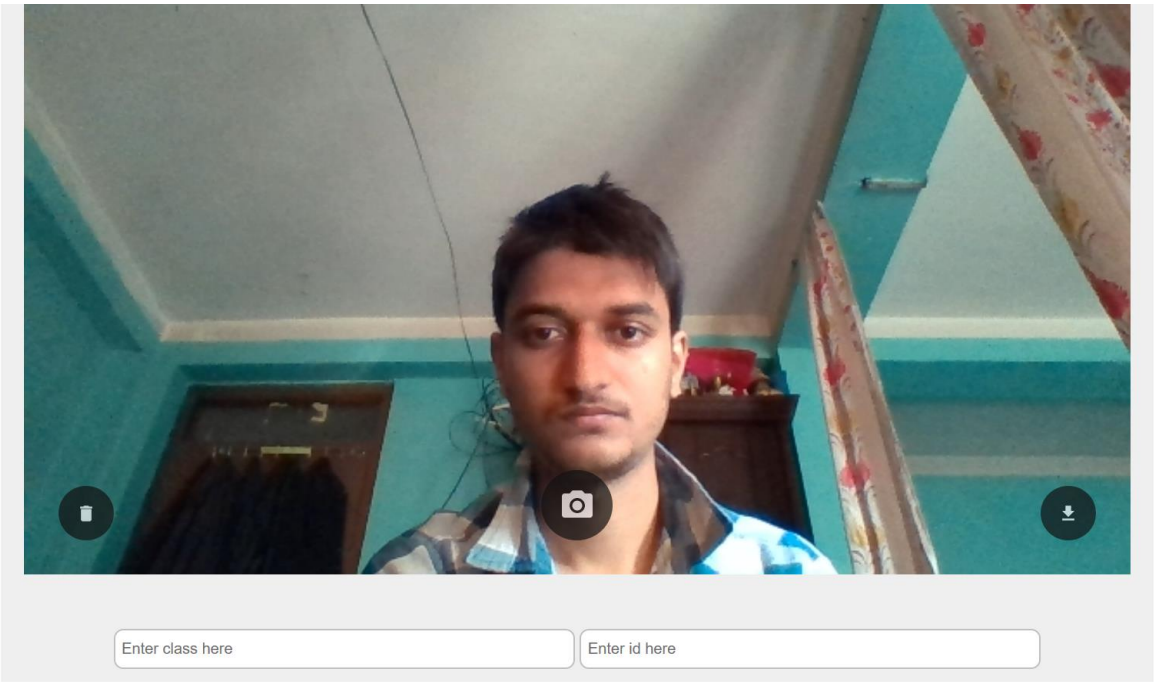


Figure 18 : Marking attendance

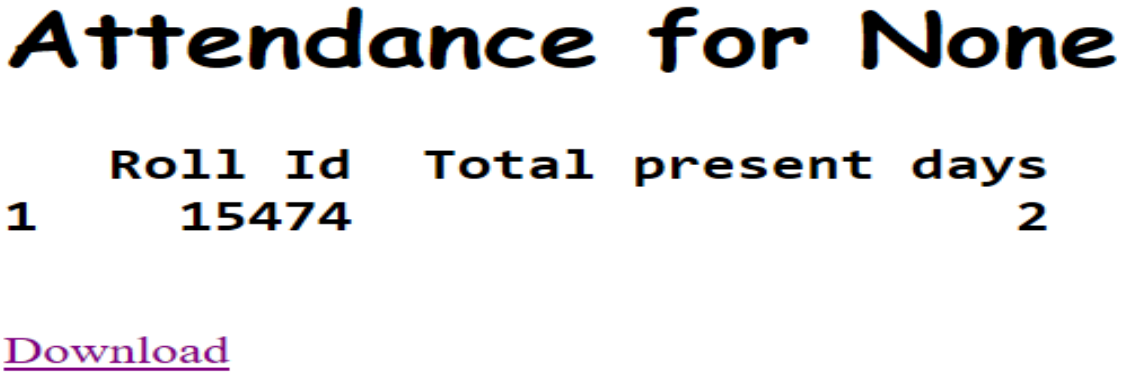


Figure 19 : Attendance view

6. TESTING

Testing is important phase to ensure that the system meets the requirements that guided its design and development responds correctly to all kinds of inputs and achieves the general result its stakeholder's desire. We wanted to evaluate our system to make sure that all the developed elements worked properly. For this test plan of our work created, in which elements such as validation, reliability and user acceptance was tested. The system was tested for normal condition, primarily. Testing was performed on each unit.

Table 2: Testing table

SN	FORM	TEST	EXPECTED RESULT	ACTUAL RESULT	EVIDENCE	RESULT
1.	Login of teacher	Incorrect user name and password	Invalid user name or password	Invalid username or password	Test 1.1	Failed
2.	Login of teacher	Correct user name and password	Show next page to take attendance	Next page to take attendance	Test 1.2	passed
3.	Mark attendance	With person with no training set created and with random roll no.	No training model exist	No training model exist	Test 1.3	failed
4.	Mark attendance	Mark the attendance of another student	Spoof detected	Spoof detected	Test 1.4	failed

5.	Mark attendance	Mark student of correct student with correct roll number	15476 present	15476 present	Test 1.5	passed

TEST EVIDIENCES

TEST 1.1

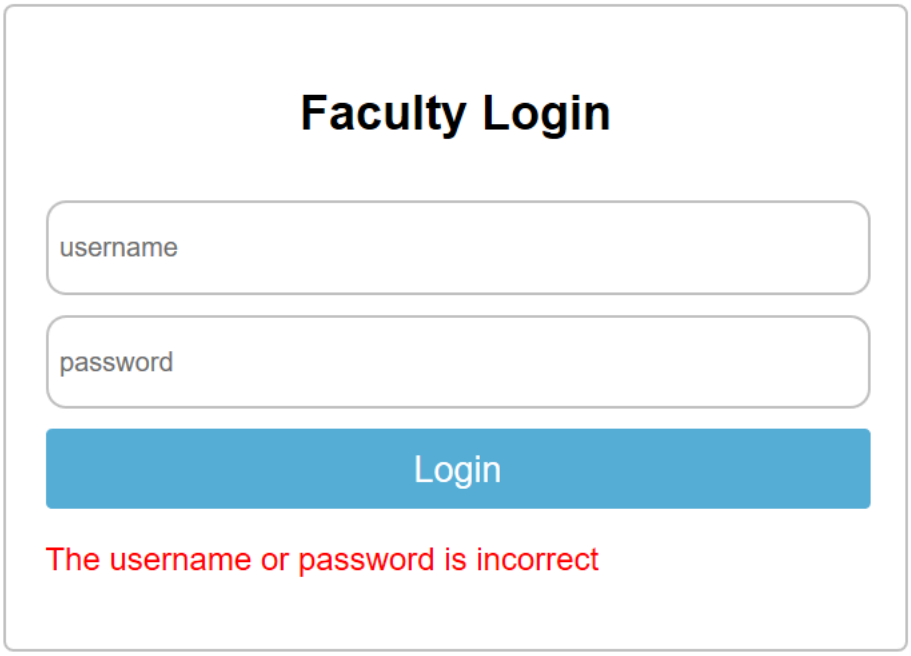


Figure 20 : Test 1.1

TEST 1.2

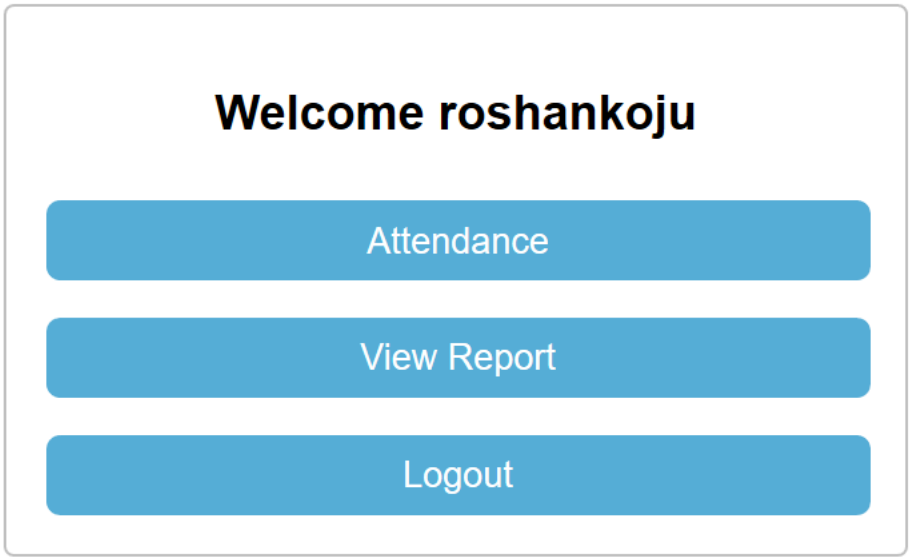


Figure 21 : Test 1.2

TEST 1.3

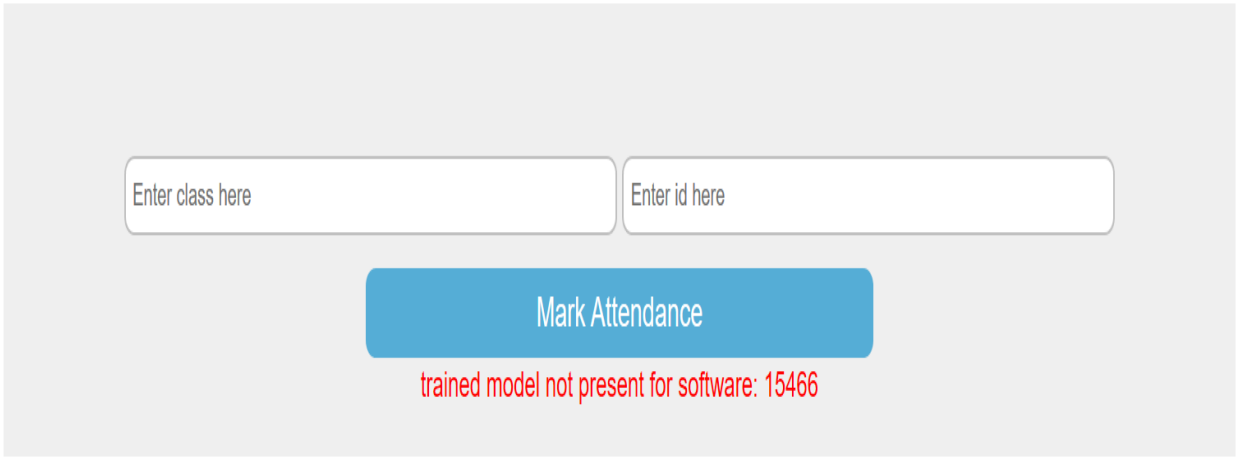


Figure 22 : Test 1.3

Test 1.5

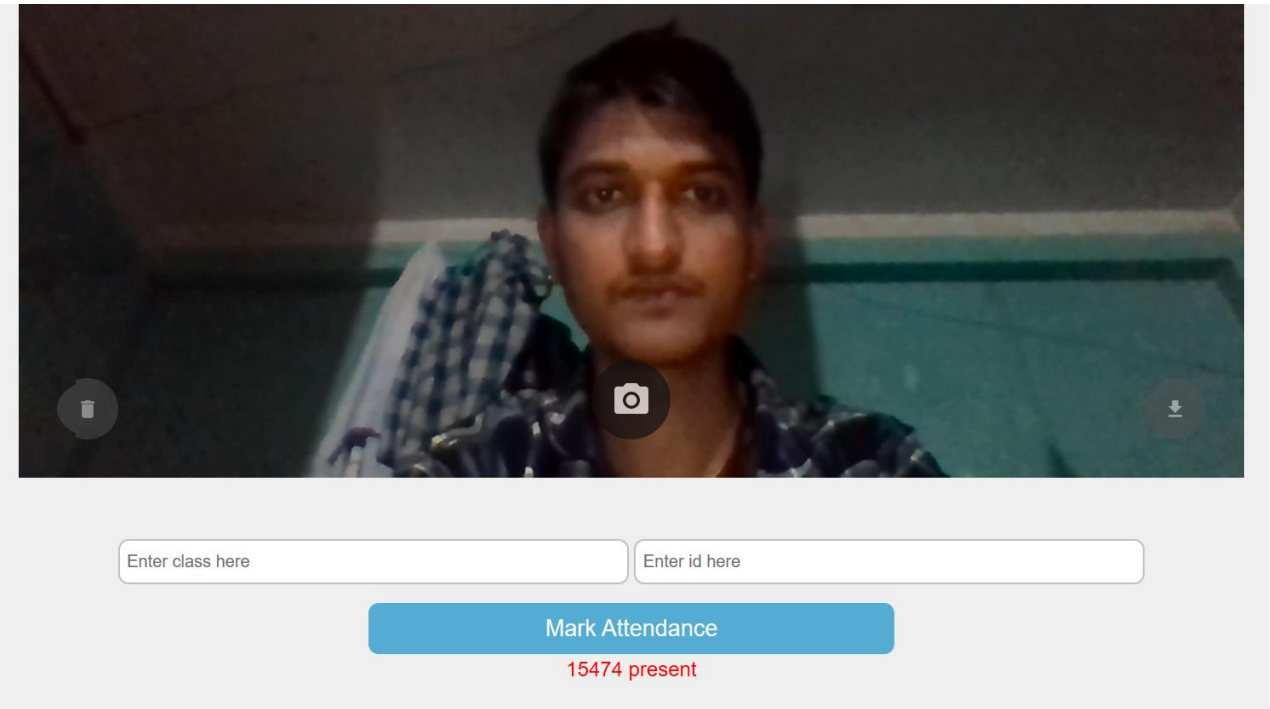


Figure 23 : Test 1.5

7. BUDGET ESTIMATE

7.1 FUNCTION POINT

Function point metric is used to collect direct measure of software engineering not only according to size but also according to functionality. FP is derived using an empirical relationship based on countable measures and assessment of s/w complexity.

Table 3: Function point

Information Domain Values	Count	Weighted Value	Total count [Weight * Count]
No of users input	14	4	56
No of User Outputs	8	5	40
Number of User Inquiries	3	4	12
No of Logical Files	7	10	70
No of External Interfaces	2	7	14
Count total			192

The value of complexity multiplier ranges from 0.65 to 1.35.Since, our project is average, the value of the complexity multiplier used is average. I.e. we have assumed an average value as 1.17.

Function point (FP) =count total*complexity multiplier

Function Point (FP) = Count Total * Complexity Multiplier

$= 192* [0.65 + 0.01 *\sum fi]$

$=192 * 1.17$

$= 224.64$

≈ 225

Average productivity = 10 FP / pm

Labor Rate = Rs. 15,000 per month

Effort =function point (FP)/average productivity

= 225 / 10

≈ 22.5

Total Project cost=FP*(labor rate/average productivity)

= 225 * 15000 / 10

= Rs. 3, 37,500

The value of the count and the count multiplier used is average.

Number of user inputs

Each user input that provides distinct application oriented data to the software is counted.

Number of user outputs

Each user output that provides application oriented information to the user is counted. In this context "output" refers to reports, screens, error messages, etc. Individual data items within a report are not counted separately.

Number of user inquiries

An inquiry is defined as an on-line input that results in the generation of some immediate software response in the form of an on-line output. Each distinct inquiry is counted.

Number of files

Each logical master file is counted.

Number of external interfaces

All machine-readable interfaces that are used to transmit information to another system are counted [9].

LINE OF CODE

LOC (Lines of code) is a simple and straight forward way of counting the productivity of a programmer in a given time period. Using lines of code metric, the project size is estimated by counting the number of source instructions in the developed program.

Estimated LOC=2706

Average productivity=100LOC/pm

Labor rate=Rs 5000per month

Now,

Estimated project cost=estimated LOC*cost per LOC

=2706*(labor rate/average productivity)

=2706*5000/100

=Rs 135300

8. CONCLUSION

The project ATTENDACE MONITORING WITH FACE RECOGNITION is in the initial phase with the basic functionality discussed before. The purpose of the project attendance monitoring with face recognition is to minimize the errors that occur in the traditional attendance taking system. This project is mainly built using deep learning which exhibits robustness in face recognition of the person with greater accuracy .this project first converts the image to HOG representation which includes the major features of image which contain person face. Landmark is then used for processing. Then 128 measurement are created by encoding and face recognition is done by finding the right person from encoding.

9. FUTURE EXTENSION

The project ATTENDANCE MONITORING WITH FACE RECOGNITION can be future extended in many organization to take the attendance of employee which can replace the traditional method of taking attendance. Instead of taking the attendance of single person we can extend the system to take the attendance by cctv when the employee enters the office.

10. PROJECT TASK AND TIME SHEDULE

The project schedule has been designed as per requirement and constraints involved. This projects schedule to be completed in about 4-5 months. Requirements analysis has been given more emphasis. Facial recognition and database management is to be done first and well document. Debugging and testing is to be done prior to the completion of project.

Table 4: Project task and time schedule

TASK	APPROX DURATION IN DAYS
Requirements analysis and specification	25
Under take analysis of the system	28
Design system	72
Produce Requirements specification	39
Testing and debugging	28
Test system modules	20
Overall system test	22
Develop Documents	56

10.1. WORK BREAKDOWN

Table 5: work breakdown among project member

Task	person
Requirement analysis and specification	Amrit, Rudra, Lal, Bikash
Undertake analysis of system	Amrit, Lal
Design system	Bikash, Rudra
Coding	Bikash, Rudra, Lal
Testing and debugging	Amrit, Lal, Bikash
Test system model	Rudra, lal, Bikash
Overall system test	Amrit, lal, Bikash
Documentation	Amrit,Lal,Rudra,Bikash

10.2. GANTT CHART

Table 6: First Iteration

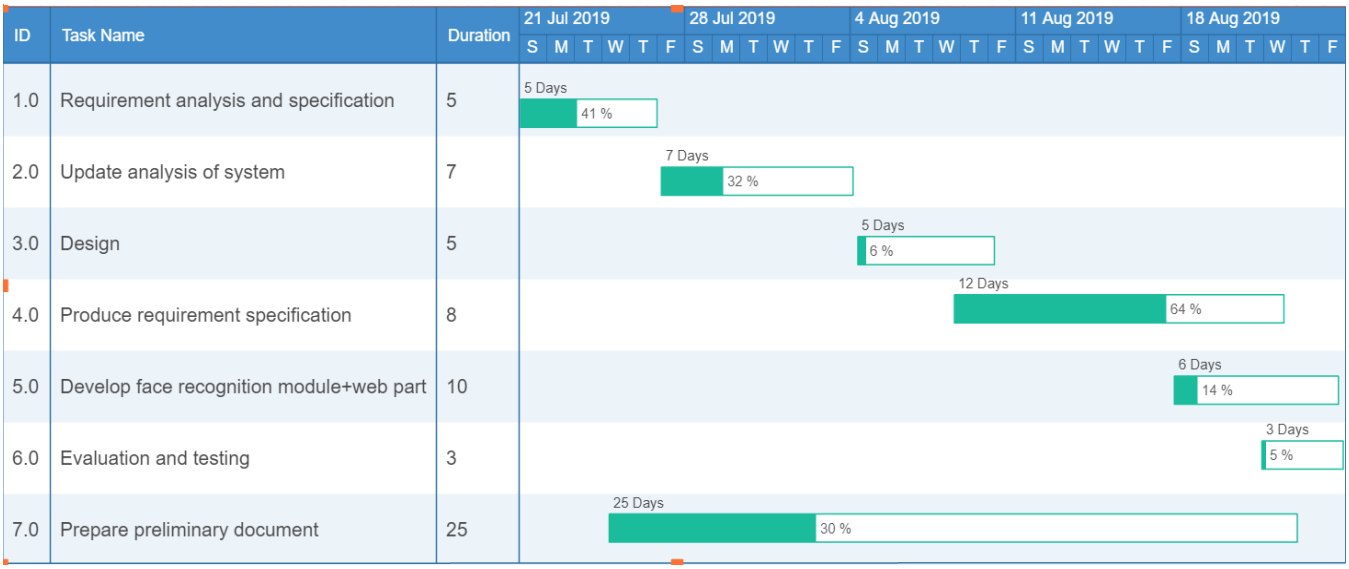


Table 7: Gantt chart Second iteration

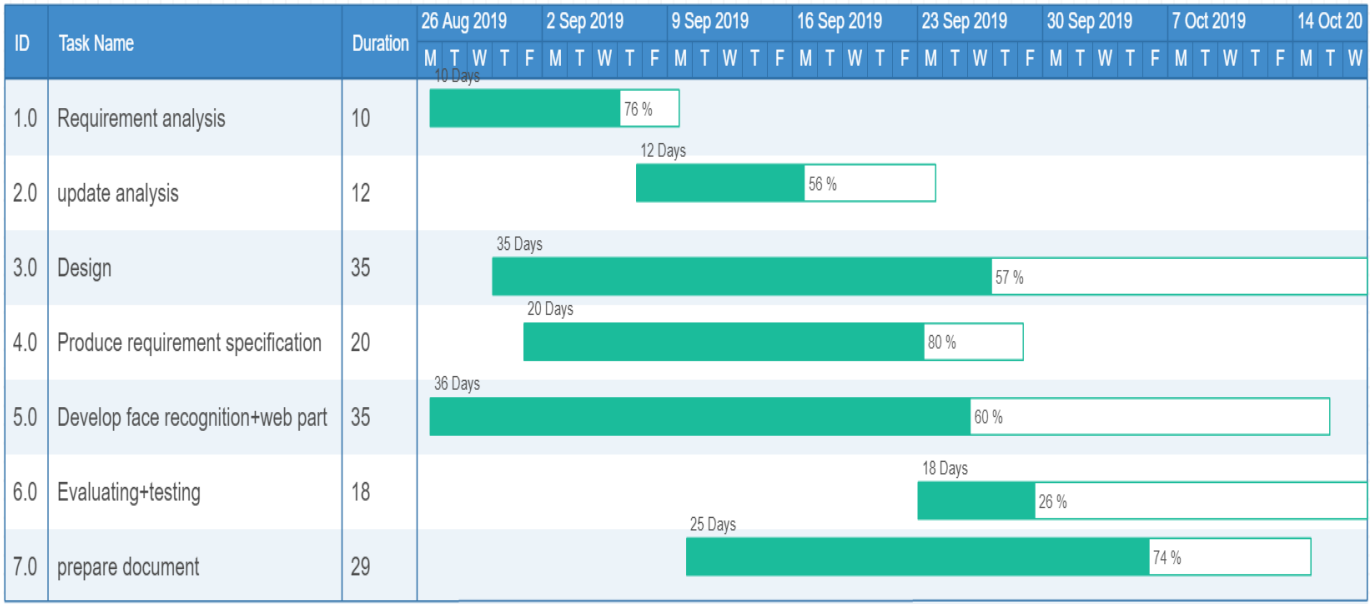
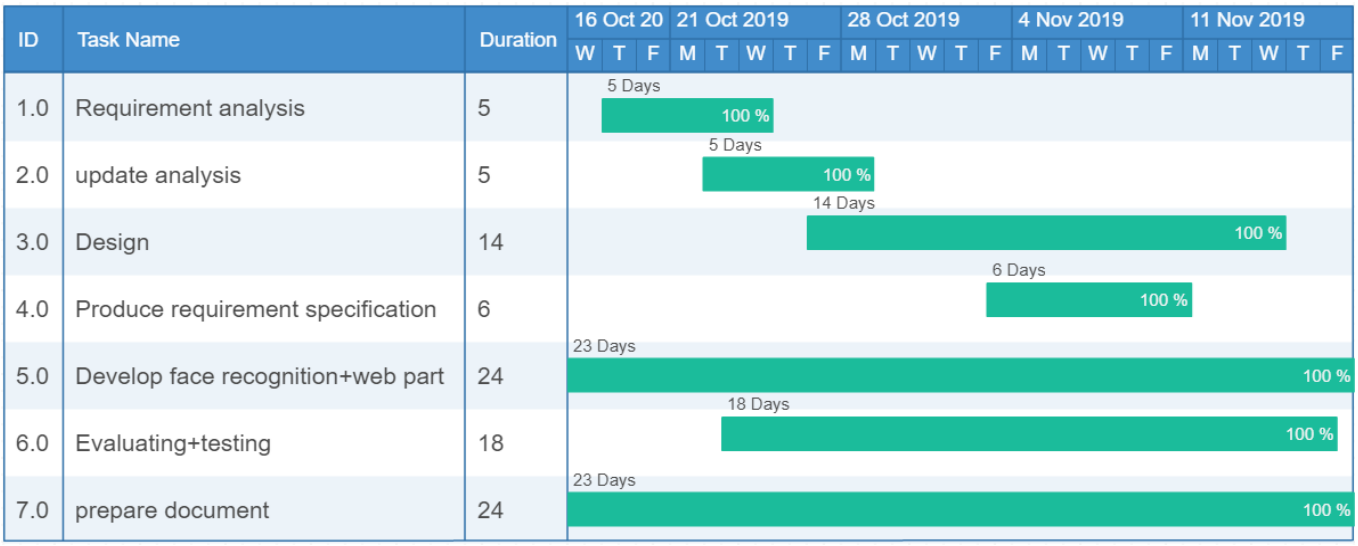


Table 8: Gantt chart Third iteration



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