



BASAVARAJESWARI GROUP OF INSTITUTIONS

## **BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT**

NBA and NACC Accredited Institution\*

(Recognized by Govt. of Karnataka, approved by AICTE, New Delhi & Affiliated to

Visvesvaraya Technological University, Belgavi)

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### **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**



#### **A Project Work Report**

**On**



**“Student face Identification and  
Attendance Management System using  
Convolution Neural Network”**

*Submitted By*

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**Visvesvaraya Technological University**

Belagavi, Karnataka

**2021-2022**



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### DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING



## CERTIFICATE

This is to certify that the PROJECT WORK PHASE-II entitled “[Student Face Identification and Attendance Management System using Convolution Neural Network](#)” has been successfully presented by **Sahil Shaikh Madarsha, Shaik Mohammed Gayazuddin, MD Yaseen, Mohammed Junaid Shaik** bearing USNs **3BR18CS140, 3BR18CS143, 3BR18CS094, 3BR18CS097** students of VIII semester B.E. for the fulfillment of the requirements for the award of **Bachelor Degree in Computer Science & Engineering** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the academic year 2021-2022.

Signature of guide  
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**Dr. R.N. Kulkarni**  
**Professor & Head**

### EXTERNAL VIVA

Name of the Examiner(s)

Signature with Date

1) \_\_\_\_\_

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2) \_\_\_\_\_

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## **ABSTRACT**

In this present era of technology, we are still using traditional methods to take attendance that with the help of pen and paper. the lecturer either calls a student by their name which is a very time-consuming and tedious task or passes the attendance sheet to sign it which other students can proxy sign. since the traditional method has so many disadvantages, to overcome this we have new technologies such as biometrics which includes a fingerprint scanner, iris scanner, face recognition, or voice recognition. We are using the face recognition method as it has many advantages over other biometric methods, the fingerprint scanner has disadvantages such as the user having to stand in queue for their turn if there are many students. In this paper, we have proposed a system that recognizes face and marks attendance and produces a report. We can achieve this with the help of CNN for face recognition and HOG method for face detection. the image of a group of students is given input to the HOG method and Convolution Neural Network(CNN) these methods process the image and produce output this output is then matched with student data stored in the database and mark attendance. and therefore attendance becomes easier and effective

## **ACKNOWLEDGEMENT**

The satisfactions that accompany the successful completion of our final year project phase-2 on “**Student face Identification and Attendance Management System using Convolution Neural Network**” would be incomplete without the mention of people who supported to make it possible, whose noble gesture, affection, guidance, encouragement and support crowned our efforts with success. It is our privilege to express our gratitude and respect to all those who inspired us in the completion of our final year project .

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We also thank Management and non-teaching staff of CSE department for their co-ordination and valuable suggestions given to us in completing the final year project .

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## **CHAPTER 1**

# **INTRODUCTION**

### **1.1 OVERVIEW**

In a globalized world today, most organizations and institutions use various technology in most of their work, but most of the institutions around the world still use the traditional method of taking attendance i.e. by paper/manual attendance system that has many challenges. The attendance is taken either by passing the attendance sheet from one student to another to sign, this takes time as well as causes disturbance during class. Furthermore, there are some students who never come to class and but sign attendance by proxy. The other method includes the lectures to call students by their names one by one to mark the attendance, but this method also consumes a lot of time. After gathering attendance data via either of these two methods, the teacher has to manually enter the data into the system and make a report.

There are many loops in the traditional method, as it is a mind-numbing task to process and mark the attendance physically and keep track of attendance of each student. The lecturers may even have trouble in keeping up every student's record in a classroom all the time. By the above points, we can conclude that the traditional method of taking attendance is a time-consuming, tedious task, and it is hard to execute strictly. To overcome this hurdle biometric identification technology was introduced, such as fingerprint recognition, iris recognition, and facial recognition, etc. the study has found that fingerprint attendance system has a mistake of about 5%, and there will be a phenomenon that fingerprints can't be hit, to beat this facial recognition is used as it has many advantages, such as low cost of implementation, high reliability. In addition, it can be widely used in different fields such as security, education, etc.

There are different methods for face recognition. They all include face detection in an image and then extracting features from that image and matching the face features with the database data and marking attendance. However, this method is very complex and time-consuming, as we have to apply different algorithms for different stages. For face recognition, we will use algorithms like the Eigenface recognition method, PCA (Principal Component Analysis) and LDA (linear discriminant analysis), etc. Moreover, LBP (local binary pattern) method can be adopted for feature extraction from the face. As these methods are very complex and time-consuming. A face recognition method based on CNN is proposed in this paper.

To overcome the above-mentioned problems we use CNN (Convolution Neural Networks). Research in the field of deep learning has achieved remarkable achievements. CNN is a deep learning method, which has better image processing techniques it has the special structure of local weight sharing. The feature extraction can be avoided by inputting multidimensional vectors directly into a network that reduces the complexity of data reconstruction in the classification process. CNN uses a feature-based method for face recognition. It is different from the traditional feature extraction methods and designs for high performance. Its advantage is that layer-by-layer convolution, then multi-layer nonlinear mapping carry out face feature extraction the network can automatically learn to extract features from the image and classify it. This ultimately leads to recognition tasks.

## **1.2 VISION, MISSION AND OBJECTIVES**

### **VISION**

To design and develop a platform for real-time facial recognition based attendance management system

### **MISSION**

To train a machine/model using CNN algorithm which detects the facial features as well as processes them for further usage such as identification and attendance marking

### **OBJECTIVES**

- To provide a system to automate the attendance in academic institutions and other organizations.
- To emphasize the importance of attendance to students for effective learning.
- To provide updated attendance status to the faculty, student and parent.

### **1.3 PROBLEM STATEMENT**

To design and develop a platform for real-time facial recognition based attendance management system

### **1.4 SCOPE OF THE PROJECT**

- The scope of the project is to design and develop an automated attendance system based on facial recognition.
- To build a platform independent application which helps the lecture, student and parents to view the attendance data any time.
- To design a system to escalate the importance of the attendance and to encourage students to attend classes regularly.

## **CHAPTER 2**

# **LITERATURE SURVEY**

### **LIST OF RESEARCH PAPERS**

**[1] Author: ] Kewen Yan , Shaohui Huang , Yaoxian Song , Wei Liu , Neng Fan, “Face Recognition Based on Convolution Neural Network”, 36th Chinese Control Conference (CCC) July 2017.**

In this paper, the author proposed a face recognition method based on Convolution Neural Network (CNN). This network consists of three Convolution layers, two pooling layers, two full-connected layers, and one Softmax regression layer. They have used a Stochastic gradient descent algorithm to train the feature extractor and classifier, which can extract the facial features and classify them automatically. They also used the Dropout method to solve the over-fitting problem. And used Convolution architecture for face feature extraction.

**[2] Author: Patrik Kamencay, Miroslav Benco, Tomas Mizdos, Roman Radil, "A New Method for Face Recognition Using Convolutional Neural Network", Digital Image Processing and Computer Graphics, VOLUME: 15, 2017.**

In this paper, the performance of the proposed Convolutional Neural Network (CNN) with three well-known image recognition methods such as Principal Component Analysis (PCA), Local Binary Patterns Histograms (LBPH) and K–Nearest Neighbour (KNN) is tested. In our experiments, the overall recognition accuracy of the PCA, LBPH, KNN and proposed CNN is demonstrated. All the experiments were implemented on the ORL database and the obtained experimental results were shown and evaluated. This face database consists of 400 different subjects (40 classes/ 10 images for each class). The experimental result shows that the LBPH provide better results than PCA and KNN. These experimental results on the ORL database demonstrated the effectiveness of the proposed method for face recognition. For proposed CNN we have obtained a best recognition accuracy of 98.3 %. The proposed method based on CNN outperforms the state of the art methods.

**[3] Author: Refik Samet, Muhammed Tanrıverdi “Face Recognition-Based Mobile Automatic Classroom Attendance Management System”, International Conference on Cyberworlds (CW), September 2017.**

This paper proposed, a face recognition-based mobile automatic classroom attendance management System has been proposed with a face recognition infrastructure allowing the use of smart mobile devices. Face detection using Viola-Jones Face detection method using Adaboost Training based on OpenCV. The face recognition process was done by EigenFace or FisherFace and LBP(Local Binary Pattern). Euclidian distances were also calculated to find similarities between faces for recognition. In a traditional attendance management system, the lecture uses two methods to take attendance either by calling students by their name or by sharing the attendance sheet to sign it as these two methods are time-consuming and especially the second method is open to fraud i.e. by proxy signing. To avoid the above problems. The author proposed a face recognition-based mobile automatic classroom attendance management system needing no extra equipment. The filtering system is based on Euclidean distances calculated by three- face recognition methods, namely Eigensfaces, Fisherfaces, and Local Binary Pattern are developed for face recognition. The proposed system includes three different applications for faculty, student, and parents to be installed on their respective phones to access attendance data. This has many problems such as code managing and platform dependence to overcome this we are developing a system that is platform-independent.

**[4] Author: Shreyak Sawhney, Karan Kacker ,Samyak Jain, Shailendra Narayan Singh , Rakesh Garg, “Real-Time Smart Attendance System using Face Recognition Techniques”, 2019 9th International Conference on Cloud Computing, Data Science & Engineering (Confluence), January 2019.**

This paper proposed an attendance system that uses face recognition and identification to mark the attendance of the students, and stores the data onto two separate databases, one for students and one for the faculty. High definition cameras are used to capture student picture and compare it to the existing databases and allow access to the students.

**[5] Author:Xiaojun Bai ,Feihu Jiang , Tianyi Shi , Yuang Wu, “Design of Attendance System Based on Face Recognition and Android Platform”, 2020 International Conference on Computer Network, Electronic and Automation (ICCNEA), September 2020.**

In this paper, the author used the Android platform and Adaboost Cascade Classifier to detect faces. The author used LBP to extract images and calculated them together with a Histogram to recognize faces from the image taken. Tests were done with ORL (Olivetti Research Laboratory) face database and compared with Fisher and EigenFace algorithms. 30 testers were tested and the results verified the face recognition accuracy and that it could meet the practical use requirement.

**[5] Author: Omar Abdul Rehman Salim ,Rashidah Funke Olanrewaju , Wasiu Adebayo Balogun, “Class Attendance Management System Using Face Recognition”, 2018 7th International Conference on Computer and Communication Engineering (ICCCE), September 2018.**

The authors proposed a replacement automated system to mark attendance, i.e. Class Attendance Management System Using Face Recognition, they used LBPS (Local binary patterns Algorithm) for face recognition, applying the LBP operation: the primary computational step of the LBPH is to make an intermediate image that describes the first image during a better way, by highlighting the facial characteristics. To do so, the algorithm uses an idea of a window, supported the parameters radius and neighbors. Therefore the system is predicated on Raspberry pi because the hardware and programming language is employed “Python” for face recognition and PHP for attendance management system website. The system not only recognizes the faces of the scholars but also controls the door to ascertain if the scholar is allowed to access it or not. On top of that, the system was built as a Web Server, in order that attendance results could also be accessible to any authenticated online customer. The interface for the web site server is included in order that the speaker may check participation outcomes from any computer browser connected to the web. Face recognition is administered through the implementation of local binary Models (LBP). Furthermore, it is equipped with a prototype door employing a servomotor that opens in order that the recognized student passes whenever the reputation is Successful.

**[7] Author: Rajat Kumar Chauhan, Vivekanand Pandey, Lokanath M, "Smart Attendance System Using CNN", Volume 119 No. 15 2018, International Journal of Pure and Applied Mathematics**

The authors proposed Smart attendance system based on face recognition that can be used to take attendance of the students sitting in a classroom all at once. The smart Attendance System is divided into four steps. First, face detection is done based on Histogram of Orientation Gradient (HOG) algorithm, face alignment is done based on face landmark estimation algorithm. Third, face encoding, Facenet algorithm based approach is used for face encoding, it has an accuracy of 99.63% on LFW dataset. Each face is encoded with unique 128 values. Finally, SVM classifier is trained with these 128 dimension values for each face. Our system also makes a report of attendance with date and it is automatically mailed to the faculty.

**[8] Author: Devaprakash, Gowtham, Murali, Muralidharan, V.J.Vijayalakshmi, "Centralized Attendance Monitoring System", 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS), March 2020**

This paper proposed the use of biometrics for attendance marking and input data is received in the Application then updated on the cloud storage through Google Apps Scripts the data is stored in Firebase the attendance data can be viewed anytime from the Firebase account. The application was developed using MIT App Inventor and Makedroid-Kodular. The output result will be displayed as a Google Spreadsheet.

## CHAPTER 3

# SOFTWARE REQUIREMENT SPECIFICATION

### 3.1 FUNCTIONAL REQUIREMENTS:

- Create a automated system which automates the attendance by facial recognition method.
- Faculty/Students/Parents can view the updated attendance regularly.
- Create a web application through which the data can be viewed.

### 3.2 NON-FUNCTIONAL REQUIREMENTS:

- **Security:**
  1. **Student Identification:** The system needs the student to register herself or himself to the cloud.
  2. **Login ID:** Faculty/Student/Parents are provided with the login credential to make use of the system.
  3. **Modifications:** Any modifications like insert delete, update, etc. for the database can be synchronized quickly and executed only by Faculty or administrator.
  4. **Administrator rights:** The administrator can view as well as alter any information in the automated attendance system.
- **Availability:** The system should be available at all the time. A user-friendly system which should be available during institute working hours
- **Portability:** The system is completely portable and the recommendations completely trustworthy as the data is dynamically updated.
- **Maintainability:** The maintenance of the product would require training of the software by recent data so that their commendations are up to date.

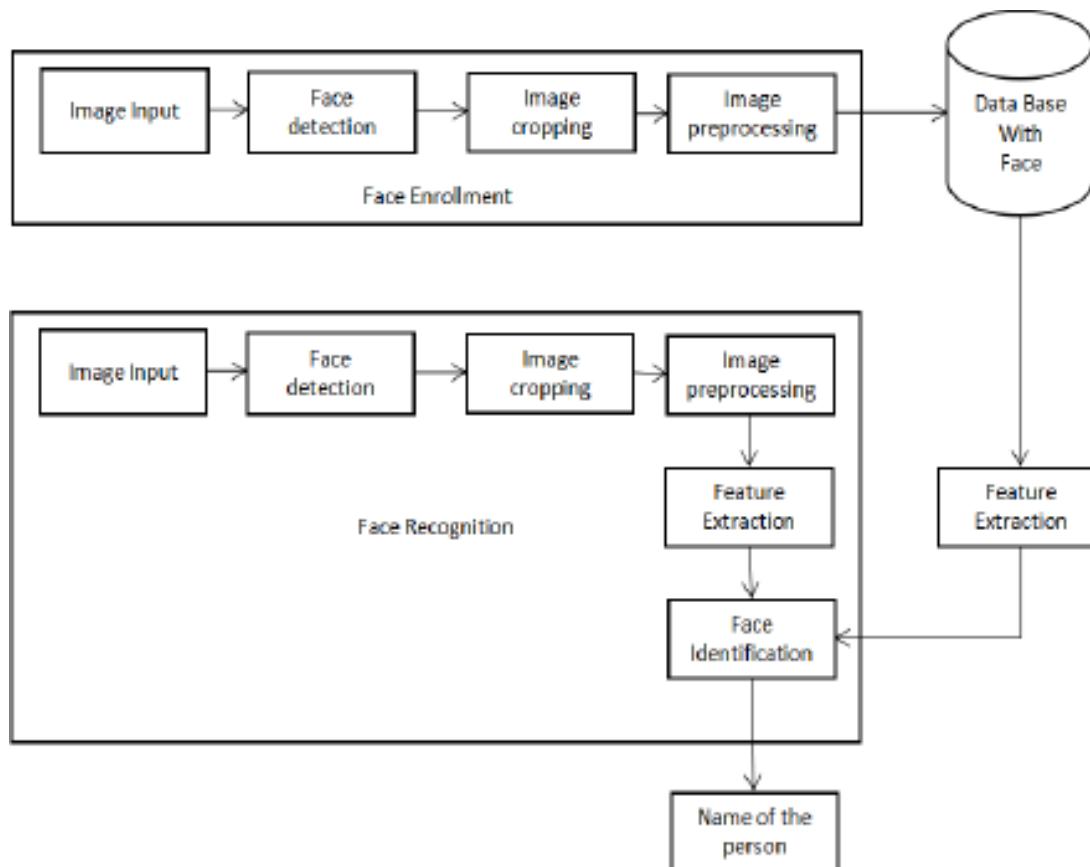
### 3.4 SOFTWARE REQUIREMENTS

1. Operating System: Windows 10
2. Software: PyCharm
3. Programming Language: Python

## CHAPTER 4

# SYSTEM ARCHITECTURE

### 4.1 SYSTEM DESIGN



**Figure 4.1 System Architecture**

The above figure 4.1 System Architecture shows the methodology of the proposed system. An image is taken by a camera module, the face is detected, cropped and processed by CNN. The features are extracted from a database with all the stored faces and identifies the name of the person for attendance marking.

## **4.2 ACTIVITY DIAGRAM:**

Activity diagram is another important diagram in UML to describe the dynamic aspects of the system.

Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system.

The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control by using different elements such as fork, join, etc

The basic purposes of activity diagrams is similar to other four diagrams. It captures the dynamic behavior of the system. Other four diagrams are used to show the message flow from one object to another but activity diagram is used to show message flow from one activity to another.

Activity is a particular operation of the system. Activity diagrams are not only used for visualizing the dynamic nature of a system, but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in the activity diagram is the message part.

It does not show any message flow from one activity to another. Activity diagram is sometimes considered as the flowchart. Although the diagrams look like a flowchart, they are not. It shows different flows such as parallel, branched, concurrent, and single.

The purpose of an activity diagram can be described as –

- Draw the activity flow of a system.
- Describe the sequence from one activity to another.
- Describe the parallel, branched and concurrent flow of the system.

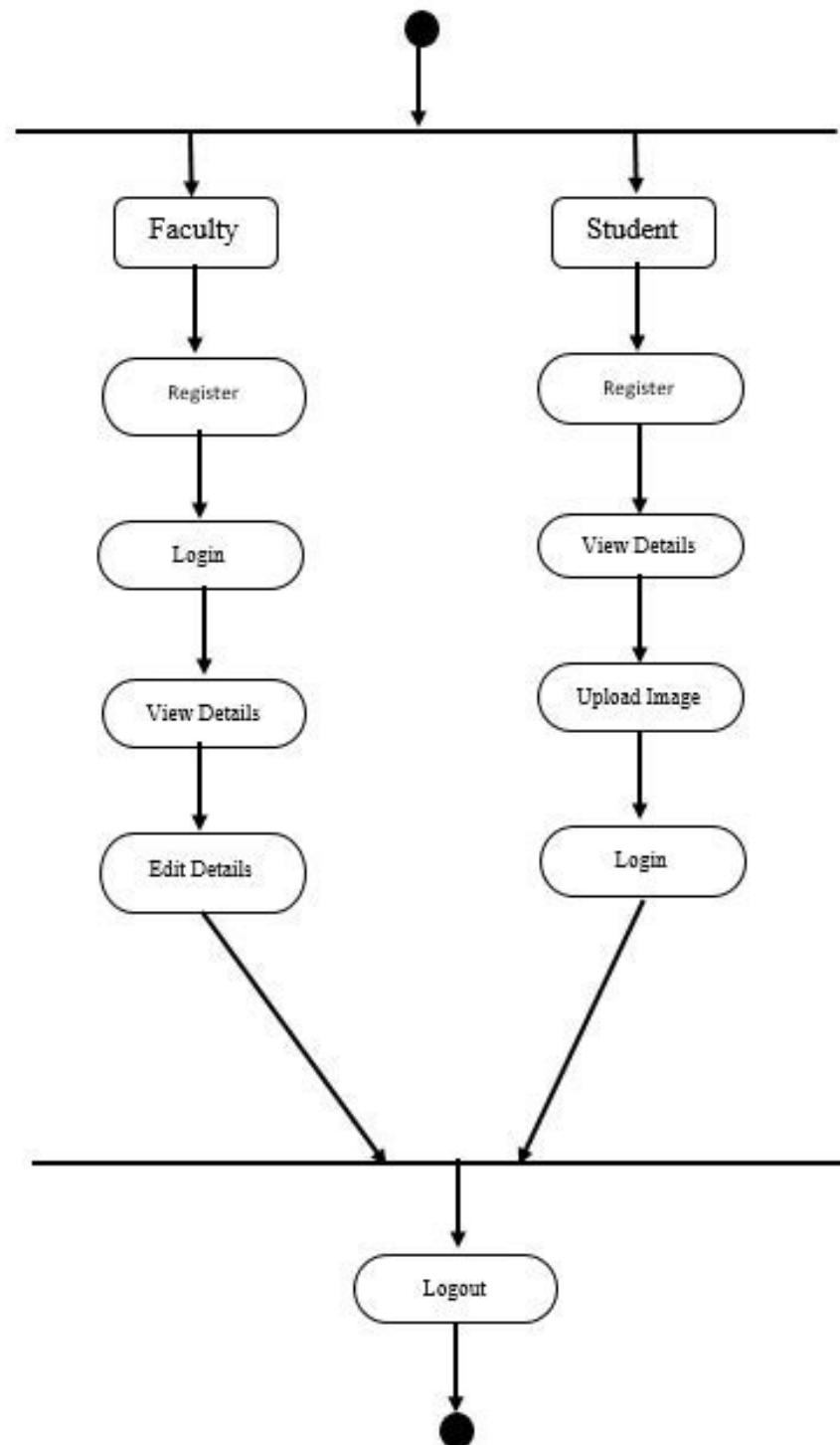


Figure 4.2 Activity Diagram

### 4.3 FLOWCHART:



**Figure 4.3 Flowchart**

#### 4.4 DATA FLOW DIAGRAM:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It can be manual, automated, or a combination of both. It shows how data enters and leaves the system, what changes the information, and where data is stored. The objective of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communication tool between a system analyst and any person who plays a part in the order that acts as a starting point for redesigning a system. The DFD is also called as a data flow graph or bubble chart. The symbols depict the four components of data flow diagram:

##### **External entity:**

An outside system that sends or receives data, communicating with the system being diagrammed. They are the sources and destinations of information entering or leaving the system. They might be an outside organization or person, a computer system or a business system. They are also known as terminators, sources and sinks or actors. They are typically drawn on the edges of the diagram.



External Entity

**Process:** any process that changes the data, producing an output. It might perform computations, or sort data based on logic, or direct the data flow based on business rules. A short label is used to describe the process, such as “Submit payment.”



Data Process

**Data store:** files or repositories that hold information for later use, such as a database table or a membership form. Each data store receives a simple label, such as “Orders.”

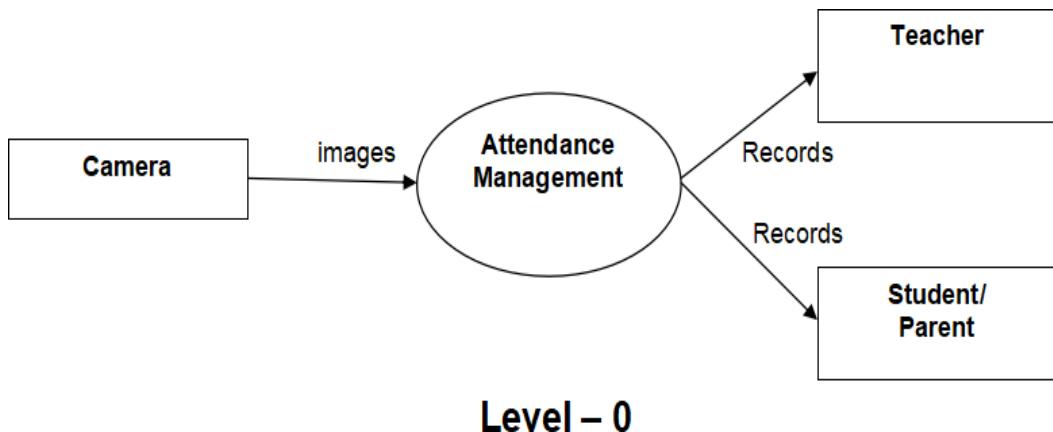


Data Store

**Data flow:** the route that data takes between the external entities, processes and data stores. It portrays the interface between the other components and is shown with arrows, typically labeled with a short data name, like “Billing details.” Levels in DFD are numbered 0, 1, 2 or beyond. Here, we will see mainly 3 levels in data flow diagram, which are: 0-level DFD, 1-level DFD, and 2-level DFD.

### **0-level DFD:**

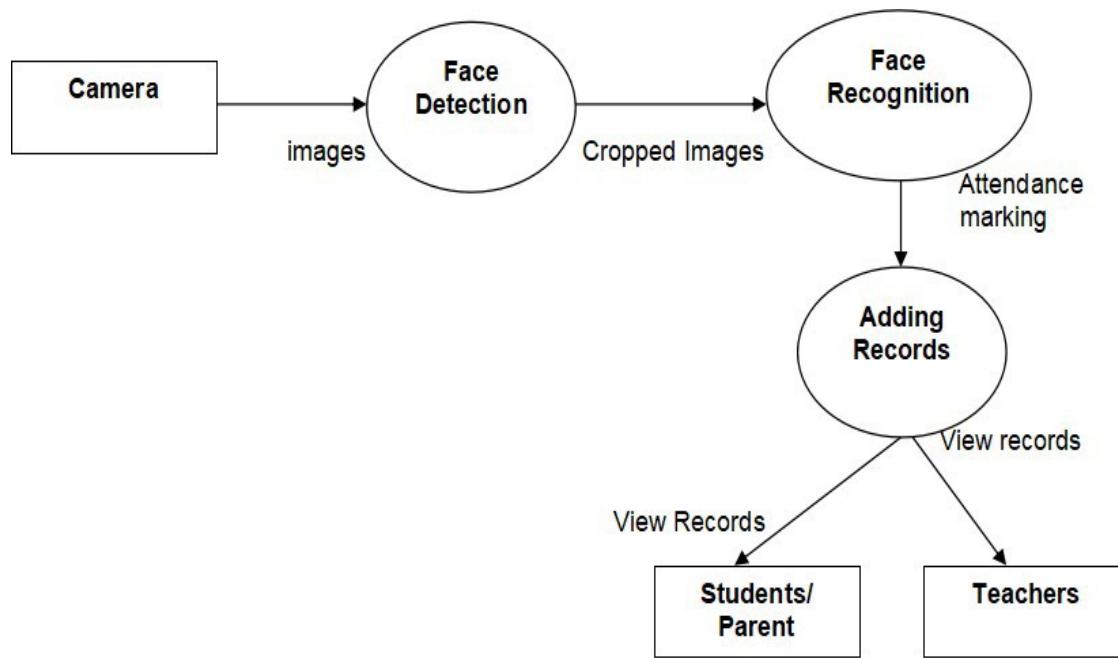
It is also known as context diagram. It's designed to be an abstraction view, showing the system as a single process with its relationship to external entities. It represents the entire system as single bubble with input and output data indicated by incoming/outgoing arrows.



**Figure 4.4.1: Level 0 Data Flow Diagram**

**1-level DFD:**

In 1-level DFD, context diagram is decomposed into multiple bubbles/processes. In this level we highlight the main functions of the system and breakdown the high level process of 0- level DFD into sub processes.

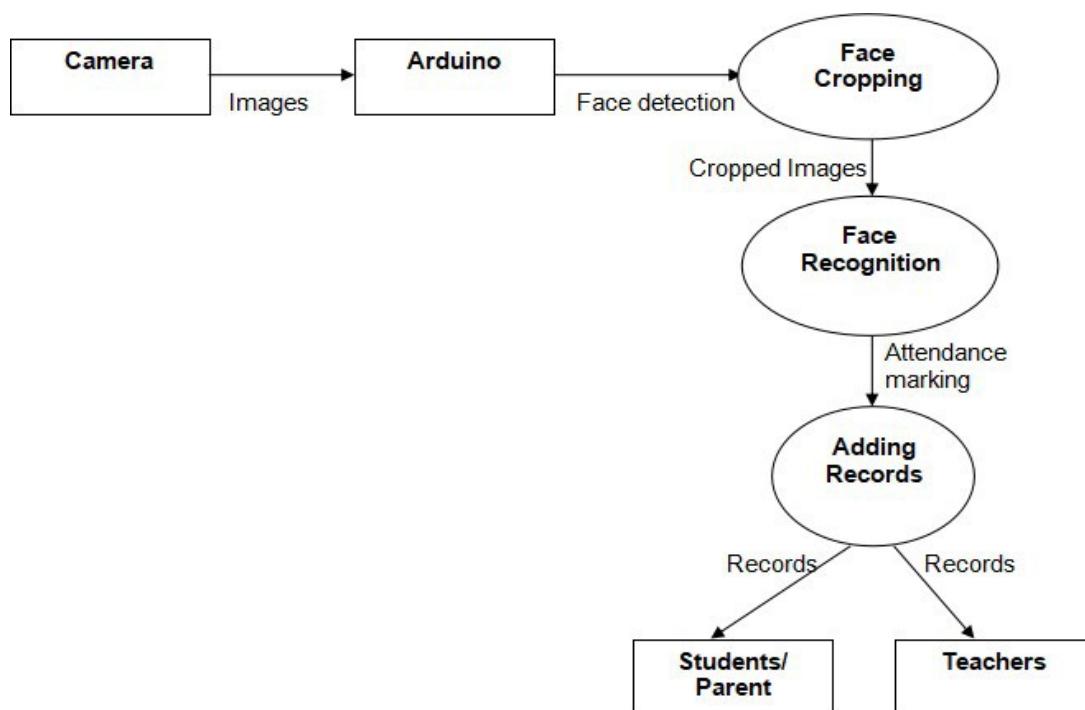


**Level – 1**

**Figure 4.4.2: Level 1 Data Flow Diagram**

**2-level DFD:**

2-level DFD goes one step deeper into parts of 1-level DFD. It can be used to plan or record the specific/necessary detail about the system's functioning.



**Level – 2**

**Figure 4.4.3: Level 2 Data Flow Diagram**

#### **4.5 USE CASE DIAGRAM:**

In the Unified Modeling Language (UML), a use case diagram can summarize the details of your system's users (also known as actors) and their interactions with the system. An effective use case diagram can help your team discuss and represent:

- Scenarios in which your system or application interacts with people, organizations, or external systems
- Goals that your system or application helps those entities (known as actors) achieve the scope of system.

Common components include:

- **Actors:** The users that interact with a system. An actor can be a person, an organization, or an outside system that interacts with your application or system. They must be external objects that produce or consume data.
- **System:** A specific sequence of actions and interactions between actors and the system. A system may also be referred to as a scenario.

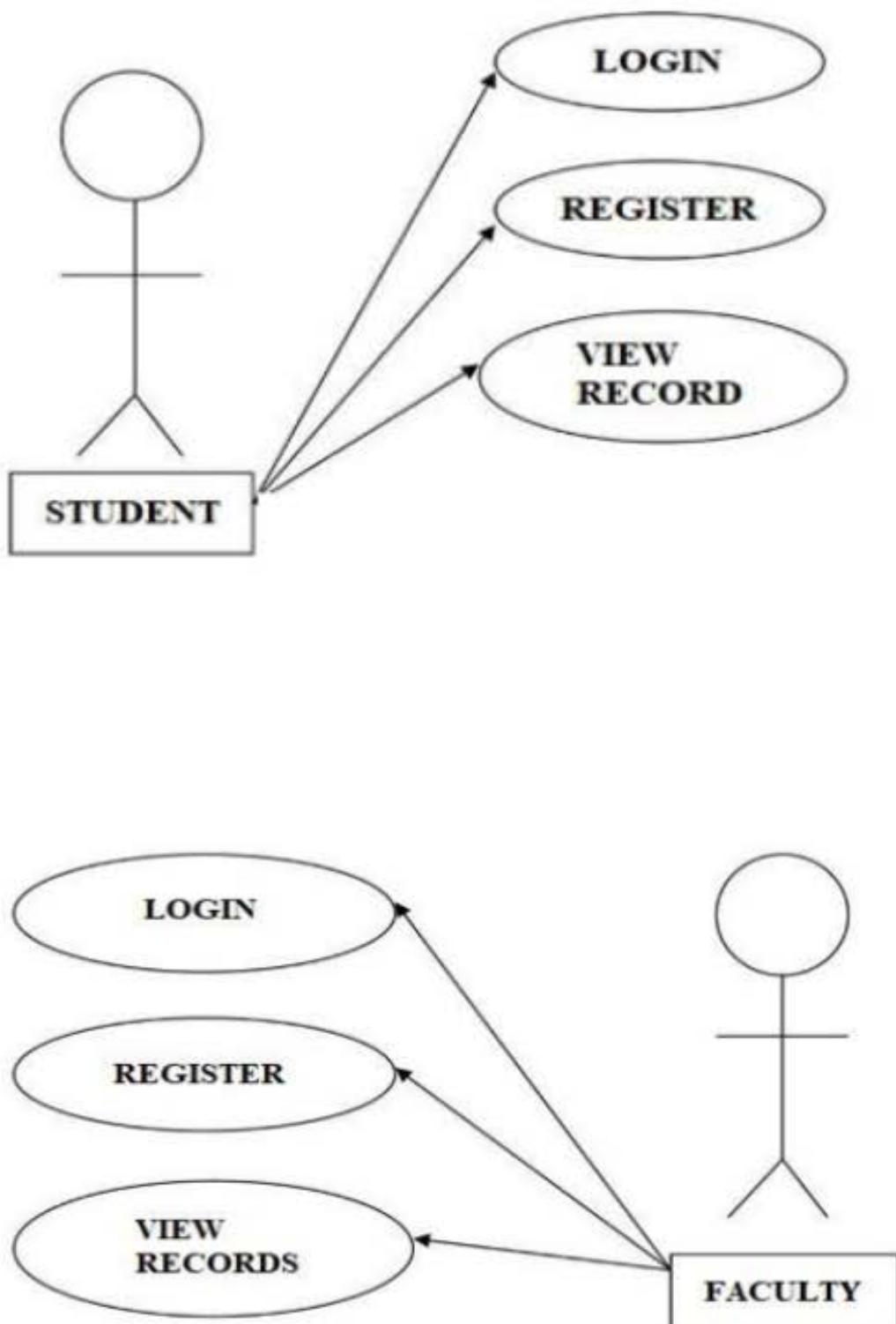


Figure 4.5: Use Case diagram

#### **4.6 SEQUENCE DIAGRAM:**

UML Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when. Sequence Diagrams captures:

1. The interaction that takes place in a collaboration that either realizes a use case or an operation (instance diagrams or generic diagrams)
2. High-level interactions between user of the system and the system, between the system and other systems, or between subsystems (sometimes known as system sequence diagrams).

#### **Purpose of Sequence Diagram**

- Model high-level interaction between active objects in a system
- Model the interaction between object instances within a collaboration that realizes a use case
- Model the interaction between objects within a collaboration that realizes an operation Either model generic interactions (showing all possible paths through interaction) or specific instances of an interaction (showing just one path through the interaction)

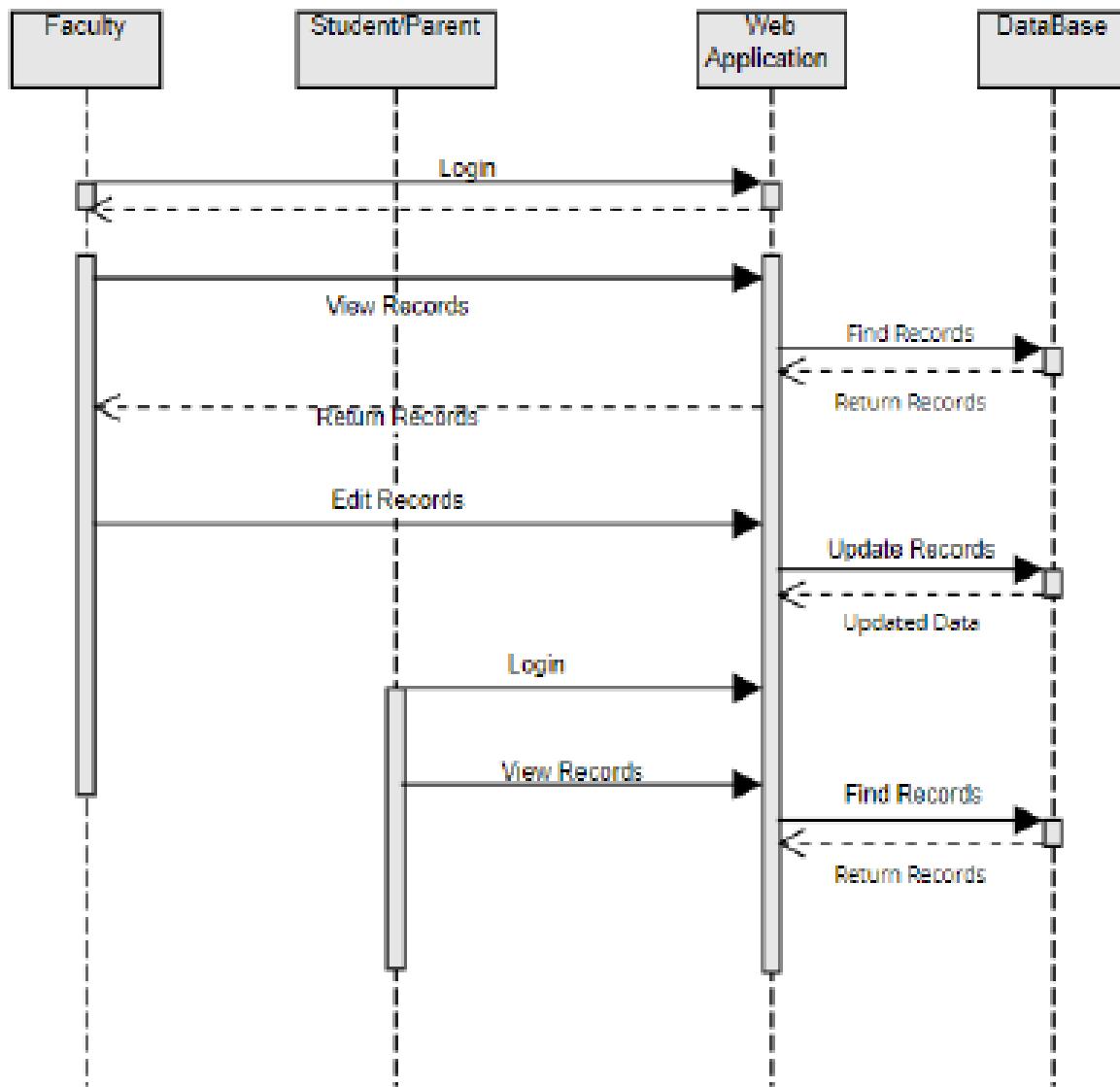
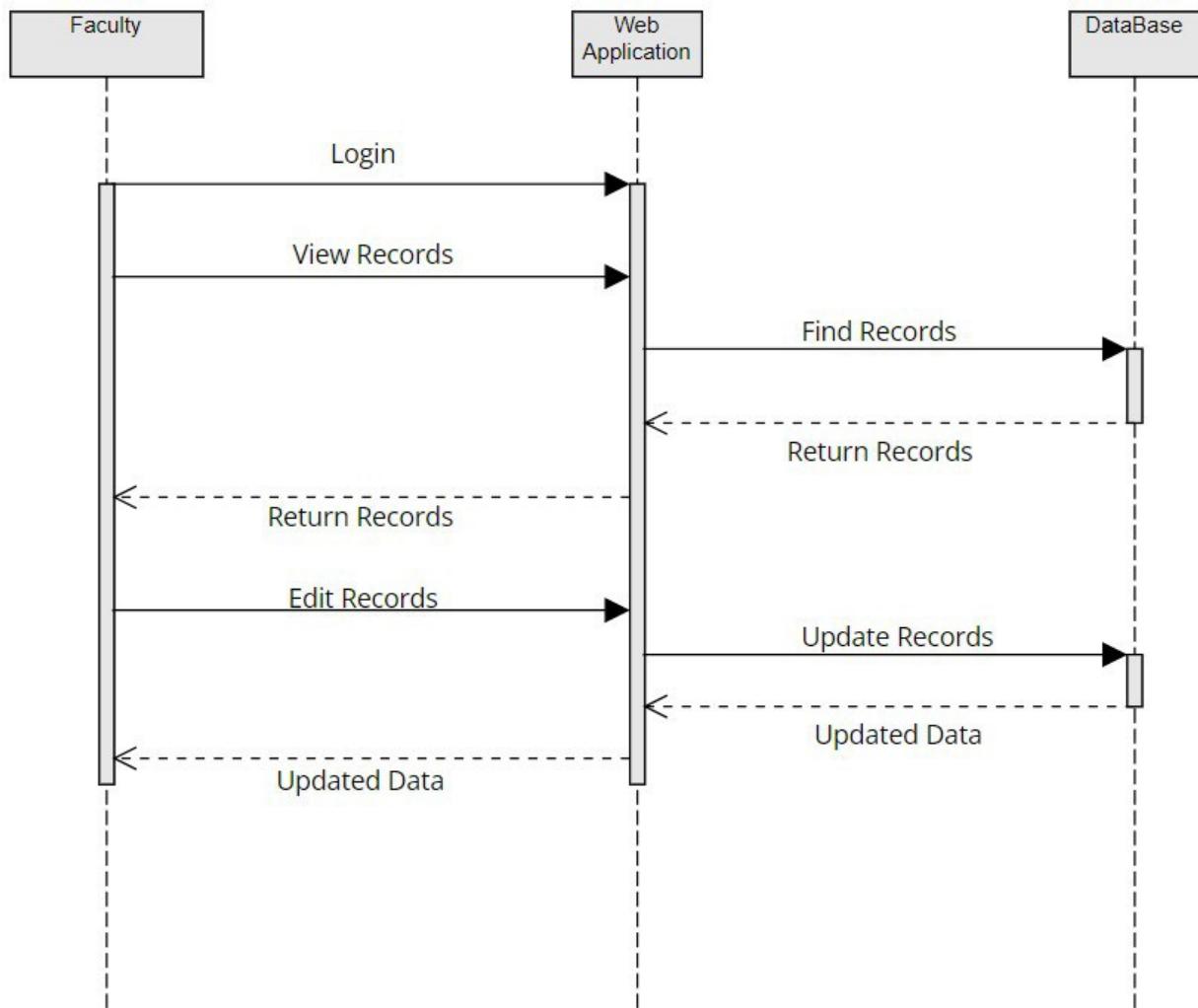


Fig 4.6 Sequence Diagram



**Fig 4.6.1 Faculty Sequence Diagram**

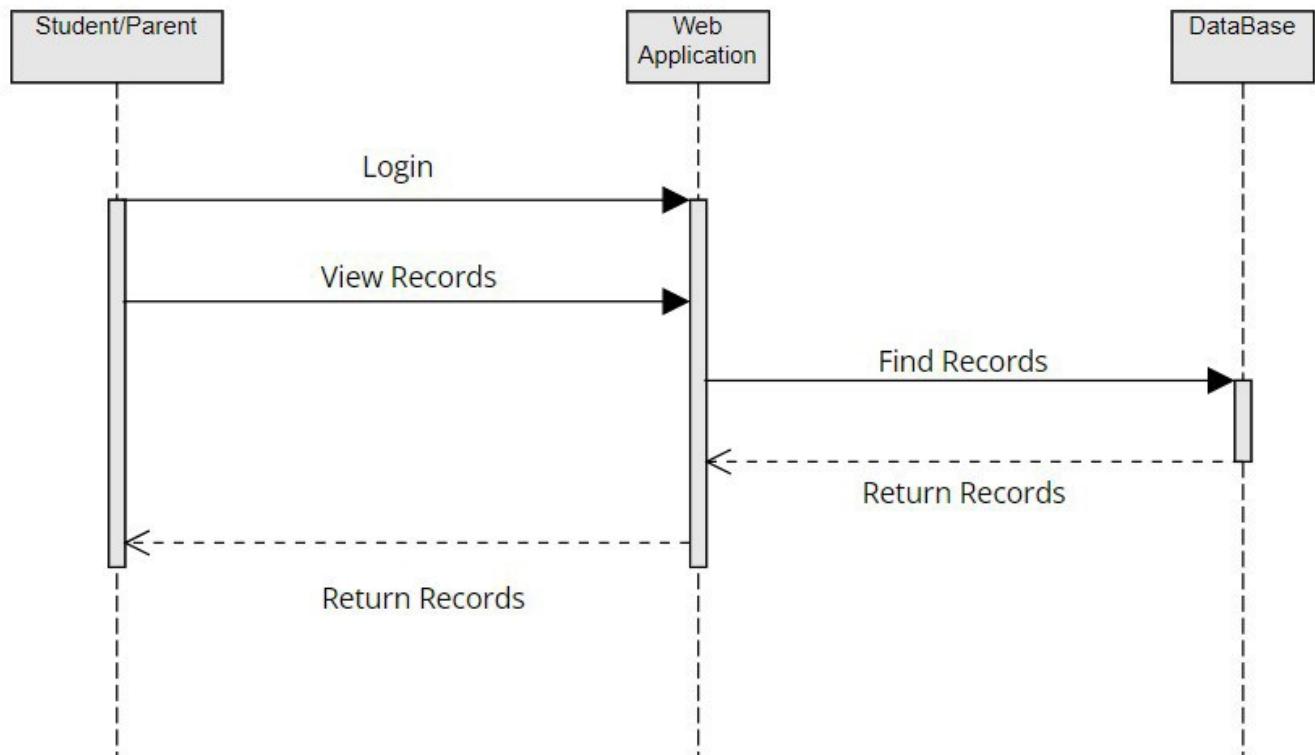


Fig 4.6.2 Student/Parent Sequence Diagram

## **CHAPTER 5**

### **IMPLEMENTATION - TOOLS AND TECHNOLOGIES USED**

Implementation is the stage in the project where the theoretical design is turned into a working system and is giving confidence on the new system for the users that it will work efficiently and effectively. It involves careful planning, investigation of the current system and its constraints on implementation, design of methods to achieve the changeover, an evaluation of change over method. Apart from planning major task of preparing the implementation are education and training of users. The implementation process begins with preparing a plan for the implementation of the system. According to this plan, the activities are to be carried out, discussions made regarding the equipment and resources and the additional equipment has to be acquired to implement the new system. Implementation is the final and the most important phase. The most critical stage in achieving a successful new system is giving the users confidence that the new system will work and be effective. The system can be implemented only after thorough testing is done and if it is found to be working according to the specification. This method also offers the greatest security since the old system can take over if the errors are found or inability to handle certain type of transactions while using then system.

## **5.1 TOOLS USED:**

### **PyCharm**

- An IDE is a software application/platform that provides an integrated environment to the programmers to develop, build, debug, package & deploy codes in multiple languages.
- Some of the famous IDE's are NetBeans, Eclipse (extremely popular for Java), etc. IDEs also provide interactive GUI tools to develop front-end applications which could take longer to develop if done manually (by coding).
- PyCharm is one of the most famous Integrated Development Environment (IDE) for Python, developed by a Czech organization called JetBrains.
- The integrated environment comes with the platform for Code Analysis, Graphical Debugger, Unit Tester and Version Control Systems, etc. It also supports web development with the Django framework.

### **Features**

- **Intelligent Coding Assistance**

PyCharm provides smart code completion, code inspections, on-the-fly error highlighting and quick-fixes, along with automated code refactorings and rich navigation capabilities.

- **Built-in Developer Tools**

PyCharm's huge collection of tools out of the box includes an integrated debugger and test runner; Python profiler; a built-in terminal; integration with major VCS and built-in database tools; remote development capabilities with remote interpreters; an integrated ssh terminal; and integration with Docker and Vagrant.

- **Web Development**

In addition to Python, PyCharm provides first-class support for various Python web development frameworks, specific template languages, JavaScript, CoffeeScript, TypeScript, HTML/CSS, AngularJS, Node.js, and more.

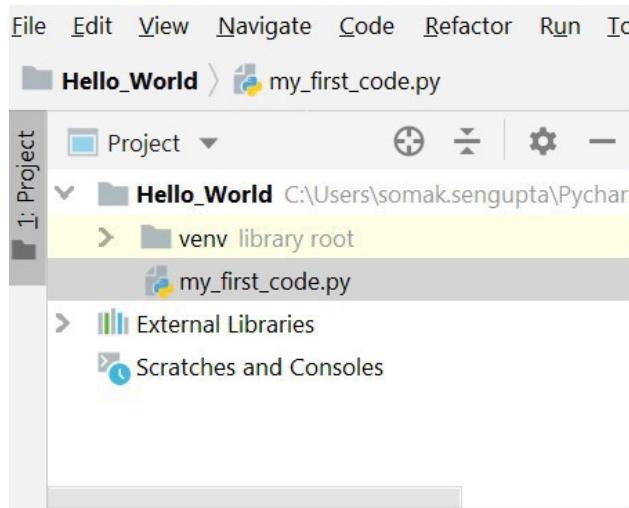
- **Scientific Tools**

PyCharm integrates with IPython Notebook, has an interactive Python console, and supports Anaconda as well as multiple scientific packages including Matplotlib and NumPy.

## Tools of PyCharm

### 1. Project Window

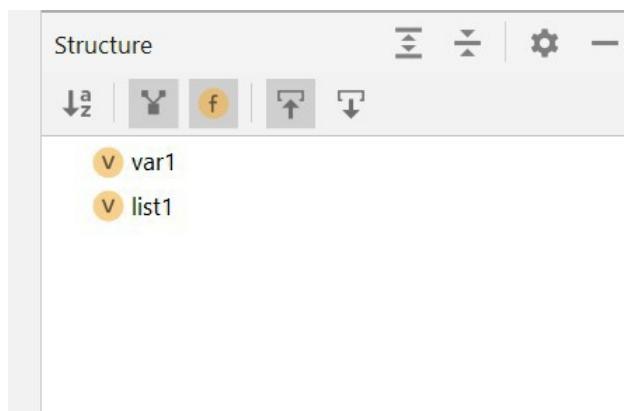
Provides complete navigation of project-related objects (like python script files/data files, etc) including the libraries available in the site-packages repository.



**Fig 5.1.1 Project Window**

### 2. Structure Window

It provides the list of variables and datasets created in the selected python file.



**Fig 5.1.2 Structure Window**

### 3. Code Editor Window

A window where you write your python codes is known as Code Editor Window.

```
my_first_code.py x my_second_code.py x
1 import pandas as pd
2
3 print("Hello World! This is my first code in Python.")
4
5 var1 = 10
6
7 list1 = list([1,2,3,4])
```

The screenshot shows the PyCharm Code Editor with two tabs: "my\_first\_code.py" and "my\_second\_code.py". The "my\_first\_code.py" tab is active. The code in the editor is:

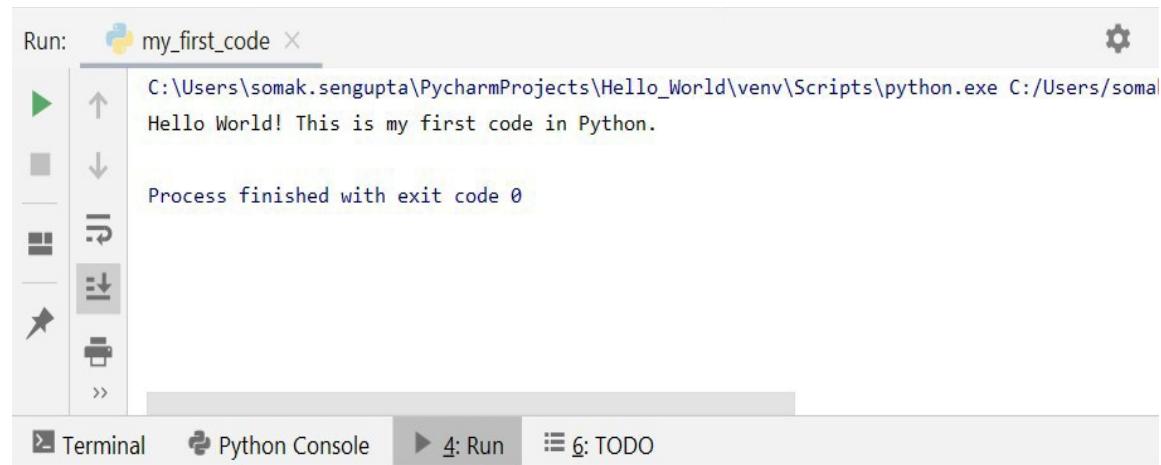
```
import pandas as pd
print("Hello World! This is my first code in Python.")
var1 = 10
list1 = list([1,2,3,4])
```

The line "list1 = list([1,2,3,4])" is highlighted with a yellow background.

**Fig 5.1.3 Code Editor Window**

## 4. Terminal & Run

The console window is where programmers can write a piece of code and see the result after execution.



A screenshot of the PyCharm IDE's Python Console tab. The title bar says "Run: my\_first\_code". The console output shows:

```
C:\Users\somak.sengupta\PycharmProjects>Hello_World\venv\Scripts\python.exe C:/Users/soma
Hello World! This is my first code in Python.

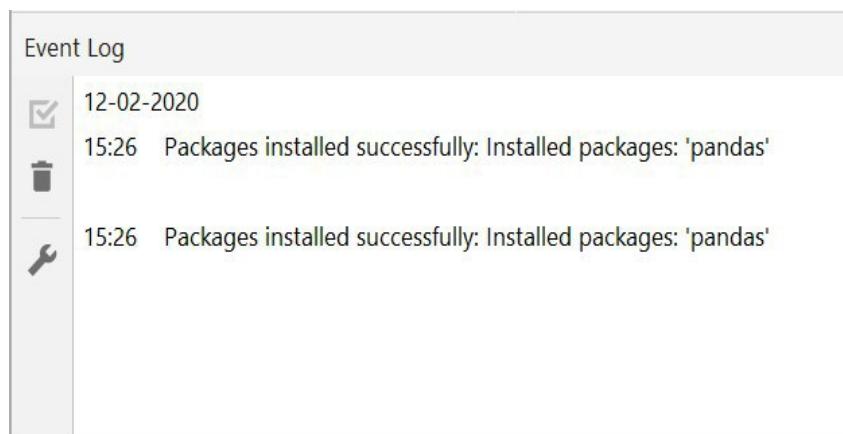
Process finished with exit code 0
```

The bottom navigation bar includes tabs for Terminal, Python Console (which is selected), Run, and TODO.

**Fig 5.1.4 Terminal & Run**

## 5. Event Log

The log is where programmers can see the events related to the environment. This includes the module installation, upgrades, etc.



**Fig 5.1.5 Event Log**

## Writing code in PyCharm

Writing code in an IDE is one of the easiest things in the world. However, you need to know a few basic configurations and settings, to begin with. Here is a quick snapshot of how you can do it in PyCharm:

### 1. Go to Menu bar – File > New Project

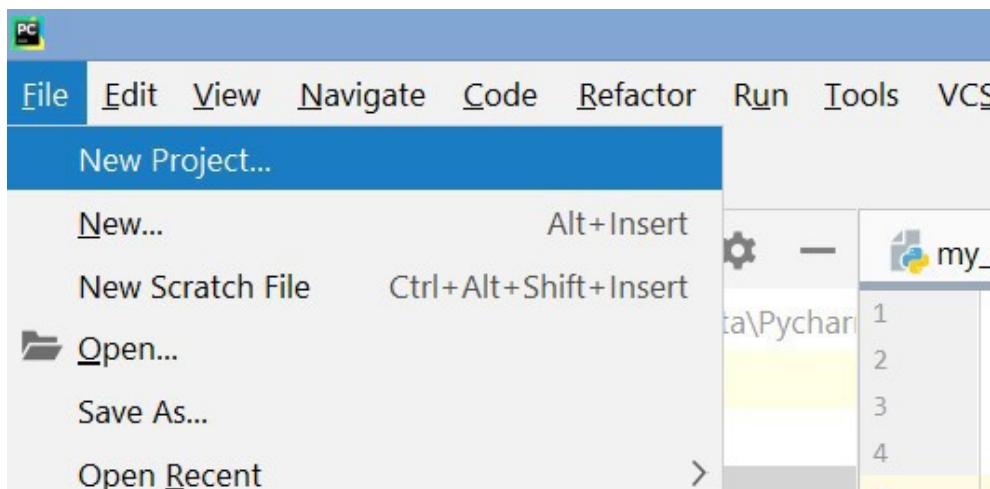


Fig 5.1.6 New Project

### 2. Create Project

This dialogue/input box allows you to give the name of the project, select the python environment you want to use (you could use Virtualenv which is provided by PyCharm or Conda environment which is provided by Anaconda), set the location of your project (recommended to use the one which is by default – to avoid any complications).

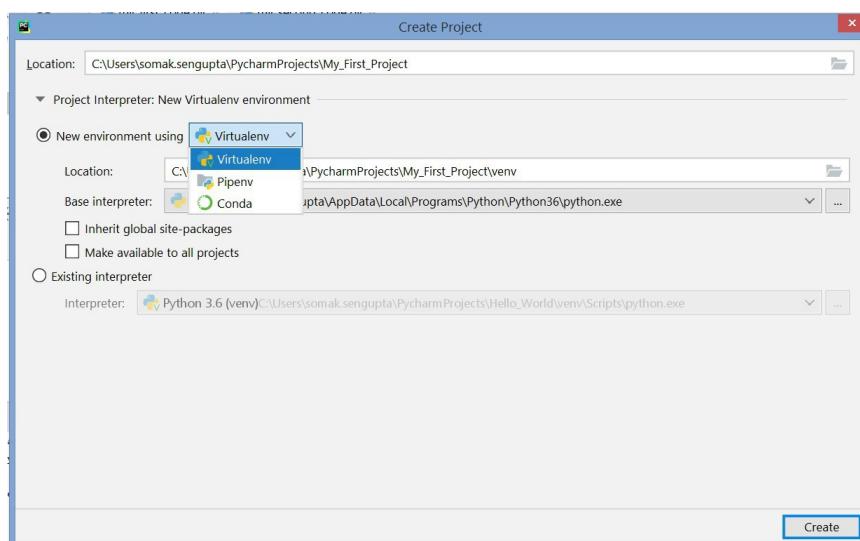
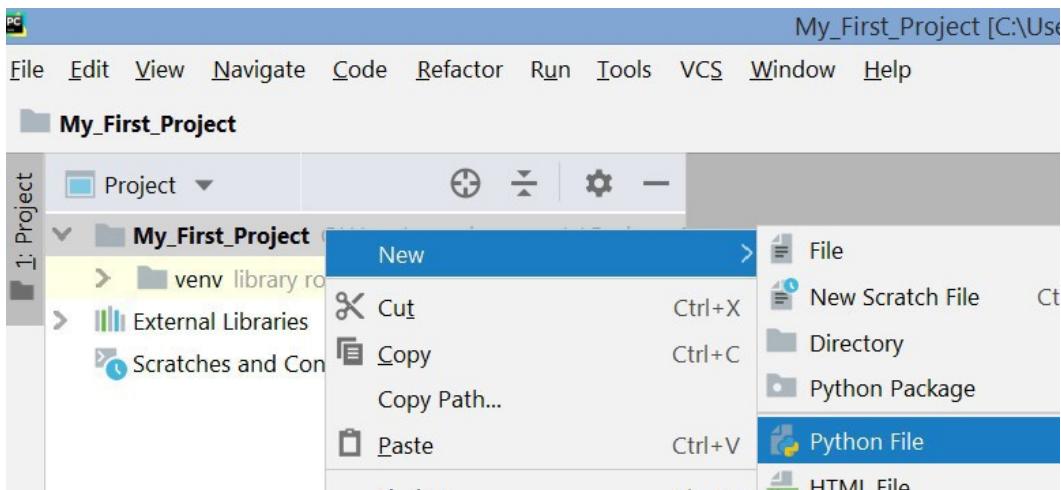


Fig 5.1.7 Create Project

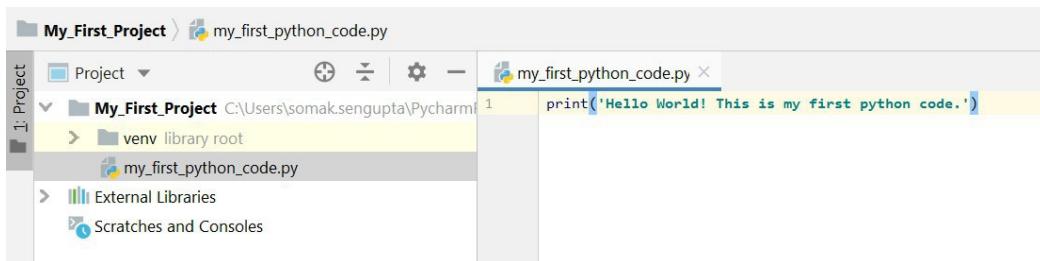
### 3. And you are ready to go!

4. Create a new python file in your project. Let's say we name it as `my_first_python_code.py`



**Fig 5.1.8 New Python file**

5. Once we create the file, the code editor opens and we write our python code in it.



**Fig 5.1.9 Writing Python Code**

## Running Code in PyCharm

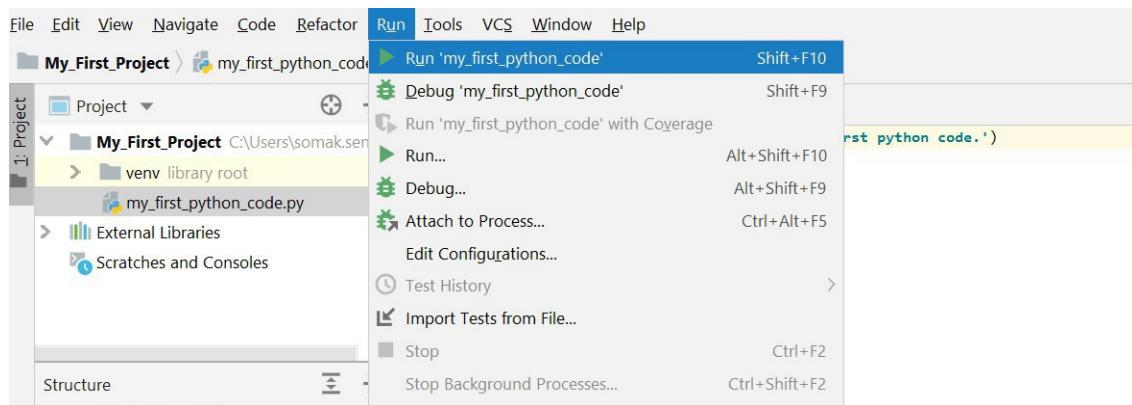
- Once we write our code in the code editor, we want to execute it. There are multiple ways of doing so-

By using hot keys / shortcut keys :

Alt+Shift+E this executes the highlighted piece of code in the editor.

Shift+F10 this executes the entire code or the entire script.

2. Or simply use the following tool to execute the complete code. The difference between the highlighted Run (Shift+F10) and the second Run (Alt+Shift+F10) is that the first one only executes the current Python script (or file) while the second one executes all the python files or scripts in the projects. Note that in that case, the sequence has to be defined or maintained by the programmer.

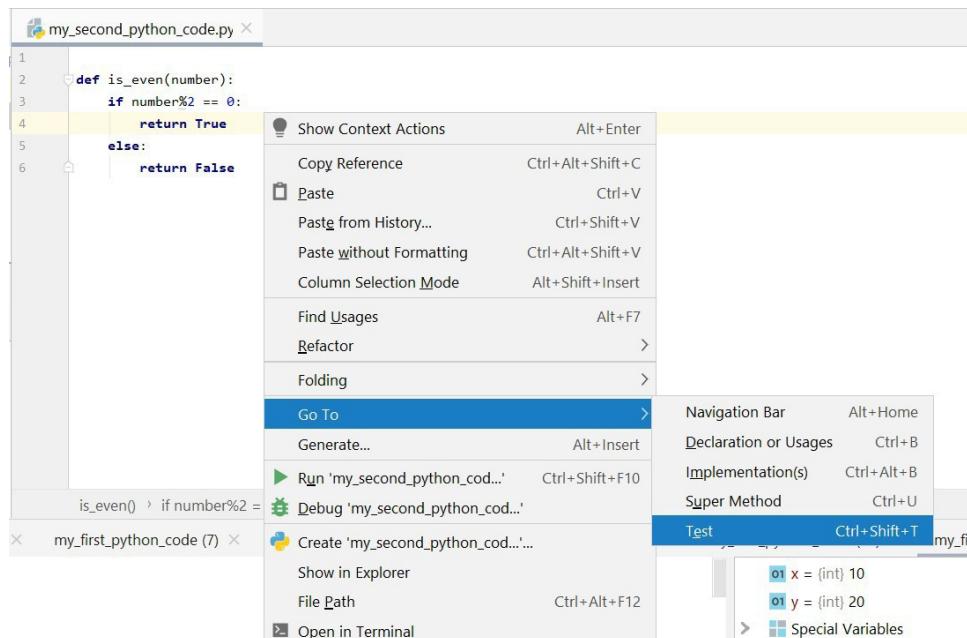


**Fig 5.1.10 Tools to run program**

## Testing in PyCharm

To test code in Python, PyCharm provides an inbuilt Unit Tester. Here is how we can test our first function using the Test feature provided in PyCharm.

1. Right click on the function(return true if an integer given is Even) you want to perform unit testing, select Go To > Test



**Fig 5.1.11 Test option**

## 2. Select Create New Test

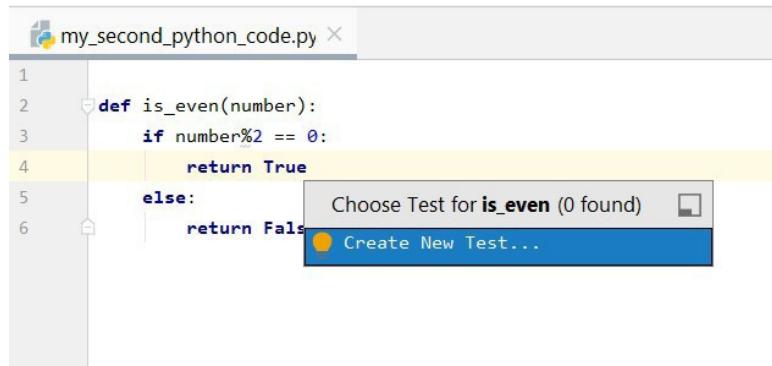


Fig 5.1.12 Creating new Test

## 3. Hit the Ok button

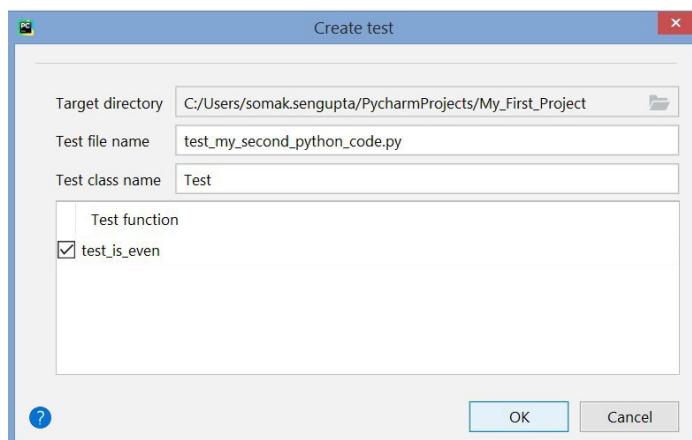


Fig 5.1.13 Created New Test

## 4. Run the Unittest code as follows. This code will check if the return type of the is\_even function is true and accordingly mark the test case as pass or fail.

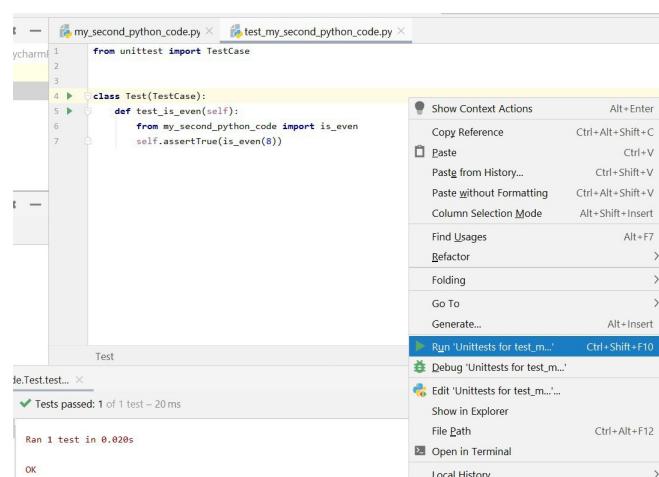


Fig 5.1.14 Running Unit Test

## **CHAPTER 6**

### **SYSTEM TESTING**

System testing is the stage of implementation, which is aimed at ensuring that the system works accurately and efficiently before live operation commences. Testing is the process of executing the program with the intent of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied. The ultimate aim is quality assurance. Tests are carried out and the results are compared with the expected document. In the case of erroneous results, debugging is done. Using detailed testing strategies, a test plan is carried out on each module. The various tests performed in “Network Backup System” are unit testing, integration testing and user acceptance testing.

#### **Unit Testing**

The software units in a system are modules and routines that are assembled and integrated to perform a specific function. Unit testing focuses first on modules, independently of one another, to locate errors. This enables, to detect errors in coding and logic that are contained within each module. This testing includes entering data and ascertaining if the value matches to the type and size supported by java. The various controls are tested to ensure that each performs its action as required.

#### **Integration Testing**

Data can be lost across any interface, one module can have an adverse effect on another, sub functions when combined, may not produce the desired major functions. Integration testing is a systematic testing to discover errors associated within the interface. The objective is to take unit tested modules and build a program structure. All the modules are combined and tested as a whole. Here the Server module and Client module options are integrated and tested. This testing provides the assurance that the application is well integrated functional unit with smooth transition of data.

#### **User Acceptance Testing:**

User acceptance of a system is the key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keeping in touch with the system users at time of developing and making changes whenever required data.

**White Box Testing:**

White Box Testing is a testing in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is used to test areas that cannot be reached from a black box level.

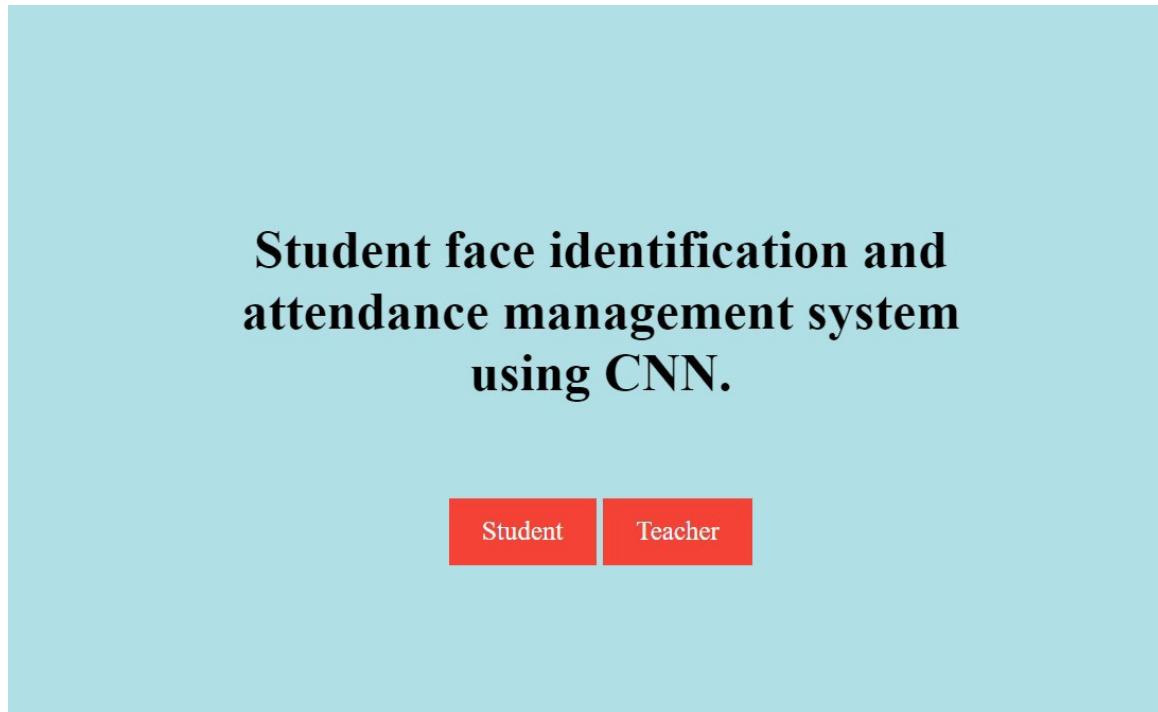
**Black Box Testing:**

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated as a black box. You cannot "see" into it. The test provides inputs and responds to outputs without considering how the software works.

<b>Case No</b>	<b>Description</b>	<b>Input</b>	<b>Expected output</b>	<b>Actual output</b>	<b>Remark</b>
1	Student login	USN, Password	Direct to student information page	Directed to student information page	Success
2	Student login	USN, Password	Direct to student information page	Not Registered student	Failure
3	Student Registration	Name, USN, Email, Password	Direct to camera module	Directed to camera module	Success
4	Student Registration	Name, USN, Email, Password	Direct to camera module	Incorrect	Failure
5	Camera module	Image is taken	Pop-up message indicating success	Pop-up message indicating success	Success
6	Camera module	Image is taken	Pop-up message indicating success	Unsuccessful	Failure
7	Attendance module	Image	Verify and Mark attendance	Verified and marked attendance	Success
8	Attendance module	Image	Verify and Mark attendance	Image not recognized	Failure
9	Faculty login	ID, Password	Direct to Student information page	Directed to student information page	Success
10	Faculty login	ID, Password	Direct to Student information page	Faculty not registered	Failure
11	Faculty Registration	Name, ID, Email, Password	Direct to Faculty login page	Directed to Faculty login page	Success
12	Faculty Registration	Name, ID, Email, Password	Direct to Faculty login page	Incorrect	Failure

## **CHAPTER 7**

### **RESULTS AND DISCUSSIONS**



**Fig 7.1 Homepage**

### **Student Login.**

USN Number  
3BR18CS143

Password  
.....

**Fig 7.2 Student Login Page**

## Student Registration.

Name:

USN Number:

Email:

Password:

Conform Password:

Fig 7.3 Student Registration page

## Faculty Login

ID Number

Password

Fig 7.4 Faculty login page

## Faculty Registration.

Name:

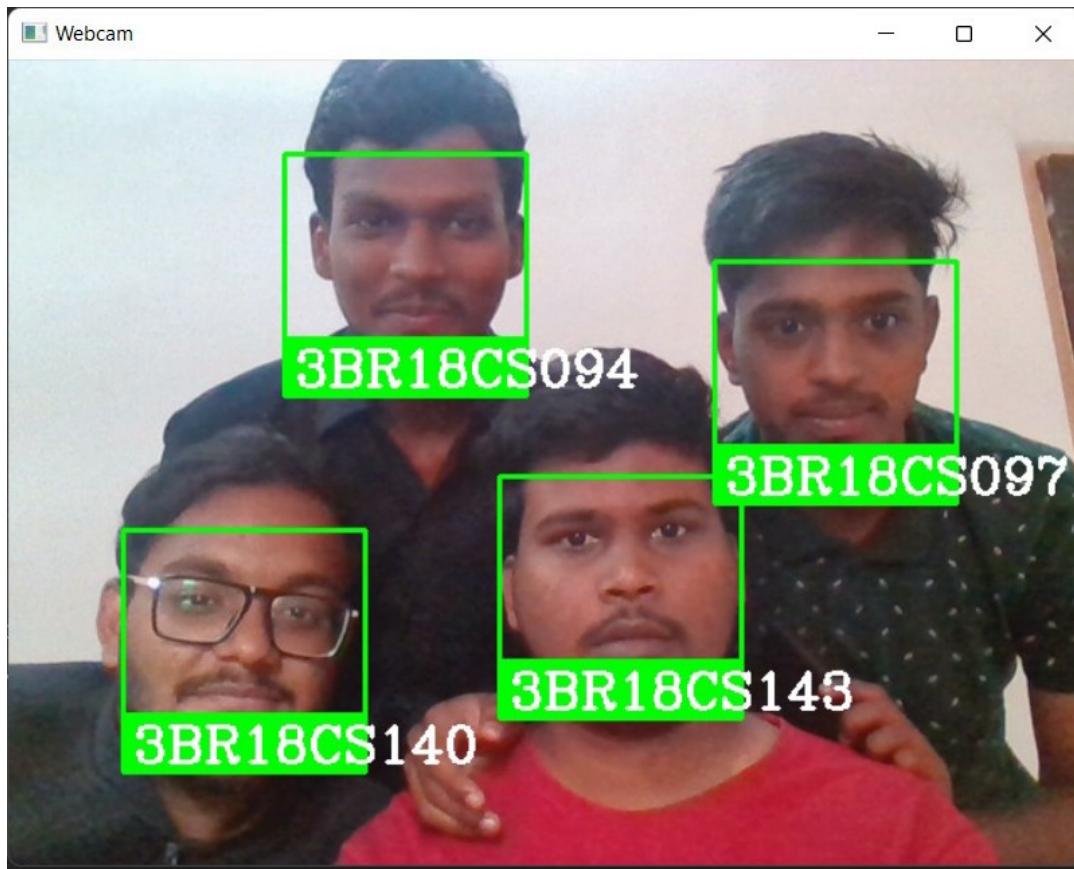
ID Number:

Email:

Password:

Conform Password:

**Fig 7.5 Faculty Registration Page**



**Fig 7.6 Camera Module identifying faces**

## **CHAPTER 8**

### **CONCLUSION**

The results obtained for the face detection and recognition for attendance management using a real-world document dataset clearly shows that the overall performance of the proposed system is promising and it is suitable for practical use.

This system uses Convolution Neural Network (CNN) and Histogram of Oriented Gradient(HOG). The HOG method produces a gray scale gradient image and forwards it to CNN this helps it to extract the features efficiently and helps in recognizing the face even in bad lighting.

## **REFERENCES**

- [1] Kewen Yan , Shaohui Huang , Yaxian Song , Wei Liu , Neng Fan, "Face Recognition Based on Convolution Neural Network", 36th Chinese Control Conference (CCC) , July 2017.
- [2] Author: Patrik Kamencay, Miroslav Benco, Tomas Mizdos, Roman Radil, "A New Method for Face Recognition Using Convolutional Neural Network", Digital Image Processing and Computer Graphics, VOLUME: 15, 2017.
- [3] Refik Samet, Muhammed Tanrıverdi "Face Recognition-Based Mobile Automatic Classroom Attendance Management System", International Conference on Cyberworlds (CW), September 2017.
- [4] Devaprakash , Gowtham , Murali , Muralidharan , V.J.Vijayalakshmi, "Centralized Attendance Monitoring System", 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS), March 2020
- [5] Shreyak Sawhney, Karan Kacker ,Samyak Jain, Shailendra Narayan Singh , Rakesh Garg, "Real-Time Smart Attendance System using Face Recognition Techniques", 2019 9th International Conference on Cloud Computing, Data Science & Engineering (Confluence), January 2019.
- [6] Xiaojun Bai , Feihu Jiang , Tianyi Shi , Yuang Wu, "Design of Attendance System Based on Face Recognition and Android Platform", 2020 International Conference on Computer Network, Electronic and Automation (ICCNEA), September 2020.
- [7] Omar Abdul Rhman Salim , Rashidah Funke Olanrewaju , Wasiu Adebayo Balogun, "Class Attendance Management System Using Face Recognition", 2018 7th International Conference on Computer and Communication Engineering (ICCCE), September 2018.
- [8] Rajat Kumar Chauhan, Vivekanand Pandey, Lokanath M, "Smart Attendance System Using CNN", International Journal of Pure and Applied Mathematics, Volume 119 No. 15 2018.

**BALLARI INSTITUTE OF TECHNOLOGY AND MANAGEMENT, BALLARI  
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**



**Project CO-PO Mapping  
ACADEMIC YEAR 2021-22**



U.S.N.	Student Name	Guide Name	Project Title
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3BR18CS097	MOHAMMED JUNAID SHAIK		
3BR18CS094	MD. YASEEN		

**COURSE OUTCOMES(CO'S)**

Course Outcomes COx	Description of Course Outcomes
CO1	Identify the problem in the field of Attendance Management.
CO2	Analyze the problem on manual Attendance Management.
CO3	Design the solution methodologies for the Automation of Attendance Management using Facial Recognition model.
CO4	Write technical Project report by following professional ethics
CO5	Create and publish the outcome of the thesis into an article

**CO-PO MAPPING**

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1			1									
CO2		3		1										
CO3		1	3		1									
CO4										3		1	1	
CO5									1	1	2		1	1

**Signature of Guide  
Mr. SRIDHAR S.K.**

## PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

- PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

- PSO1.** Understand the principles, architecture and organization of computers, embedded systems and computer networks
- PSO2.** To develop software applications using advanced technologies to cater the growing needs of industry.

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