A PROJECT REPORT ON

"SECURITY SURVEILLENCE SYSTEM"

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IN

CS (Artificial intelligence and machine learning)

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ABSTRACT

The face is one of the easiest ways to distinguish the individual identity of each other. Face recognition is a personal identification system that uses personal characteristics of a personto identify the person's identity. Human face recognition procedure basically consists of two phases, namely face detection, where this process takes place very rapidly in humans, except under conditions where the object is located at a short distance away, the next is the introduction, which recognize a face as individuals. Stage is then replicated and developed as a model for facial image recognition (face recognition) is one of the much-studied biometrics technology and developed by experts. There are two kinds of methods that are currently popular in developed face recognition pattern namely, Eigenface method and Fisherface method. Facial image recognition Eigenface method is based on the reduction of facedimensional space using PrincipalComponent Analysis (PCA) for facial features. The main purpose of the use of PCA on face recognition using Eigen faces was formed (face space) by finding the eigenvector correspondingto the largest eigenvalue of the face image. The area of this project face detection system with face recognition is Image processing. The software requirements for this project is matlab software.

Keywords: Digital Image Processing, Face Detection, Face Recognition, MotionDetecti

TABLE OF CONTENTS

Sr. No.	Title of Chapter	Page No.
01	**Introduction**	
1.1	Overview	
1.2	Motivation	
1.3	Problem Definition and Objectives	
1.4	Project Scope & Limitations	
02	**Literature Survey (Atleast 20 Papers in Paragraph Form)**	
03	**Software Requirements Specification**	
3.1	System Requirements	
3.1.1	Database Requirements	
3.1.2	Software Requirements (Platform Choice)	
3.1.3	Hardware Requirements	
04	**System Design**	
4.1	System Architecture	
4.2	Mathematical Model	
4.3	Data Flow Diagrams	
4.4	Entity Relationship Diagrams	
4.5	UML Diagrams	
05	**Project Plan**	
5.1	Project Estimate	
5.1.1	Reconciled Estimates	
5.1.2	Project Resources	
5.3	Project Schedule	
5.3.1	Project Task Set	
5.3.2	Task Network	
5.3.3	Timeline Chart	
5.4	Team Organization	
5.4.1	Team structure	
5.4.2	Management reporting and communication	
06	**Project Implementation**	
6.1	Overview of Project Modules	
6.2	Tools and Technologies Used	
6.3	Algorithm Details	
6.3.1	Algorithm 1	
6.3.2	Algorithm 2	
6.3.3	…	
09	**Conclusions**	
	References	

	Appendix A: Details of paper publication: name of the conference/journal, comments of reviewers, certificate, paper. **Appendix B**: Plagiarism Report of project report.	

LIST OF ABBREVATIONS

ABBREVIATIONS	ILLUSTRATION
VPN	Virtual Private Network
IP	Internet Protocol
IDS	Intrusion Detection System
TCP	Transmission Control Protocol

LIST OF FIGURES

FIGURE	ILLUSTRATION	PAGE NO.
1.1	System Overview	3
1.2	System Behavior	5
2.1	TCP Header	11
4.1	Waterfall Model	27
4.2	Timeline Chart	30
4.3	DFD Level – 0	31
4.4	DFD Level – 1	32
4.5	DFD Level – 2	33
4.6	Use case Diagram	34
4.7	Sequence Diagram	35
4.8	ER Diagram	36
4.9	Class Diagram	37
4.10	Component Diagram	38
4.11	Deployment Diagram	39
4.12	State Machine Diagram	40

LIST OF TABLES

TABLE	ILLUSTRATION	PAGE NO.
4.1	Project Plan	29
3.1	Packet Information	47
3.2	Network Error	48
3.3	IP Configuration	48

1. Introduction

1.1 Overview

In sensitive area where generally no one is allowed So first we will detect the motion after The motion detection it automatically revoke the functions for face detection.The identification of human can be done through the face of human. So first we detect face of human after that, Does that face has mask or it is naked face. If it is naked face check in our database that does that human is present in database or someone else. Real time security face recognition is part of the field of biometrics. Biometrics is the ability for a computer to recognize a human through a unique physical trait. Face recognition provides the capability for the computer to recognize a human by facial characteristics. Today, biometrics is one of the fastest growing fields in advanced technology. Predictions indicate a biometrics explosion in the next century, to authenticate identities and avoid and unauthorized access to networks, database and facilities.

1.2 Problem Definition and Objectives

The problem is that in some sensitive area where no one is allowed, so detect themotion to identify if someone is entering in there and check if that person is database ornot.

1.3 Project Scope & Limitations

A facial recognition device is a device that takes an image or a video of a humanface and compares it to other image faces in a database. The structure, shape and proportions of the faces are compared during the face recognition steps. In addition, distance between the eyes, nose, mouth and jaw, upper outlines of the eye sockets, the sides of the mouth, location of the nose and eyes, and the area surrounding the check bones are also compared. When using a facial recognition program, several pictures of the person must be taken at different angles and with different facial expressions. At timeof verification and identification the subject stands in front of the camera for a few seconds, and then the image is compared to those that have been previously recorded. Facial recognition is widely used because of its benefits. The advantages of facial recognition are that it is not intrusive, can be done from a faraway distance even withoutthe person being aware that he/she is being scanned. Such thing is needed in banks or government offices for example, and this is what makes facial recognition systems betterthan other biometric techniques in that they can be used for surveillance purposes like searching for wanted criminals, suspected terrorists, or missing children. Face recognitiondevices are most beneficial to use for facial authentication than for identification purposes, because it is easy to alter someone's face, and because the person can disguiseusing a mask. Environment is also a consideration as well as subject motion and focus onthe camera. Facial recognition, when used in combination with another biometric method, can improve verification and identification results dramatically.

2. Literature Survey

Rishabh Paunikar, Shubham Thankare, Utharsh Abuse from Computer Engineering Bharati Vidyapeeth College of Engineering, Navi Mumbai. In April 2020 they made a complex projectnamed “Action Recognition Using Surveillance System” the project was based on ideas in whichthe neural network with different datasets twice for computing an action. For object detection, the yoloV3 [3] will be used to detect humans and or any other objects and for activityrecognition. The same neural network processing Yolo[2] weights will be used again which will be trained on a different dataset with human actions. They got the conclusion of the project demonstrating pattern matching, object detection, and action recognition. Using space-time convolutions and YOLO [2][3][4] over a large number of video frames, we obtain bounding boxes that detect the object or human in the frame. With a consequently larger training dataset, the media output will be much more efficient. 3 Figure 1.1 Bounding Boxes when Threshold isset high for the same image

- Nandhini R, Duraimurugan N, S.P.Chokkalingam from International Journal of Engineering and Advanced Technology (IJEAT). In February 2019 they made a project named “Face Recognition Based Attendance System”. It was on Automatic face recognition (AFR) technologies have made many improvements in the changing world. Smart Attendance using Real-Time Face Recognition. They developed the “Fingerprint Based Recognition” later hoursor before, the student needs to record the fingerprint on the configured device to ensure their attendance for the day. The problem with this approach is that during the lecture time it may distract the attention of the students then they implemented “Radio Frequency Identification” using a connection of RS232. The conclusion was using the video capturing method one uses to recognize students convert it into frames, relate it with the database to ensure their presenceor absence, mark attendance to the particular student to maintain the record. The Automated Classroom Attendance System helps in increasing the accuracy and speed ultimately achievinghighprecision real-time attendance to meet the need for automatic classroom evaluation. Figure 1.2 Post Processing frames 4

- K.Govinda1 K., Sai Krishna Prasad, Sai ram susheel SCSE, University, Vellore, India, SENSE, VIT University Vellore, India. They Created a nice project named “Intrusion Detection Systemfor Smart Home using Laser Rays” In March 2014 whereas it is issued in vol. 2in IJSED(International Journal for Scientific Research & Development) it is based on the device that works based on the interaction between the sensor (which is LDR) and light source, preferablya LASER. When light is incident upon the LDR that is connected-the resistance would below,which directs a high input current through the base of the transistor, which in turn gives a low output which is accepted as an input into the buzzer. The conclusion of the program is most occasions the security system was usually occupied or organized by big insurance companies or specific security companies. That means users need to pay higher money for management fees to protect the safety of their own houses. In this paper, we develop another home-securitysystem combined with some brand-new technologies such as a wireless sensor network. This security system has been tested under

many conditions and has given a satisfactory result and has proved to be very efficient.

3. Software Requirements Specification

To develop an Android application for a college feedback system, we need the following software requirements:

- 1.Integrated Development Environment (IDE): Android Studio is the most commonly used IDE for Android application development.
- It provides an intuitive interface for designing, coding, and testing Android applications.
- 2.Java Development Kit (JDK): Android Studio requires JDK to run. Make sure you have installed the latest version of JDK.
- 3.Android SDK: The Android SDK contains a set of tools required for Android application development,
- such as SDK Manager, Android Emulator, and ADB (Android Debug Bridge).
- 4.Gradle: Gradle is an open-source build tool used to automate the build process of Android applications.
- It is integrated with Android Studio and simplifies the build process.
- 5.Database: To store the feedback data, you will need a database.
- You can use SQLite or any other relational database management system (RDBMS) supported by Android.
- 6.Web Services: You will need web services to connect the Android application with the server-side application.
- RESTful web services are commonly used for this purpose.
- 7.Version Control System: To manage source code and track changes, you will need a version control system (VCS).
- Git is a popular VCS used in Android application development.
- 8.Testing Frameworks: To ensure the quality of the Android application, you will need testing frameworks such as JUnit, Espresso, and Mockito.
- These are some of the software requirements that we need to develop an Android application for a college feedback system. Make sure you have installed the latest

versions of all the required software for efficient and effective application development.

Hardware specifications:

- To develop an Android application for a college feedback system, you will need a computer that meets the following hardware requirements:
-
- 1.Processor: A multi-core processor with a clock speed of at least 2.0 GHz is recommended for efficient and faster development.
- 2.RAM: At least 8 GB of RAM is recommended for running the Android Studio, emulator, and other development tools simultaneously.
- 3.Storage: You will need at least 10 GB of free storage space on your hard drive for installing Android Studio and related development tools.
- 4.Display: A high-resolution display with a minimum resolution of 1280 x 800 pixels is recommended for an optimal development experience.
- 5.Mobile Device: You will need an Android device to test the application on a real device. A device with the latest version of Android and compatible hardware specifications is recommended.
- 6.Internet Connectivity: You will need a stable and high-speed internet connection to download and update the required software, libraries, and dependencies.
- These are some of the hardware requirements you will need to develop an Android application for a college feedback system. Make sure your computer meets these hardware requirements to ensure smooth and efficient development. Additionally, having a dedicated graphics card could also help in improving the overall performance of the Android Studio and emulator.

Hardware Specifications

- Processor: Intel core i3 or advanced.
- RAM: 4 GB (min).

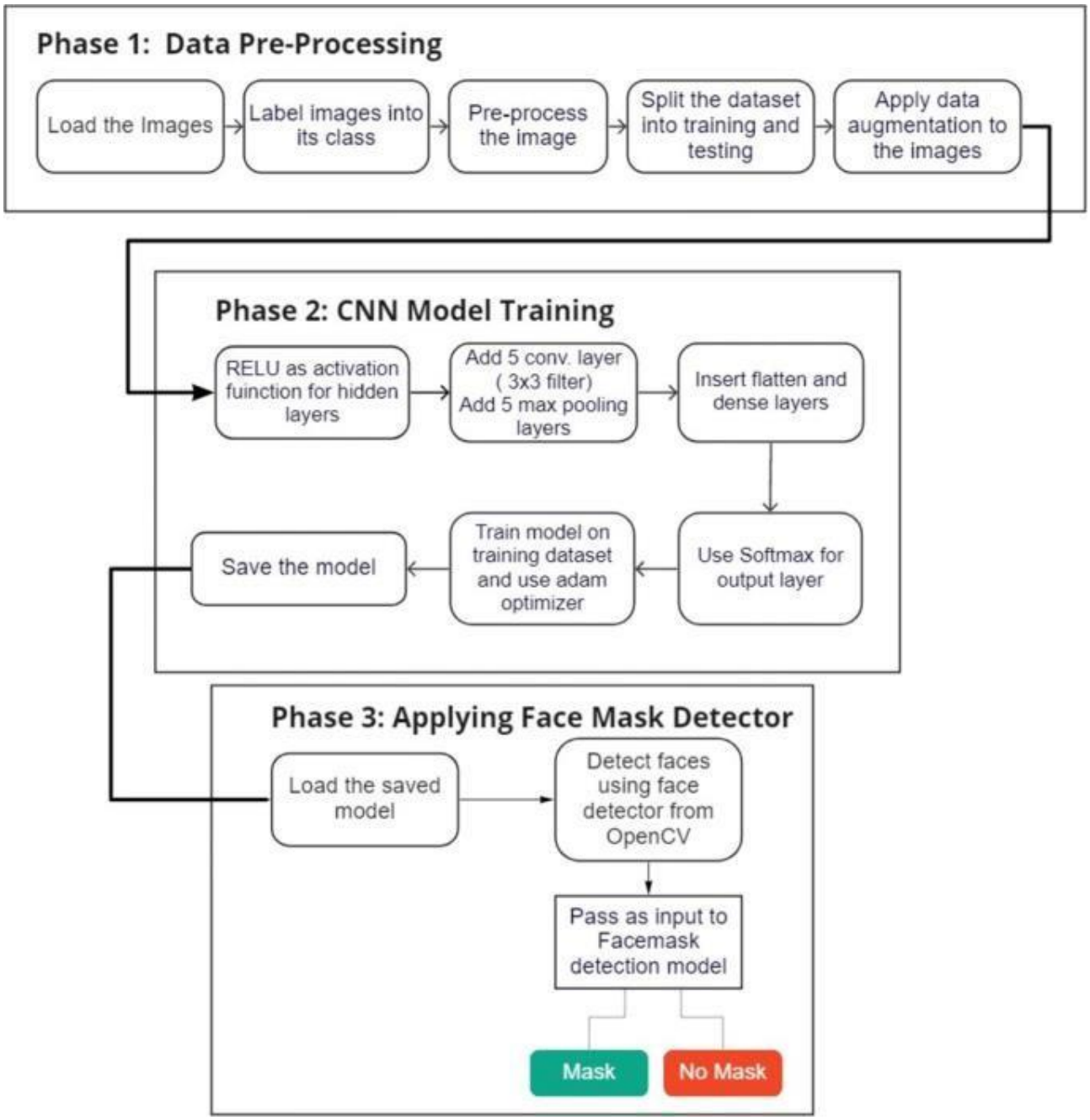
- HDD: 200 GB (min).
- Camera
  - Key Board - Standard Windows Keyboard
  - Mouse - Two or Three Button Mouse
  - Monitor - LCD(Liquid Crystal Display

Software Specifications

Operating System: Ubuntu OS
Languages: Python Software: Visual tudioDatabase: Image database.

4. System Design

4.1 System Architecture

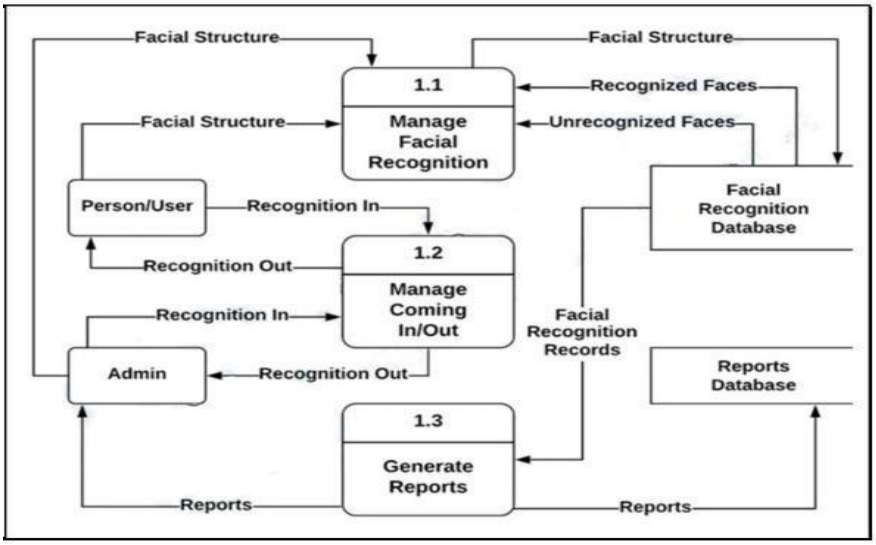


4.2 Mathematical Model

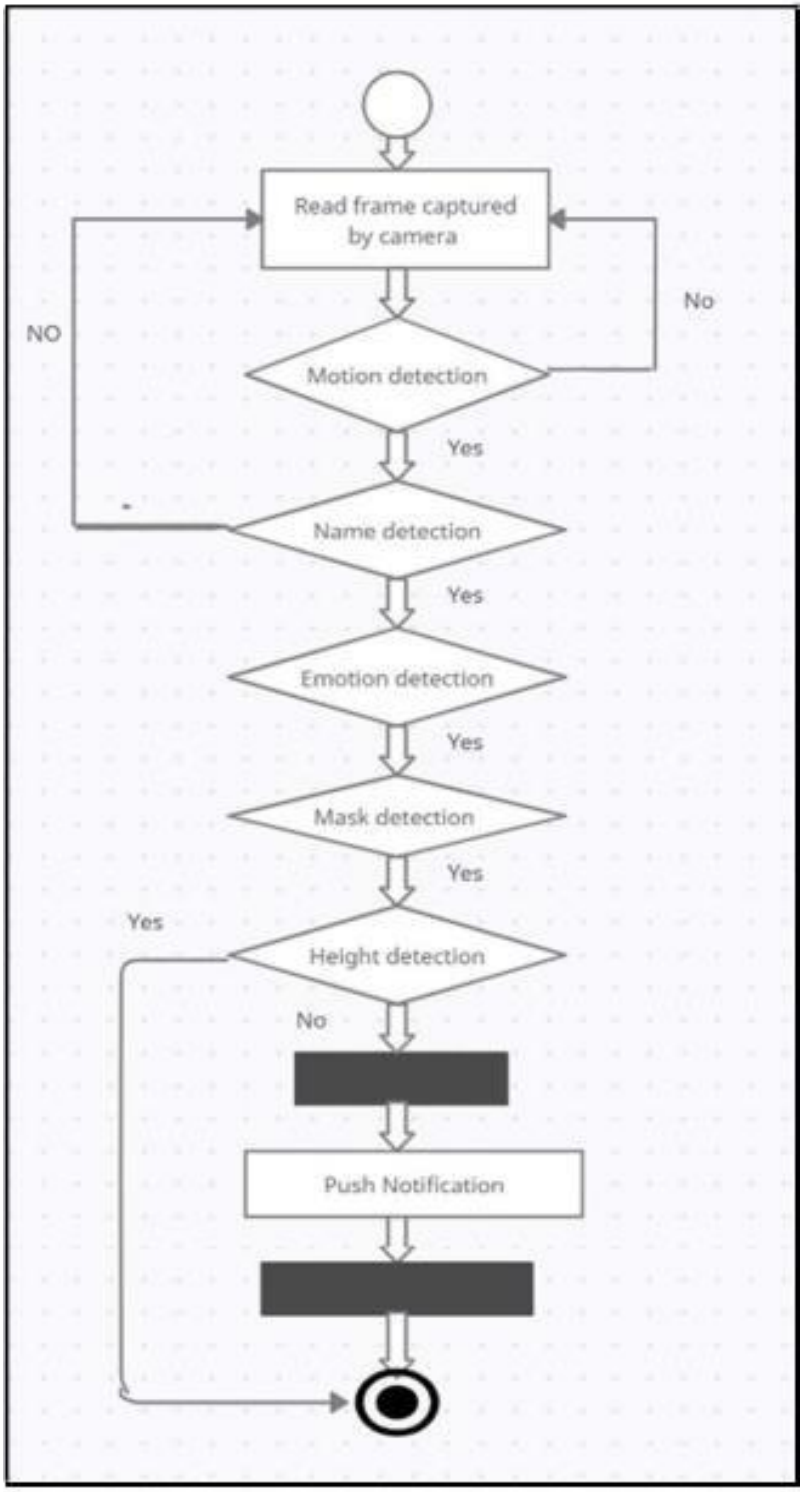
Design is a meaningful engineering representation of something that is to be built. It isthe most crucial phase in the developments of a system. Software design is a process through which the requirements are translated into a representation of software. Design is a place where design is fostered in software Engineering. Based on the user requirements and the detailed analysis of the existing system, the new system must be designed. This is the phase ofsystem designing. Design is the perfect way to accurately translate a customers requirement inthe finished software product. Design creates a representation or model, provides details aboutsoftware data structure, architecture, interfaces and components that are necessary to implement a system. The logical system design arrived at as a result of systems analysis is converted into physical system design.

4.3 Data Flow Diagrams

A data flow diagram (DFD) is a graphical representation of the ”flow” of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).A DFD shows what kind of information will be input to and output from the system, how the data will advance through the system, and where the data will be stored. It does not show information about process timing or whether processes will operate in sequence or in parallel,unlike a traditional structured flowchart which focuses on control flow, or a UML activity workflow diagram, which presents both control and data, flows as a unified model.



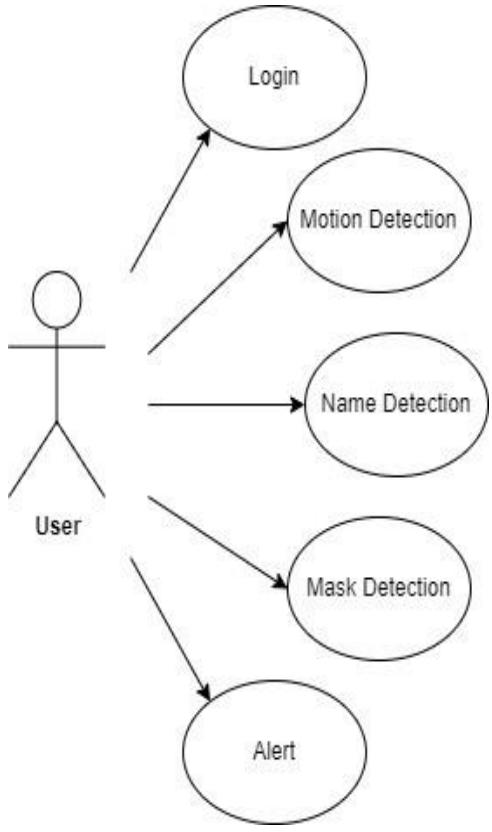
4.4 Entity Relationship Diagrams



4.5 UML Diagram

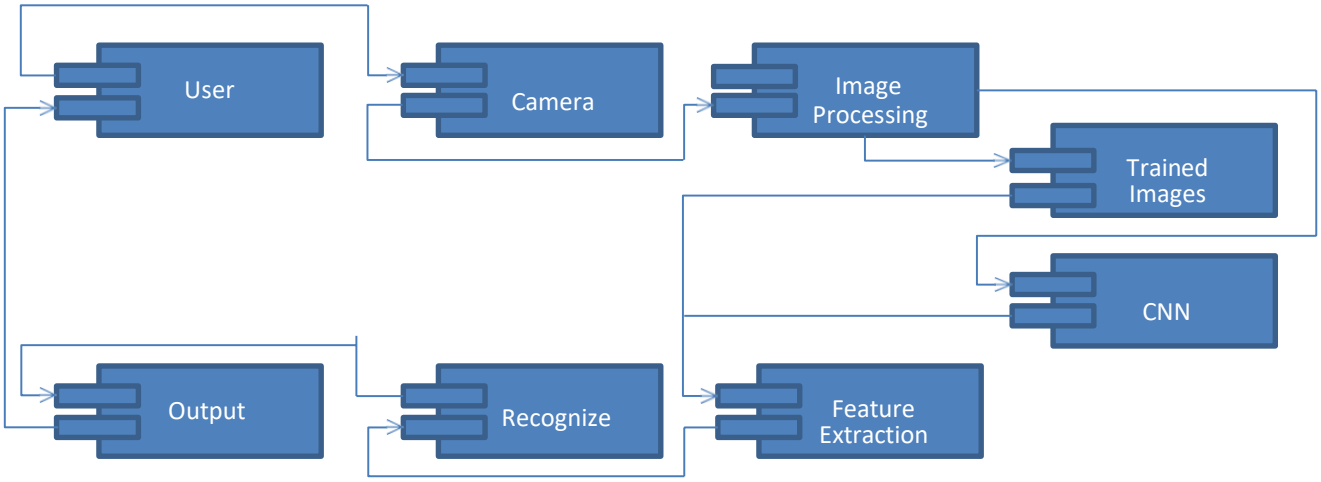
A use case diagram is a graphical representation of a user's interaction with the system and depicting the specifications of a use case. A use case diagram can show the different types of users of a system and the various ways in which they interact with the system. Use case diagrams are used to gather the requirements ofa system including internal and external influences. These requirements are mostly design requirements. So when a system is analyzed to gather its functionality use cases are prepared and actors are identified. The purposes of use case diagrams can be as follows:

- Used to gather requirements of a system.
- Used to get an outside view of a system.
- Identify external and internal factors influencing the system.
- Show the interaction among the actors.



4.6 Component Diagram

A Component Diagram displays the structural relationship of components of a soft-ware system. These are mostly used when working with complex systems that havemany components. Components communicate with each other using interfaces. Theinterfaces are linked using connectors.



5. Project Plan

5.1 Project Estimate

Cost Estimation is a well formulated prediction of probable manufacturing, developing cost of a specific project. A cost estimation is a powerful management tool for providing an idea for budget. It accounts for all the items from various stages of cost estimation.

I. Conceptual Estimation:-

It is the process of determining the cost before project execution.

II. Detailed Estimation :-

It is the process of determining the cost by breaking each stage of operation & finding cost of each component by using a format.

7.1 COCOMO Model :-

Step 1: Measure the size in terms of the amount of functionality in a system. Functionpoints are computed by first calculating an unadjusted function point count (UFC).

Table No. 7.1 Function Points 1

Sr. No.	Function points	Number	Description
1	User inputs	4	Login, Screener Creation, Image processing, Track Object
2	User outputs	2	Detect Persons without any id, Alert.
3	User requests	2	Allocate task, enter Information
4	Internal Files	1	Datastore
5	External interfaces	2	Display the allocated Task, Display all Information

Step 2: Multiply each number by a weight factor according to the complexity of theparameter, associated with that number.

Complexity considered is average.

Table No. 7.2 Function Points 2

Sr. No.	Function points	Number	Weight Factor	Multiplication
1	User inputs	4	5	20
2	User outputs	2	8	16
3	User requests	2	5	10
4	External interfaces	2	7	14
5	Internal files	1	9	9

Step 3: Calculate the total UFP (Unadjusted function points) by adding the multiplication column in above table

UFP = 20+16+10+14+9

= 69

Step 4: Calculate the total TCF (Technical Complexity Factor) by giving a value between 0 and 5

Table No. 7.3 Technical Complexity Factors

Sr no.	Technical Complexity Factor	Value
1	Data communication	5
2	Distributed Data Processing	2
3	Performance criteria	4
4	Heavily Utilized Hardware	0
5	High Transaction Rates	2
6	Online Data Entry	2
7	Online Updating	2
8	End user efficiency	3
9	Complex Computations	2
10	Reusability	2
11	Ease of Installation	5
12	Ease of Operation	5
13	Portability	2
14	Maintainability	4

Step 5: Sum the resulting numbers to obtain DI (degree of influence) by adding the value column in above table

DI = 40

Step 6: TCF (Technical Complexity Factor) by given formulaTCF

= 0.65+0.01*DI
= 0.65+0.01*40
= 1.05

Step 7: Calculate FP (Function Points) using the given formulaFP =

UFP * TCF

= 55*1.05

= 57.75

Step 8: To find KLOC (Lines of code) using language factor and FP Language factor ofphp = 56

KLOC = Language factor * FP

= 56*57.75

= 3.23

Step 9: To calculate the effort and nominal development time using given formula and constants

Effort = a1*(KLOC)a2 PM Tdev=b1*(Effort)b2 Months
Development mode is considered Organic.
Values of the constants in the Organic Development mode:
a1=2.4 a2=1.05 b1=2.5 b2=0.38
Effort = 2.4*(3.23) ^1.05
= 8.22 PM
Tdev = 2.5*(8.22) ^0.38
= 5.56 Months

Step 10: Calculate the cost required to develop product by multiplying development timeand average salary of engineers Average salary is 2950.

Cost required to develop the product = 5.56 * 2950
= 16402

Hence the total cost required to develop the product is ₹16,402/-

6. Project Implementation

6.1 Overview of Project Modules

- Data Collection

- Aspect Identification
- Data classification
- Recommendation

6.2 Tools and Technologies Used

Technology Description

In the python language, all source code is first written in plain text files endingwith the .py extension. Those source files are then compiled into visual studio .

6.3 Types Of Testings

6.3.1 Unit testing

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

6.3.2 Integration testing

ntegration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

6.3.3 Functional test

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

6.3.4 System Test

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

6.3.5 White Box Testing

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

6.3.6 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.

6.3.7 Unit Testing:

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

6.3.8 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. Test Results: All the test cases mentionedabove passed successfully. No defects encountered.

6.4 Test cases and Test Results

Testing of project problem statement using generated test data (using mathematical models, GUI, Function testing principles, if any) selection andappropriate use of testing tools, testing of UML diagram's reliability.

Module-ID:-01

Modules to be tested:-Selecting datasets 1. We have to select dataset.

Expected : It should open system folder .

Module-ID:-2

Modules to be tested:- Capturing Image –hand 1. Capturing image from webcam.Expected: It should capture image.

Module-ID:-3

Modules to be tested:- training and testing image indataset 1.training and testing image in dataset.

Expected: It should predict output.

Module-ID:-4

Modules to be tested:- Output display

1. Output Display

Expected: It should display output.

7. Conclusions:

We can use this application to recognize a person. Face detection improves surveillance efforts and helps track down criminals and terrorists. Personal security is also enhanced since there is nothing for hackers to steal or change such as passwords easy to integrate. Smart surveillance system significantly contributes to situation awareness. Such systems transform video surveillance from data acquisition tool to information and intelligence acquisition systems. Real-time video analysis provides smart surveillance systems with the ability to react in real time. Our system senses the intrusion and sends notifications to authorized persons so that action can be taken in response to the intrusion. This web app can be live hosted on a server, a user interface can be made more user-friendly and more professional-looking, can add more useful features for making it commercially viable.

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