SAVITRIBAI PHULE PUNE UNIVERSITY

A PRELIMINARY PROJECT REPORT ON

Digital Solution For Enforcing Social Distancing

SUBMITTED TOWARDS THE
PARTIAL FULFILLMENT OF THE REQUIREMENTS OF

BACHELOR OF ENGINEERING (Computer Engineering)

BY

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CERTIFICATE

This is to certify that the Project Entitled

Social distancing and Mask detection

Submitted by

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is a bonafide work carried out by Students under the supervision of Prof. Bhagyashri Vyas and it is submitted towards the partial fulfillment of the requirement of Bachelor of Engineering (Computer Engineering) Project.

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Abstract

Head pose classification is widely used for the preprocessing before face recognition and multi-angle problems, because algorithms such as face recognition often require the input image to be a front face. But affected by the COVID-19 pandemic, people wear face masks to protect themselves safe, which makes cover most areas of the face. This makes some common algorithms cannot be applied to head pose classification in the new situation. Therefore, this paper established a method HGL to deal with the head pose classification by adopting color texture analysis of images and line portrait. The proposed HGL method combines the Hchannel of the HSV color space with the face portrait and grayscale image, and train the CNN to extract features for classification. The evaluation on MAFA dataset shows that compared with the algorithms based on facial landmark detection and convolutional neural network, the proposed method has achieved a better performance.

Acknowledgments

Please Write here Acknowledgment.Example given as

It gives us great pleasure in presenting the preliminary project report on **'Digital Solution For Enforcing Social Distancing'**.

I would like to take this opportunity to thank my internal guide **Prof. Bhagyashri Vyas** *for giving me all the help and guidance I needed. I am really grateful to them for their kind support. Their valuable suggestions were very helpful.*

I am also grateful to **Prof. Bhagyashree Dhakulkar**, *Head of Computer Engineering Department, Dr. D. Y. Patil School of Engineering Technology for his indispensable support, suggestions.*

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

Presented that coronavirus disease 2019 (COVID-19) has globally infected over 2.7 million people and caused over 180,000 deaths. In addition, there are several similar large scale serious respiratory diseases, such as severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS), which occurred in the past few years Liu et al. reported that the reproductive number of COVID-19 is higher compared to the SARS. Therefore, more and more people are concerned about their health, and public health is considered as the top priority for governments . Fortunately, Leung et al. showed that the surgical face masks could cut the spread of coronavirus. At the moment, WHO recommends that people should wear face masks if they have respiratory symptoms, or they are taking care of the people with symptoms Furthermore, many public service providers require customers to use the service only if they wear masks Therefore, face mask detection has become a crucial computer vision task to help the global society, but research related to face mask detection is limited.

1.1.1 Motivation

- The motivation of our project is to detect Unmask person easy.

- Our system is also give notification to all user for sanitize

- Another motive of our project is to follow social Distancing.

1.1.2 Objective

- Face mask detection and face recognition.

- Distance measurement between people for social distance

CHAPTER 2

LITERATURE SURVEY

2.1 STUDY OF RESEARCH PAPER

1.Paper Name: Multi-angle Head Pose Classification when Wearing the Mask for Face Recognition under the COVID19 Coronavirus Epidemic

Author: Shuang Li, Xin Ning, Lina Yu, Liping Zhang, Xiaoli Dong , Yuan Shi , Wei He

Abstract : Head pose classification is widely used for the preprocessing before face recognition and multi-angle problems, because algorithms such as face recog- nition often require the input image to be a front face. But affected by the COVID-19 pandemic, people wear face masks to protect themselves safe, which makes cover most areas of the face. This makes some common algorithms cannot be applied to head pose classification in the new situation. Therefore, this paper established a method HGL to deal with the head pose classification by adopting color texture anal- ysis of images and line portrait. The proposed HGL method combines the Hchannel of the HSV color space with the face portrait and gray scale image, and train the CNN to extract features for classification. The evaluation on MAFA dataset shows that com- pared with the algorithms based on facial landmark detection and convolu- tional neural network, the proposed method has achieved a better performance (Front accuracy: 93.64%, Side accuracy: 87.17%).

2.Paper Name: Explainable AI and Mass Surveillance System-based Healthcare Framework to Combat COVID-19 like Pandemics

Author:M. Shamim Hossain, Ghulam Muhammad, and Nadra Guizani

Abstract : :—— Tactile edge technology that focuses on 5G or beyond 5G reveals an excit- ing approach to control infectious diseases such as COVID-19 internationally. The control of epidemics such as COVID-19 can be managed effectively by exploit- ing edge computation through the 5G wireless connectivity network. The implemen- tation of a hierarchical edge computing system provides many advantages, such as low latency, scalability, and the protection of application and training model data, enabling COVID-19 to be evaluated by a dependable local edge server. In addition, many deep learning (DL) algorithms suffer from two crucial disadvantages: first, training requires a large COVID-19 dataset consisting of various aspects, which will pose challenges for local councils; second, to acknowledge the outcome, the find- ings of deep learning require ethical acceptance and clarification by the health care sector, as well as other contributors. In this article, we propose a B5G framework that utilizes the 5G network's low-latency, high-bandwidth functionality to detect COVID-19 using chest X-ray or CT scan images, and to develop a mass surveillance system to monitor social distancing, mask wearing, and body temperature. Three DL models, ResNet50, Deep tree, and Inception v3, are investigated in the proposed framework. Furthermore, blockchain technology is also used to ensure the security of healthcare data.

3.Paper Name: Automated evaluation of COVID-19 risk factors coupled with real-time, indoor, personal localization data for potential disease identification, prevention and smart quarantining.

Author::J. Barabas* , R. Zalman† and M. Kochlan† , Alena Kuhn,Frederic von Wegner.

Description :—Since the beginning of the current COVID-19 pandemic, more than five million people have been infected and the numbers are still on the rise. Early symptom detection and proper hygienic standards are thus of utmost impor- tance, especially in venues where people are in random or opportunistic contact with each other. To this end, automated systems with medical-grade body temperature mea-surement, hygienic compliance evaluation and individualized, person-to-person track-ing, are essential, not only for disease spread intervention and prevention, but also to assure economic stability. Herein, we present a system that encapsulates all of the mentioned functionality via readily-available components (both hardware and software) and is further enhanced with preliminary RTLS data acquisition, enabling post-symptom detected, person-to person interaction identification to asses potential infection vectors and mitigate further propagation thereof by means of smart quar-antine.

4.Paper Name:A Novel AI-enabled Framework to Diagnose Coronavirus COVID-19 using Smartphone Embedded Sensors: Design Study.

Author: : Halgurd S. Maghdid, Kayhan Zrar Ghafoor, Ali Safaa Sadiq, Kevin Curran, Danda B. Rawat, Khaled Rabie.

Description :—Coronaviruses are a famous family of viruses that cause illness in both humans and animals. The new type of coronavirus COVID-19 was firstly discovered in Wuhan, China. However, recently, the virus has widely spread in most of the world and causing a pandemic according to the World Health Organi- zation (WHO). Further, nowadays, all the world countries are striving to control the COVID-19. There are many mechanisms to detect coronavirus including clinical analysis of chest CT scan images and blood test results. The confirmed COVID-19 patient manifests as fever, tiredness, and dry cough. Particularly, several techniques can be used to detect the initial results of the virus such as medical detection Kits. However, such devices are incurring huge cost, taking time to install them and use. Therefore, in this paper, a new framework is proposed to detect COVID-19 using built-in smartphone sensors. The proposal provides a low-cost solution, since most of radiologists have already held smartphones for different dailypurposes. Not only that but also ordinary people can use the framework on their smartphones for the virus detection purposes. Today's smartphones are powerful with existing computationrich processors, memory space, and large number of sensors including cameras, microphone, temperature sensor, inertial sensors, proximity, colour-sensor, humidity-sensor, and wireless chipsets/sensors. The designed Artificial Intelligence (AI) enabled framework reads the smartphone sensors' signal measurements to predict the grade of severity of the pneumonia as well as predicting the result of the disease.

5.Paper Name: Diagnosing COVID-19: The Disease and Tools for Detection.

Author: Bana Handaga, Budi Murtiyasa,Jan Wantoro

Abstract:COVID-19 has spread globally since its discovery in Hubei province, China in December 2019. A combination of computed tomography imaging, whole genome sequencing, and electron microscopy were initially used to screen and identify SARS-CoV-2, the viral etiology of COVID-19. The aim of this review article is to inform the audience of diagnostic and surveillance technologies for SARS-CoV-2 and their performance characteristics. We describe point-of-care diagnostics that are on the horizon and encourage academics to advance their technologies beyond conception. Developing plug-and-play diagnostics to manage the SARS-CoV-2 outbreak would be useful in preventing future epidemics.

CHAPTER 3

PROJECT REQUIREMENT

3.1 EXTERNAL INTERFACE REQUIREMENT

3.1.1 User Interface

• Application Based On social distancing and mask detection.

3.1.2 Hardware Interfaces:

• Hardware : intel core i5

• Speed : 2.80 GHz

• RAM : 8GB

• HardDisk : 500 GB

• Key Board: Standard Windows Keyboard

3.1.3 Software Interfaces

• Operating System: Windows 10

• IDE: Spyder

• Programming Language : Python

3.2   NON FUNCTIONAL REQUIREMENT

3.2.1   Performance Requirements

- The performance of the functions and every module must be well.

- The overall performance of the software will enable the users to work efficiently.

- Performance of encryption of data should be fast.

- Performance of the providing virtual environment should be fast.

3.2.2   Safety Requirement

- The application is designed in modules where errors can be detected and fixed easily. This makes it easier to install and update new functionality if required.

3.2.3   Software Quality Attributes

- Our software has many quality attribute that are given below:-

- Adaptability: This software is adaptable by all users.

- Availability: This software is freely available to all users. The availability of the software is easy for everyone.

- Maintainability: After the deployment of the project if any error occurs then it can be easily maintained by the software developer.

- Reliability: The performance of the software is better which will increase the reliabilityof the Software.

- User Friendliness: Since, the software is a GUI application; the output generated is much user friendly in its behavior.

- Integrity: Integrity refers to the extent to which access to software or data by unauthorized persons can be controlled.

- Security: Users are authenticated using many security phases so reliable security is provided.

- Testability: The software will be tested considering all the aspects.

CHAPTER 4

SYSTEM ANALYSIS

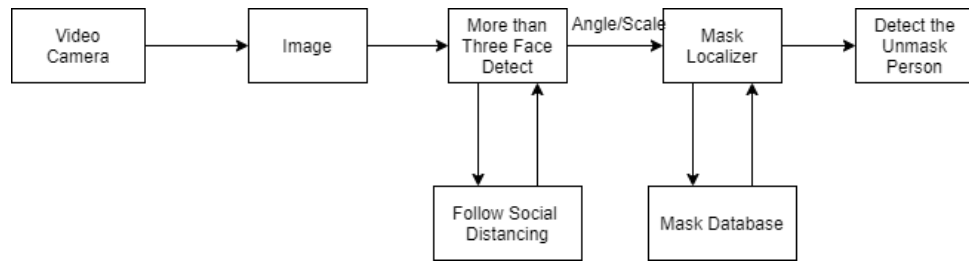## 4.1 SYSTEM ARCHITECTURE

Figure 4.1: System Architecture

4.1.1 Module

• Admin

In this module,the Admin has to log in by using valid user name and password. After login successful he can do some operations such as View All Users and Authorize, View All E-Commerce Website and Authorize,View All Products and Reviews,View All Products Early Reviews, View All Keyword Search Details, View All Products Search Ratio, View All Keyword Search Results, View All Product Review Rank Results.

• View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

• View Charts Results

View All Products Search Ratio,View All Keyword Search Results,View All Product Review Rank Results.

• E-Commerce User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful,he has to login by using authorized user name and password Once Login is successful user will do some operations like Add Products, View All Products with reviews, View All Early Product's reviews, View All Purchased Transactions.

• End User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will best or to the database. After registration successful,he has to login by using authorized user name and password. Once Login is successful user will do some operations like Manage Account, Search Products by keyword and Purchase, View Your Search Transactions, View.

4.1.2 Data Flow Diagram

In Data Flow Diagram,we Show that flow of data in our system in DFD0 we show that base DFD in which rectangle present input as well as output and circle show our system,In DFD1 we show actual input and actual output of system input of our system is text or image and output is rumor detected like wise in DFD 2 we present operation of user as well as admin.
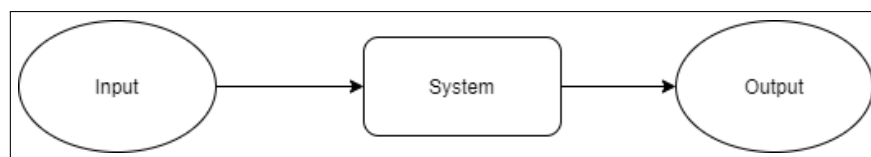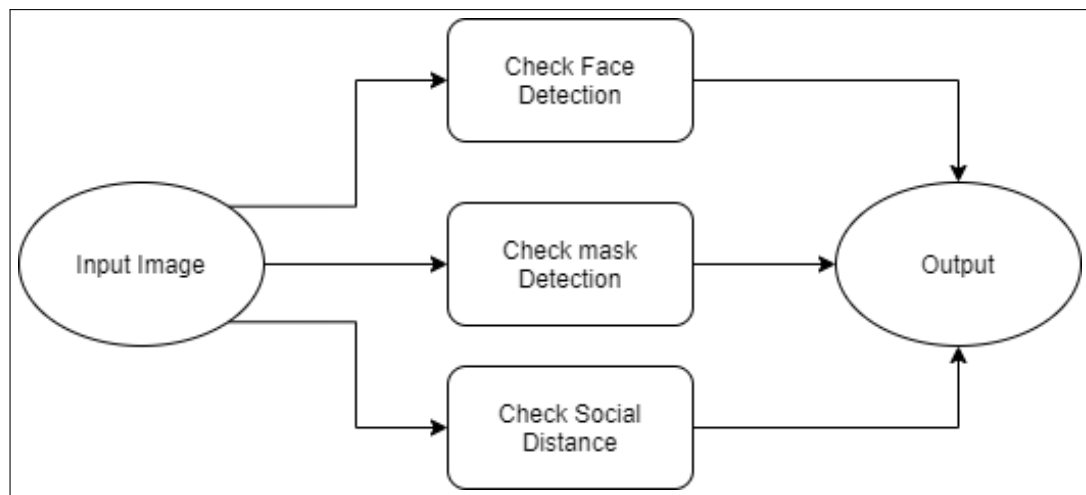

Figure 4.2: Data Flow diagram
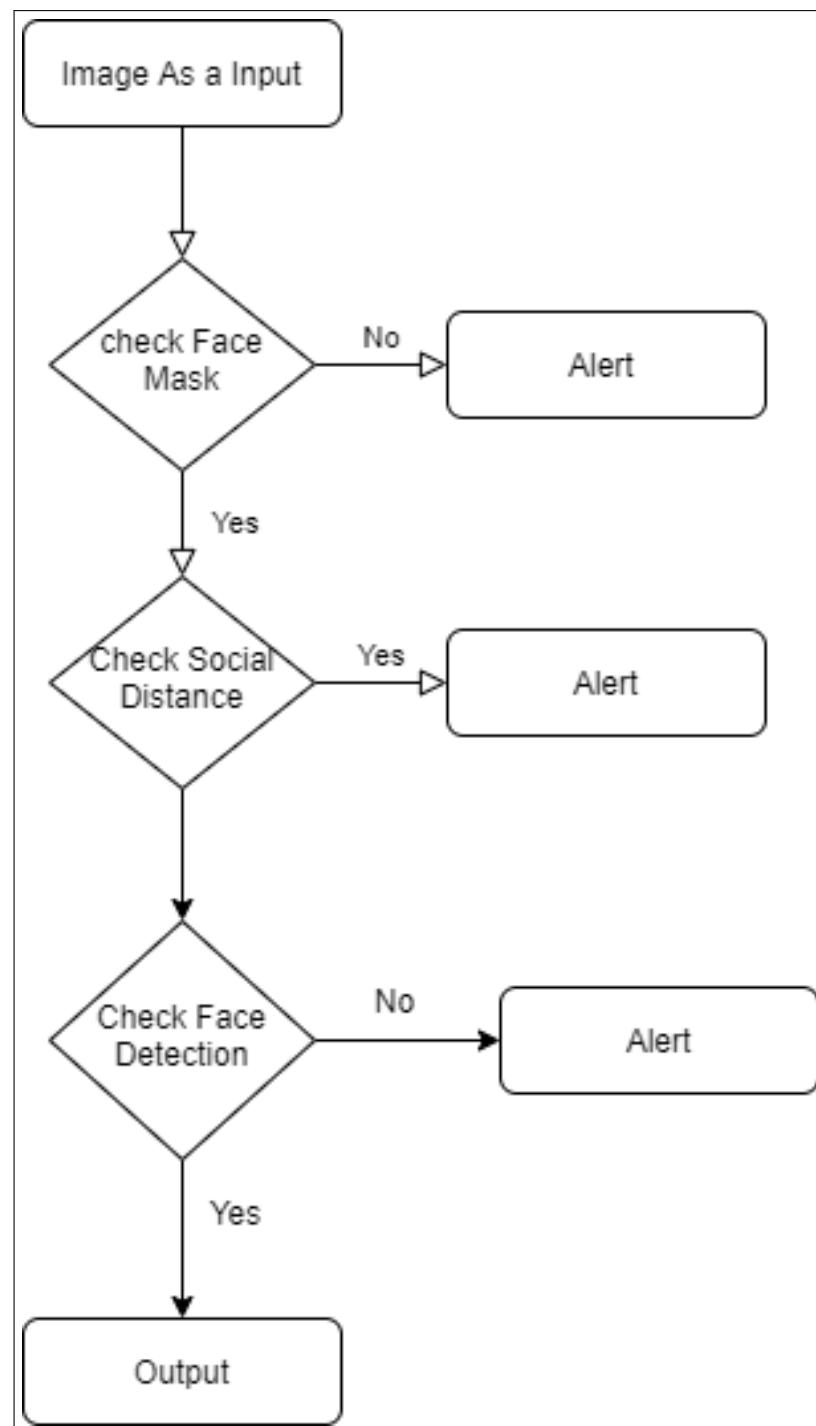
Figure 4.3: Data Flow diagram

Figure 4.4: Data Flow diagram

4.2 UML DIAGRAMS

Unified Modeling Language is a standard language for writing software blueprints.The UML may be used to visualize,specify,construct and document the artifacts of a softwareintensive system.UML is process independent,although optimally it should be used in process that is use case driven,architecture-centric,iterative,and incremental.The Number of UML Diagram is available.

Use case Diagram.

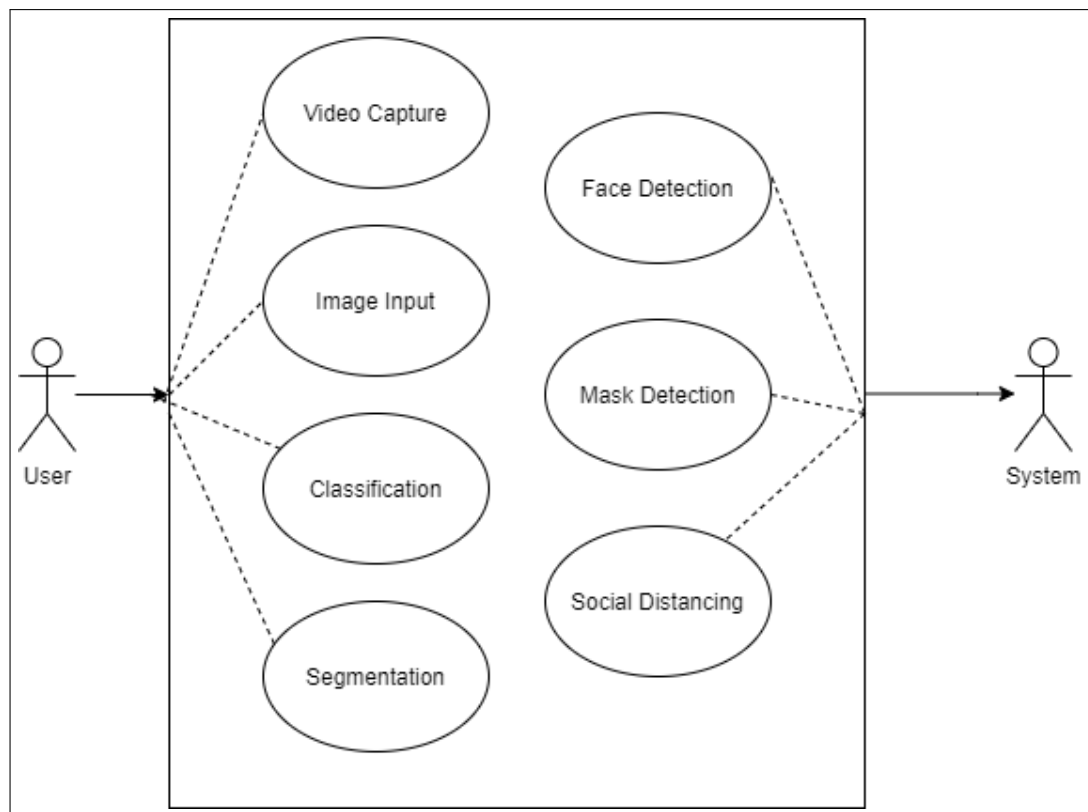Activity Diagram.

Sequence Diagram.
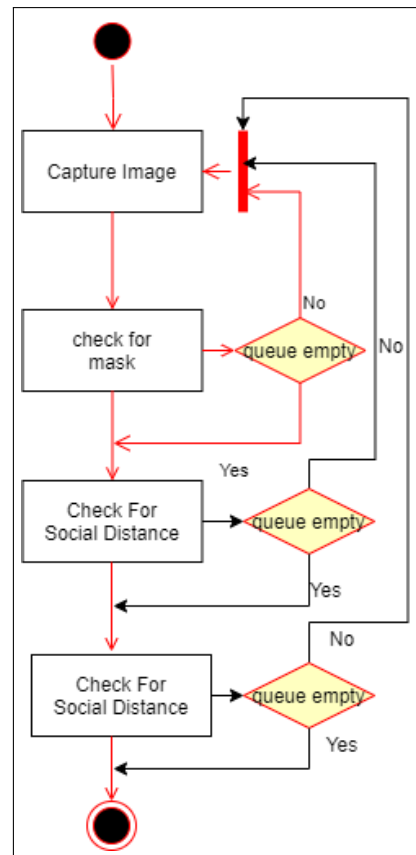
Class Diagram.

ER Diagram.

Figure 4.5: Usecase Diagram
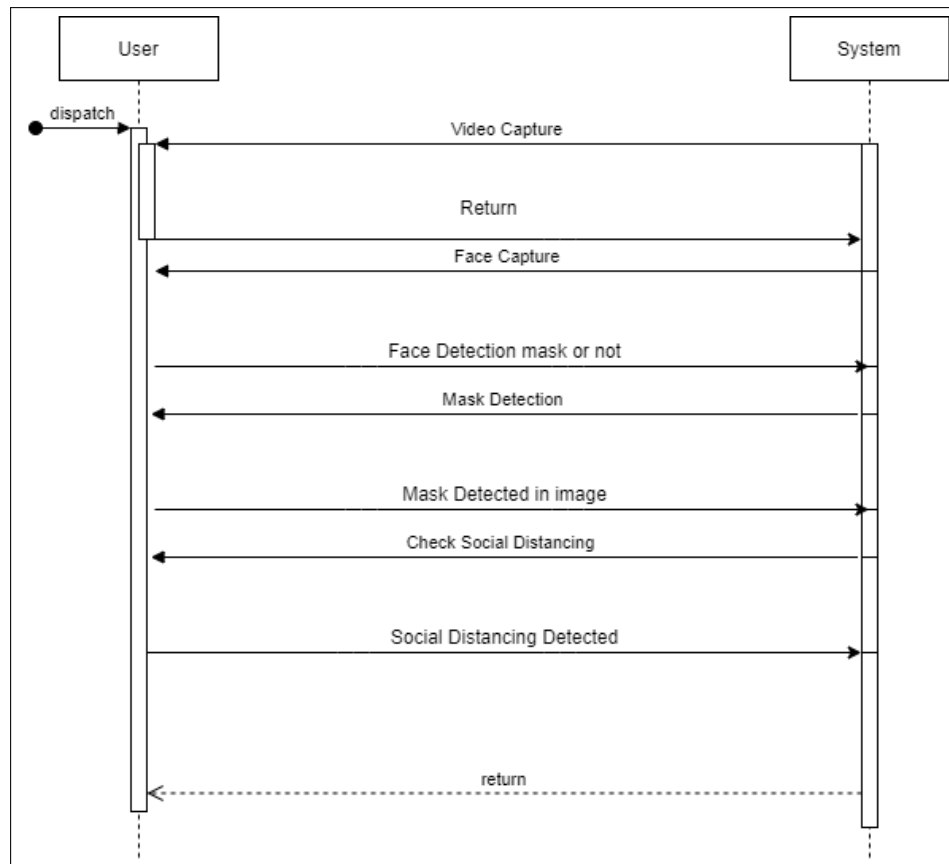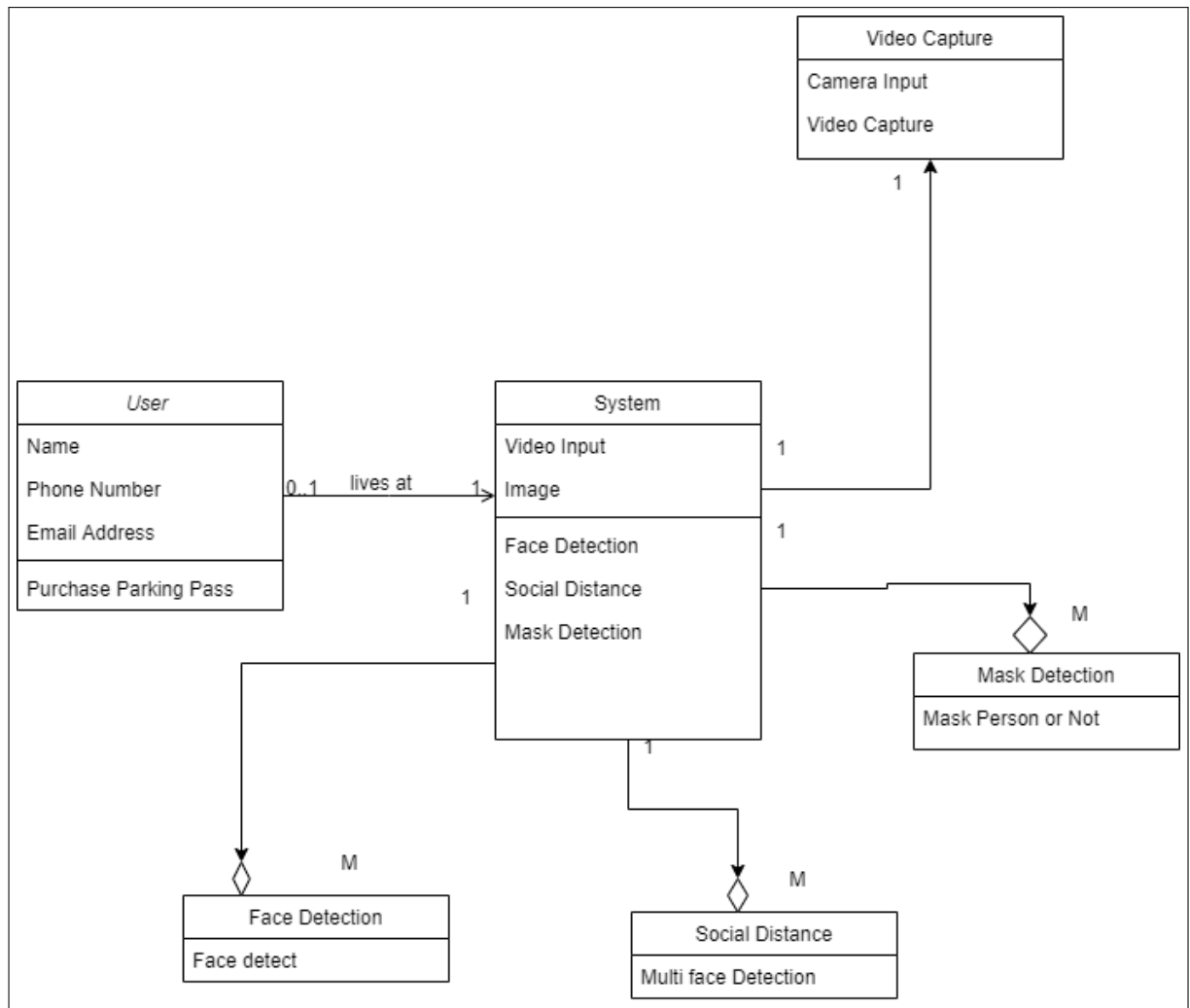
Figure 4.6: Activity Diagram
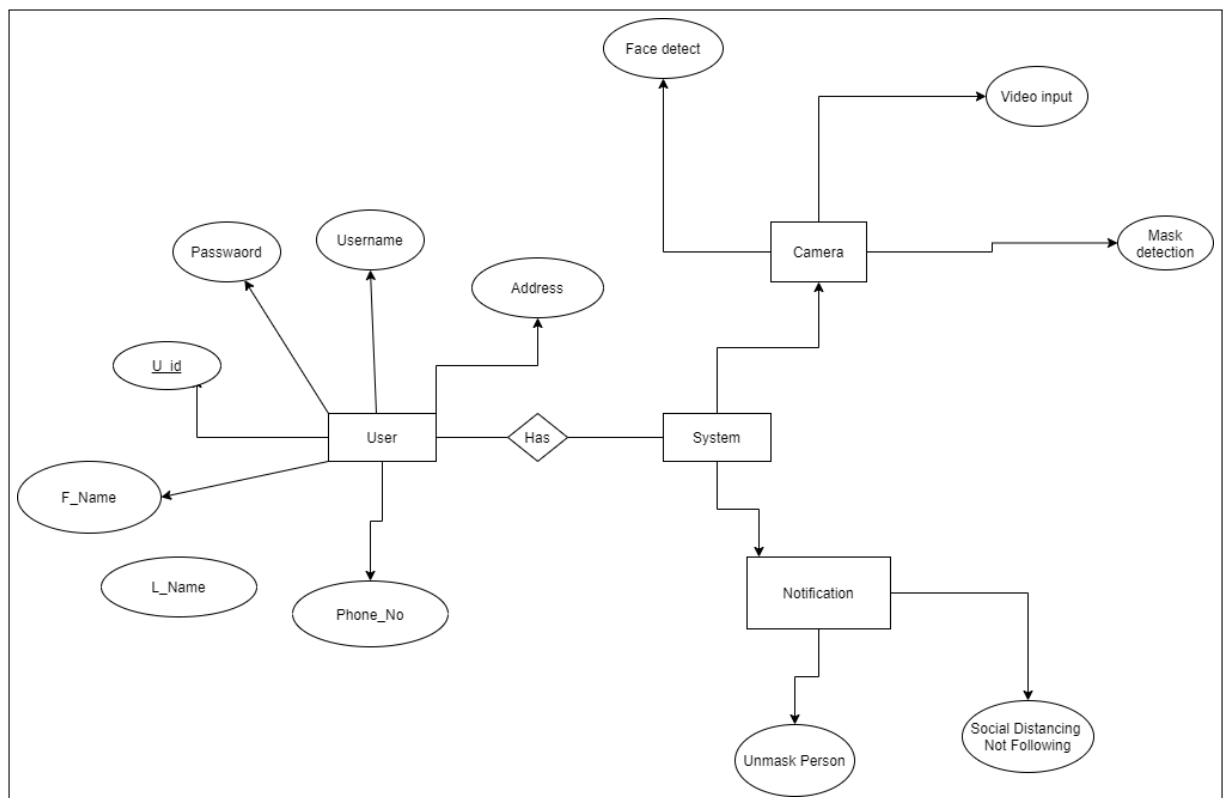
Figure 4.7: Sequence Diagram

Figure 4.8: Class Diagram

Figure 4.9: ER Diagram

CHAPTER 5

SOFTWARE INFORMATION

Python: Python is an interpreted, high-level and general-purpose programming language. Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

Python was created in the late 1980s, and first released in 1991, by Guido van Rossum as a successor to the ABC programming language. Python 2.0, released in 2000, introduced new features, such as list comprehensions, and a garbage collection system with reference counting, and was discontinued with version 2.7 in 2020. Python 3.0, released in 2008, was a major revision of the language that is not completely backward-compatible and much Python 2 code does not run unmodified on Python 3. With Python 2's end-of-life (and pip having dropped support in 2021, only Python 3.6.x and later are supported, with older versions still supporting e.g. Windows 7 (and old installers not restricted to 64-bit Windows).

Python interpreters are supported for mainstream operating systems and available for a few more (and in the past supported many more). A global community of programmers develops and maintains CPython, a free and open-source reference implementation. A non-profit organization, the Python Software Foundation, manages and directs resources for Python and CPython development.

As of January 2021, Python ranks third in TIOBE's index of most popular programming languages, behind C and Java, having previously gained second place and their award for the most popularity gain for 2020.

Annaconda: What is Anaconda Navigator? Anaconda Navigator is a desktop graphical user interface (GUI) included in Anaconda® distribution that allows you to launch applications and easily manage conda packages, environments, and channels without using command-line commands. Navigator can search for packages on Anaconda.org or in a local Anaconda Repository. It is available for Windows, macOS, and Linux. To get Navigator, get the Navigator Cheat Sheet and install Anaconda.

The Getting started with Navigator section shows how to start Navigator from the shortcuts or from a terminal window.

What applications can I access using Navigator?

The following applications are available by default in Navigator:

1. JupyterLab

2. Jupyter Notebook

3. Spyder

4. PyCharm

5. VSCode

6. Glueviz

7. Orange 3 App

8. RStudio

XAMPP

XAMPP is one of the widely used cross-platform web servers, which helps developers to create and test their programs on a local webserver. It was developed by the Apache Friends, and its native source code can be revised or modified by the audience. It consists of Apache HTTP Server, MariaDB, and interpreter for the different programming languages like PHP and Perl. It is available in 11 languages and supported by different platforms such as the IA-32 package of Windows x64 package of macOS and Linux.

What is XAMPP?

XAMPP is an abbreviation where X stands for Cross-Platform, A stands for Apache, M stands for MYSQL, and the Ps stand for PHP and Perl, respectively. It is an open-source package of web solutions that includes Apache distribution for many servers and command-line executables along with modules such as Apache server, MariaDB, PHP, and Perl.

XAMPP helps a local host or server to test its website and clients via computers and laptops before releasing it to the main server. It is a platform that furnishes a suitable environment to test and verify the working of projects based on Apache, Perl, MySQL database, and PHP through the system of the host itself. Among these technologies, Perl is a programming language used for web development, PHP is a backend scripting language, and MariaDB is the most vividly used database developed by MySQL. The detailed description of these components is given below

Spyder

Spyder is an open source cross-platform integrated development environment (IDE) for scientific programming in the Python language. Spyder integrates with a number of prominent packages in the scientific Python stack, including NumPy, SciPy, Matplotlib, pandas, IPython, SymPy and Cython, as well as other open source software.[3][4] It is released under the MIT license.[5]

Initially created and developed by Pierre Raybaut in 2009, since 2012 Spyder has been maintained and continuously improved by a team of scientific Python

developers and the community.

Spyder is extensible with first- and third-party plugins,[6] includes support for interactive tools for data inspection and embeds Python-specific code quality assurance and introspection instruments, such as Pyflakes, Pylint[7] and Rope. It is available cross-platform through Anaconda, on Windows, on macOS through MacPorts, and on major Linux distributions such as Arch Linux, Debian, Fedora, Gentoo Linux, openSUSE and Ubuntu.[8][9]

Spyder uses Qt for its GUI, and is designed to use either of the PyQt or PySide Python bindings.[10] QtPy, a thin abstraction layer developed by the Spyder project and later adopted by multiple other packages, provides the flexibility to use either backend

CHAPTER 6

PROJECT PLAN

In this chapter we are going to have an overview about how much time does it took to complete each task like- Preliminray Survey Introduction and Problem Statement, Literature Survey, Project Statement, Software Requirement and Specification, System Design, Partial Report Submission, Architecture Design, Implementation, Deployment, Testing, Paper Publish, Report Submission and etcetera. This chapter also gives focus on stakeholder list which gives information about project type, customer of the proposed system, user and project member who developed the system.

6.1 STAKEHOLDER LIST

Sr. No.	Stackholder	
1	project Type	
2.	Customer	
3	User	

6.2 SYSTEM IMPLEMENTATION PLAN

The System Implementation plan table, shows the overall schedule of tasks compilation and time duration required for each task.

Sr. No.	Name/Title	Start Date	End Date
1	Preliminary Survey		
2	Introduction and Problem Statement		
3	Literature Survey		
4	Project Statement		
5	Software Requirement And Specification		
6	System Design		
7	Partial Report Submission		
8	Architecture Design		
9	Implementation		
10	Deployement		
11	Testing		
12	Paper Publish		
13	Report Submission		

Chapter 7

Conclusion

7.1 CONCLUSION

We will be building a model which will detect whether a person is wearing a mask or not and will also determine if people are maintaining social distance or not. If a person is found Covid positive, contact tracing for such cases is provided. Necessary actions will be taken against them who do not follow rules.

Chapter 8

References

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