



Alzheimer Assistant

A Mobile Application using Machine Learning

A graduation project report submission in partial fulfilment of the requirements for the award of the degree Bachelor of Science

Submitted by:

Sameh Mahmoud Mahmoud 77965

Younna Magdy Mohamed 77744

Maram Jamal Al-Farmawy 89684

Hend Ali Abdel-Razek Kandil 77928

Ahmed El-Sayed Mahmoud 77641

Under the supervision of professors:

Supervisor(s):

Dr. Mohamed Hasballah

TA. Zeyad Khaled

Department of Computer Science - CS

*Misr University for Science and
Technology - MUST*

*College of Computers and Artificial
Intelligence Technologies – CAIT*



Alzheimer Assistant

تطبيق جوال يستخدم التعلم الآلي

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مقدم بواسطة:

سامح محمود محمود ٧٧٩٦٥

يمنى مجدي محمد ٧٧٧٤٤

مرام جمال الفرماوي ٨٩٦٨٤

هند علي عبد الرازق قنديل ٧٧٩٢٨

احمد السيد محمود ٧٧٦٤١

تحت إشراف الأساتذة:

المشرف (المشرفون):

د. محمد حسب الله

م. زياد خالد

CS - قسم علوم الحاسب الآلي

MUST - جامعة مصر للعلوم والتكنولوجيا

— كلية الحاسبات وتقنيات الذكاء الاصطناعي

CAIT



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DECLARATION

I hereby certify that this work, which I now submit for assessment on the programmed of study leading to the award of Bachelor of Science in Computers and Artificial Intelligence Department of Information Systems is entirely my own work, that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others and to the extent that such work has been cited and acknowledged within the references section of this report.

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ABSTRACT

Alzheimer's disease is a progressive neurologic disorder that causes the brain to shrink and brain cells to die. Alzheimer's disease is the most common cause of dementia — a continuous decline in thinking, behavioral and social skills that affects a person's ability to function independently. Alzheimer's disease causes memory loss and affects daily task performance. Memory loss leads to challenges including remembering people's names, faces, places, or other information.

As a result, the goal of this research is to help Alzheimer's patients in mild (early-stage) and moderate (middle-stage) stages stay active in society and live independently. We present a smartphone application that uses facial recognition technology to detect individuals faces. By incorporating a notification feature, the application intends to increase everyday communication while also boosting their capacity to do daily chores. The application has assisted persons with Alzheimer's symptoms and considerably aided their daily lives, according to the findings. As a result, this study emphasizes the relevance of using AI-based features, such as face recognition, in this context.

To conclude, Alzheimer Assistant application expands on the current array of software tools that help people with Alzheimer's disease continue to engage in social activities with their family and friends. As a result, the essential knowledge, skill levels, and enthusiasm have been relentlessly employed in the design of this application in order to handle the issues associated with this current societal state. Furthermore, this application emphasizes the advantages of using advanced technologies, most notably facial recognition, to achieve this goal, given that there has been rising evidence in recent years that such systems can be employed in a variety of scenarios.

الملخص

مرض الزهايمر هو اضطراب عصبي تدريجي يتسبب في تقلص الدماغ وموت خلايا الدماغ. مرض الزهايمر هو السبب الأكثر شيوعًا للخرف - التدهور المستمر في التفكير والمهارات السلوكية والاجتماعية التي تؤثر على قدرة الشخص على العمل بشكل مستقل. يسبب مرض الزهايمر فقدان الذاكرة ويؤثر على أداء المهام اليومية. يؤدي فقدان الذاكرة إلى تحديات تشمل تذكر أسماء الأشخاص، أو وجوههم، أو أماكنهم، أو معلومات أخرى

نتيجة لذلك، فإن الهدف من هذا المشروع هو مساعدة مرضى الزهايمر في المراحل الخفيفة (المرحلة المبكرة) والمتوسطة (المرحلة المتوسطة) على البقاء نشطين في المجتمع والعيش بشكل مستقل. نقدم تطبيق هاتف ذكي يستخدم تقنية التعرف على الوجه لاكتشاف وجوه الأفراد. من خلال دمج ميزة التنبيه، يعتزم التطبيق زيادة التواصل اليومي مع تعزيز قدرتهم على القيام بالأعمال اليومية. ووفقًا للنتائج، فقد ساعد التطبيق الأشخاص الذين يعانون من أعراض مرض الزهايمر وساعد بشكل كبير في حياتهم اليومية. نتيجة لذلك، تؤكد هذه الدراسة على أهمية استخدام الميزات القائمة على الذكاء الاصطناعي، مثل التعرف على الوجوه

في الختام، يوسع تطبيقنا في المجموعة الحالية من أدوات البرامج التي تساعد الأشخاص المصابين بمرض الزهايمر على الاستمرار في الانخراط في الأنشطة الاجتماعية مع أسرهم وأصدقائهم. نتيجة لذلك، تم توظيف المعرفة الأساسية ومستويات المهارة والحماس بلا هوادة في تصميم هذا التطبيق من أجل التعامل مع القضايا المرتبطة بهذه الحالة المجتمعية الحالية. علاوة على ذلك، يؤكد هذا التطبيق على مزايا استخدام التقنيات المتقدمة، وأبرزها التعرف على الوجه، لتحقيق هذا الهدف، نظرًا لوجود أدلة متزايدة في السنوات الأخيرة على إمكانية استخدام هذه الأنظمة في مجموعة متنوعة من السيناريوهات.

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LIST OF ACRONYMS/ABBREVIATIONS

ML	Machine Learning
FR	Face Recognition
AI	Artificial Intelligence
AD	Alzheimer Disease
DFD	Data Flow Diagram



Chapter One

1 INTRODUCTION

In 1906, German physician Dr. Alois Alzheimer first described "a peculiar disease" — one of profound memory loss and microscopic brain changes — a disease we now know as Alzheimer's.

Just like the rest of our bodies, our brains change as we age. Most of us eventually notice some slowed thinking and occasional problems with remembering certain things. However, serious memory loss, confusion, and other major changes in the way our minds work may be because Alzheimer disease.[1]

Alzheimer's disease and related dementias (AD/RD) are progressive neurocognitive disorders that currently affect approximately 50 million people worldwide. This number is estimated to increase to 131.5 million by 2050. Mobile phone apps have been well-integrated into daily lives and can be used to deliver and promote health care. There is an increase in the use of technology to provide care and support to AD/RD patients and their families.

Artificial Intelligence (AI) and machine learning (ML) have transformed the mobile app development landscape. The mobile app developer relies on cognitive technology like ML to write powerful algorithms to create intelligent apps that can understand human behavior, assist users, and entertain them.[2]

The machine learning technique of pattern recognition is a dynamic learning experience. On the other side, predictive analytics is applicable to financial, marketing, and banking data, face detection, image, and object recognition methods are essential for reliable security. The percentage of mobile app developers relying on ML techniques at various mobile app development stages is increasing.

ML helps reduce the gap between understanding user behavior and utilizing it to create a customized solution. App developers embed ML into mobile applications to create customized applications for each individual. ML depends on continuous learning. Based on the user's everyday activity, the ML program learns and re-learns to create a customized solution. This advancement helps to create an adaptive app that can help to achieve an ideal omnichannel experience.

Face Recognition:

The detection phase of facial recognition starts with an algorithm that learns what a face is. Usually, the creator of the algorithm does this by "training" it with photos of faces. If you cram in enough pictures to train the algorithm, over time it learns the difference between, say, a wall outlet and a face. Add another algorithm for analysis, and yet another for recognition, and you've got a recognition system.[6]

Every facial recognition system works differently—often built on proprietary algorithms—but you can sort out the process into three basic types of technology:

Detection is the process of finding a face in an image. If you've ever used a camera that detects a face and draws a box around it to auto-focus, you've seen this technology in action. On its own, it isn't nefarious—face detection only focuses on finding a face, not the identity behind it.

Analysis (aka attribution) is the step that maps face—often by measuring the distance between the eyes, the shape of the chin, the distance between the nose and mouth—and then converts that into a string of numbers or points, often called a “faceprint.” Goofy Instagram or Snapchat filters use similar technology (video). Although analysis can suffer from glitches, particularly involving misidentification, that’s generally problematic only when the faceprint is added to a recognition database.

Recognition is the attempt to confirm the identity of a person in a photo. This process is used for verification, such as in a security feature on a newer smartphone, or for identification, which attempts to answer the question “Who is in this picture?” And this is where the technology steps into the creepier side of things. The diversity of photos fed into the system has a profound effect on its accuracy during the analysis and recognition steps.[9]

1.1 Problem definition

Alzheimer’s can be a serious and sad disease for those who have it. As it slowly progresses, it will rob you of your independence. At first, you’ll just need someone to help you take medicine on time and even do errands.

There is hope though. One day in the not-so-distant future Alzheimer’s will become a disease you can live with and manage and will have more time to enjoy a happy and productive life.

Alzheimer's changes typically begin in the part of the brain that affects learning and remembering. As Alzheimer's advances through the brain, it leads to unfounded suspicions about family, friends, and professional caregivers, more serious memory loss, and behavior changes.[5]

Alzheimer's has no cure; other treatments can temporarily slow the worsening of dementia symptoms and today, there is a worldwide effort underway to find better ways improve the quality of life for those with Alzheimer's and their caregivers.

In many parts of the world, there is a growing awareness of Alzheimer's, but across the globe, it remains the case that a diagnosis of Alzheimer's can bring with it social isolation.

The World Alzheimer Report updates data on the prevalence, incidence, and trends of Alzheimer's worldwide. It also estimates how these numbers will increase in the future, leaving us with no doubt that Alzheimer’s disease is one of the biggest global public health and social care challenges facing people today and in the future.[8]

1.2 System objective

Alzheimer’s not only stealing people’s memories but also their ability to recognize faces, which widens the gulf between people with this disease and their loved ones. beyond causing memory problems, Alzheimer’s disease also impairs visual face perception.

So, our main objective is to enhance the facial recognition capabilities of Alzheimer's patients, which will make them feel independent and safe. So, a key foundation of Our app is to help patients remember people and recall faces. One aspect of this functionality is an image gallery, which can



have images of the patient family faces or of memorable events such as family birthdays, complete with a description of who is in the photo, details of the occasion, and when and where it was.[7]

In addition, the team has also aimed to use the current Face recognition Algorithms and tools to develop artificial intelligence (AI) face recognition solution, which can be used to automatically provide information about a person to a patient, simply by holding a smartphone camera towards their face. Powered by a Face recognition Algorithm, users can also add new faces and label them accordingly so that there's a higher chance of newcomers being recognized in subsequent visits.

Other practical tools include a schedule to help them keep on top of the day's events and take medicine time to help keep patients' minds engaged, as well as cognitive reports of Alzheimer's patient Health. People with Alzheimer's can often become distressed when they can't remember what they're doing or who they're with, so these memory-triggering features are designed to offer a source of comfort.

Also, our objective to make the app would be easy to use with minimal training from written or spoken instructions as noted.

"There is no cure for Alzheimer's disease or a way to slow its progression," Feydi states.

But as Robert A. Heinlein once said, everything is theoretically impossible, until it is done. Today, with technology like AI, the only thing that can make us abandon our fight against this disease is believing that it's incurable.[13]

1.3 Motivation

Today, there are an estimated 50 million people living with Alzheimer's disease and other forms of dementia. With no known cure and a poor understanding of the mechanisms behind it, Alzheimer's is an illness that can bring sorrow to both patients and caregivers, including their family and friends; with 60 percent of caregivers reporting high levels of emotional stress.

also, our findings suggest that currently available apps for AD patients may not meet complex needs and may be difficult to use given the possible impaired communication ability associated with AD. Therefore, high-quality apps need to be developed and rigorously evaluated for feasibility and efficacy in helping AD patients.

1.3.1 App Availability:

Of the 245 apps identified, 14 met the eligibility criteria and were included in this report. After duplicates were removed, 44 of the remaining search apps did not have a primary function assisting dementia care, 10 did not have an AD/RD patient focus, 2 were not available in English, and 3 were not available in the Google Play Store or Apple's App Store. Of the 14 included apps, 11 (78%) were supported by both Google Play and Apple's App Store. In addition, 1 (1/14, 7%) app was available only in Apple's App Store, and 1 (1/14, 7%) was available only in Google Play.[15]

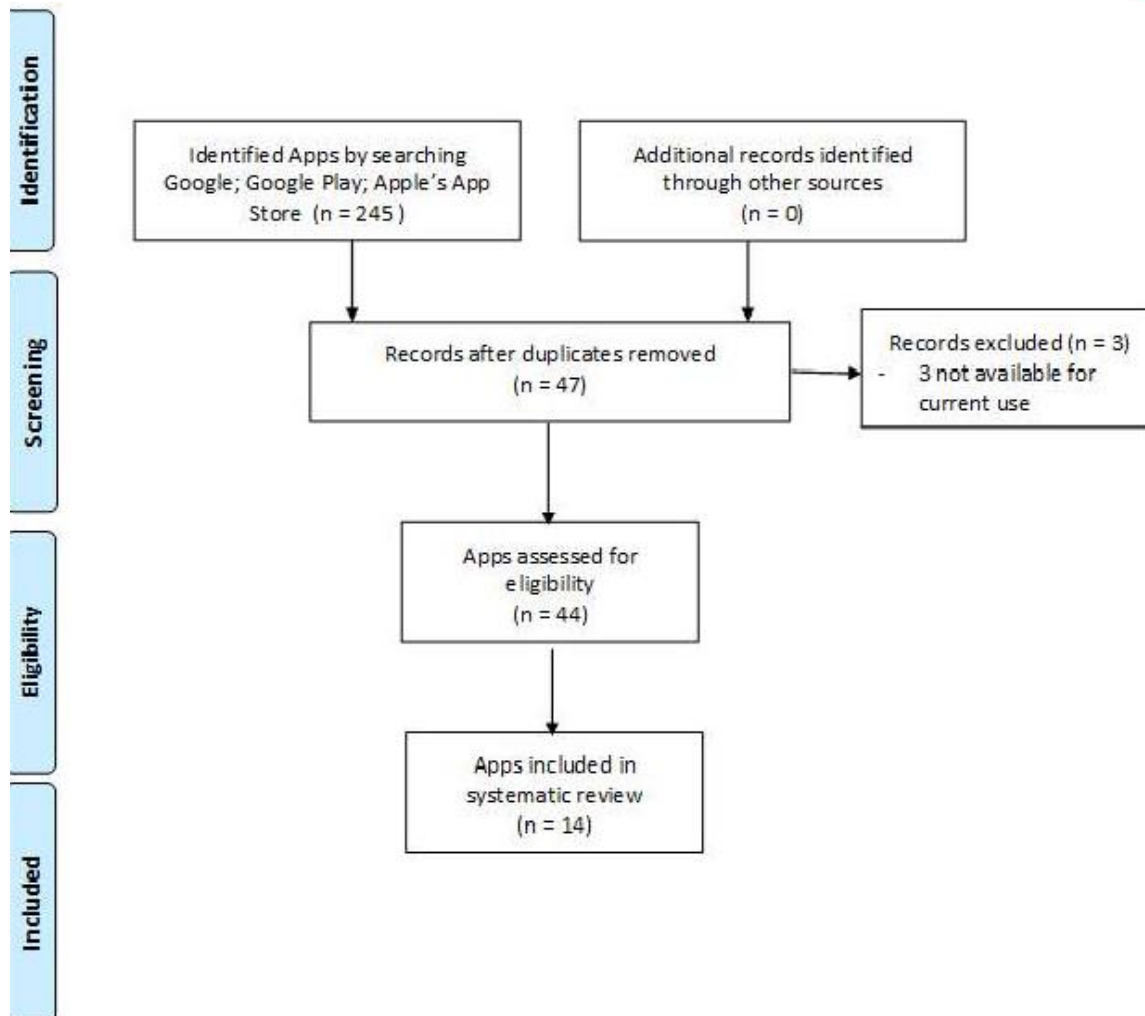


Figure 1. App screening process.

However, we believe that the challenging behaviors of AD patients can be modified, and their health can be promoted through adequate mobile technology-based interventions designed to meet the needs of these patients and their caregivers. The evolution of mobile phone technology can have extensive influence on health care and promotion; therefore, apps focusing on dementia with comprehensive components may support AD patients in meeting their needs. Other suggested features include targeting the prevention of memory loss, communication and language skills, and connectedness with the community.

“Rarely do we find anyone recovering from Alzheimer’s, but we must not lose hope and strive to offer a better future to all those suffering from the disease”

Motivated by the struggles of patients and caregivers alike, our team has come together to work on a solution that can alleviate some of the burdens of the illness (Mobile Application that helps people with Alzheimer’s recognize faces using AI).[11]

1.4 System Functions

1.4.1 Functional Requirements

This section, **Functional Requirements** contains the specification of functional requirements. Functional requirements will be figured in the tables below:

1.4.2 Non-Functional Requirements

Nonfunctional Requirements (NFRs) define system attributes such as **security, reliability, performance, maintainability, scalability, and usability**. Non-Functional requirements will be figured in the tables below:

i. Start Now [SN]

Function ID	Function Description	Non-Functional Description
SN-1	The system allows the user to register in the application.	tem asks for birthday date, this date should be valid and match our system requirements.
SN-2	The system allows the user to log in to the application.	Security test: Username and password must be correct.

Table 1. Functional & Non-Functional requirements of Start Now

ii. Set Database [SD]

Function ID	Function Description	Non-Functional Description
SD-1	The system allows the user to add a new person.	New person must be valid
SD-2	The system allows the user to update an existing person.	Must be an existing person to update information
SD-3	The system allows the user to remove an existing person.	Validity of existence person to be removed.

Table 1. Functional & Non-Functional requirements of Set Database

iii. Face Recognition [FR]

Function ID	Function Description	Non-Functional Description
FR-1	The system using camera to detects and locates the image of a face.	Camera should be working
FR-2	The system analyzes the face: an image of the face is captured and analyzed.	Performance testing.
FR-3	The system converts the image to data.	Performance and Maintenance, shouldn't take much time in analyzing.
FR-4	The system finding a match .	_____

Table 2 Functional & Non-Functional requirements of Face Recognition

iv. Set Medical Appointments [SMA]

Function ID	Function Description	Non-Functional Description
SMA-1	The system allows the user to add a new medical appointment.	_____
SMA-2	The system allows the user to update an existing medical appointment.	Check for having pre-existing data.
SMA-3	The system allows the user to remove an existing medical appointment.	Check for having pre-existing data.
SMA-4	The system allows the user to mark the completed appointments.	_____

Table 3. Functional & Non-Functional requirements of Set Medical Appointments

v. Set Daily Tasks [SDT]

Function ID	Function Description	Non-Functional Description
SDT-1	The system allows the user to add a new Daily Task.	_____
SDT-2	The system allows the user to update an existing Daily Task.	Check for having pre-existing data.
SDT-3	The system allows the user to remove an existing Daily Task.	Check for having pre-existing data.
SDT-4	The system allows the user to mark the completed tasks.	_____

Table 4 Functional & Non-Functional requirements of Set Daily Tasks

vi. Create Monthly Medical Report [CMMR]

Function ID	Function Description	Non-Functional Description
CMMR-1	The system gathers data from medical appointments and daily tasks.	Check for having pre-existing data.
CMMR -2	The system analyzes the gathered data.	Performance and Maintenance shouldn't take much time in analysing
CMMR -3	The system Creates the report.	Ensure that the data is correct.

Table 5. Functional & Non-Functional requirements of Create Monthly Medical Report

1.5 System architecture

The facial recognition system proposed, basically consists in the following steps: (a) image acquisition; (b) pre-processing; (c) features extraction; (d) classification and verification. The facial recognition process starts from the image acquisition

module. Via an application camera, the system captures the face image, which will be used as input to the facial recognition system. [1]

The images were showed frame by frame, and the faces were detected and extracted the image pre-processing used here to the images more normalized and corrected to improve the face recognition.

After pre-processing, the face image normalized was served as an input to

extraction features module that is aiming to find the main features to be used for classification. Each individual representative image was transformed into a matrix of size $w \times h$, where w and h are, respectively, the pixels number for the width and height of the image. Each pixel value of the image corresponds to a component of the vector

After pre-processing, the face image normalized was served as an input to extraction features module that is aiming to find the main features to be used for classification (If space characteristic contains only the most visible features, the classifier is more efficient in sorting and occupies less memory) [2]

With the aid of a pattern's classifier, the features extracted from the face image are compared to the samples of the face training set. Then, the face image is classified as known or unknown.

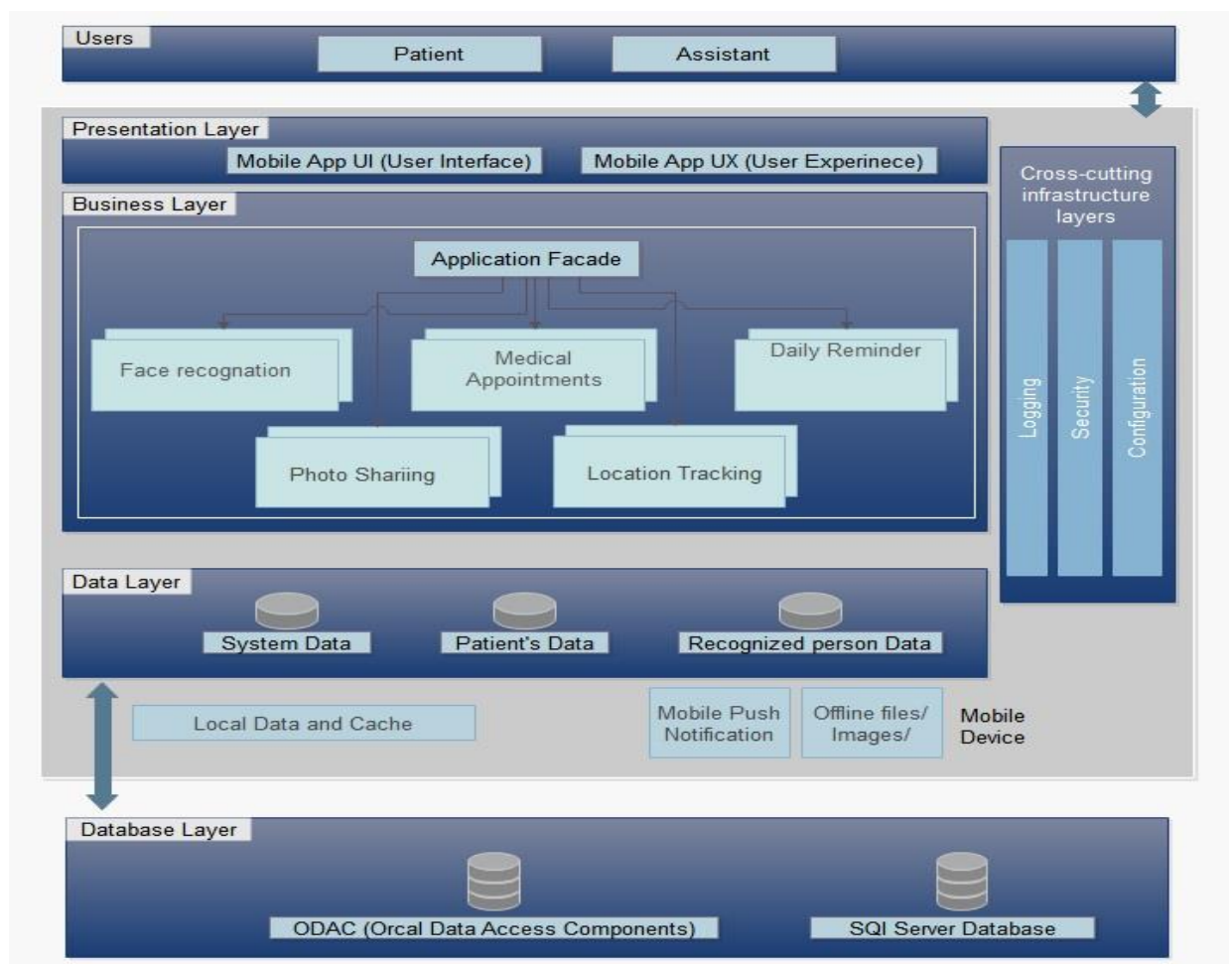


Figure 2. System Architecture

1.6 System analysis

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. Often, they are a preliminary step used to create an overview of the system which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design). A DFD shows what kinds of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored. It does

not show information about the timing of processes, or information about whether processes will operate in sequence or in parallel.[2]

1.6.1 Context diagram:

The Context Diagram is a diagram that defines the boundary between the system, or part of a system, and its environment, showing the entities that interact with it. This diagram is a high-level view of a system. It shows the system in state of rest with its external users. It is similar to a block diagram.

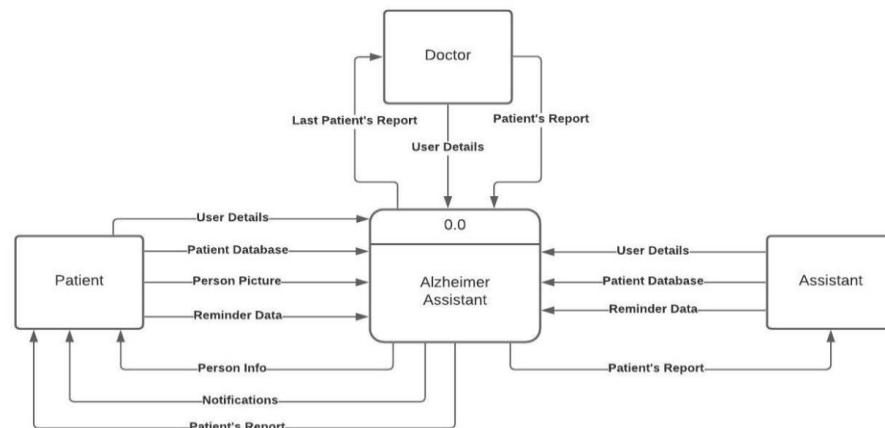


Figure 3. Context Diagram

1.6.2 Level 0 Data Flow Diagram:

In the Level “0” Diagram, the Data stores, or places where the data are stored are illustrated.

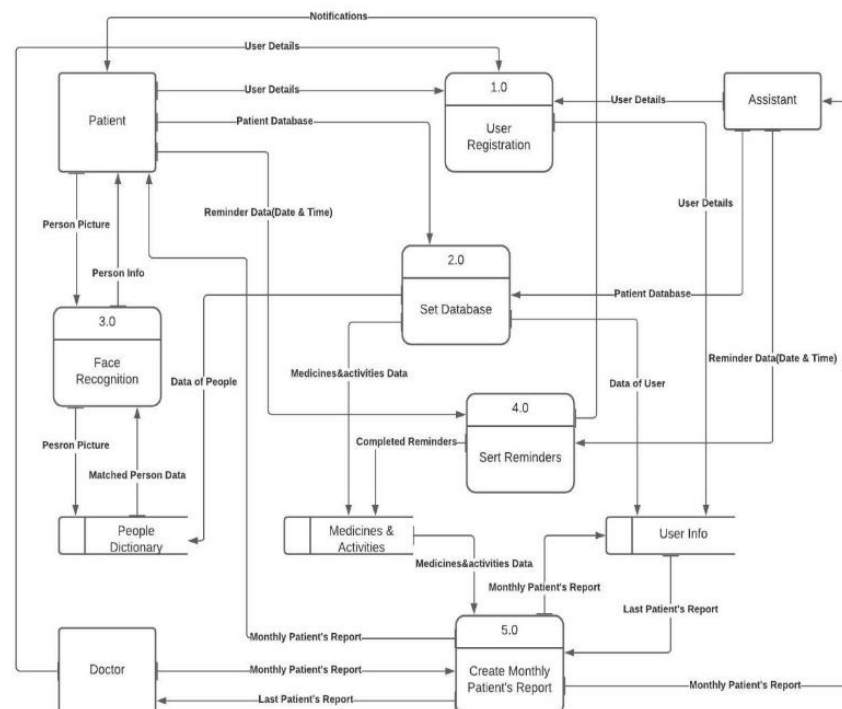


Figure 4. Level 0

1.7 System design

Systems design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on the specified requirements.

1.7.1 ERD

This ER (Entity Relationship) Diagram represents the model of ALZHIEMER System Entity. The entity-relationship diagram of Alzheimer System shows all the visual instrument of database and the relations between Patient, Doctors, Assistants, etc. It used structure data to define the relationships between structured data groups of Alzheimer Management System functionalities. The main entities of the Alzheimer System are Patient, Doctors, Assistants, Recognition Dictionary, Medical Reports and Reminders.[6]

Alzheimer System entities and their attributes:

Patient Entity: Attributes of Patient are patient_id, patient_name, patient_phone, patient_email, patient_Address, patient_Age, patient_Diagnosis and Health_Insurance

Assistant Entity: Attributes of Assistant are Assistant_id, Assistant_Email, Assistant_name, Assistant_phone, Assistant_Age, Assistant_Relative_Relation, Assistant_address

Doctors Entity: Attributes of Doctors are doctor_id, doctor_name, doctor_specialist, doctor_mobile, doctor_email, doctor_address

Reminder Entity: Attributes of Reminder are Reminder_diary, Reminder_medicines, Reminder_daily_activity, Reminder_events, Reminder_Latest_update

Recognition Dictionary Entity: Attributes of Recognition Dictionary are Recognition_Dictionary_id, Recognition_Dictionary_name, Recognition_Dictionary_phone, Recognition_Dictionary_email, Recognition_Dictionary_address, Recognition_Dictionary_Age, Recognition_Dictionary_safety_identification, Recognition_Dictionary_Relative_relation

Medical Reports Entity: Attributes of Medical Reports are Medical_Reports_id, Medical_Reports_Examination_Date, Medical_Reports_Treatment_methods, Medical_Reports_Desease_Diagnosis, Medical_Reports_case_Rate, medicine_type

Description of Alzheimer System Database:

The detail of the system is store into Alzheimer entities

Entities of (Medical Reports, Doctors, Recognition Dictionary, Patient, Assistant) contains primary key and unique keys.[10]

The entity Reminder is a weak entity which doesn't have a primary key

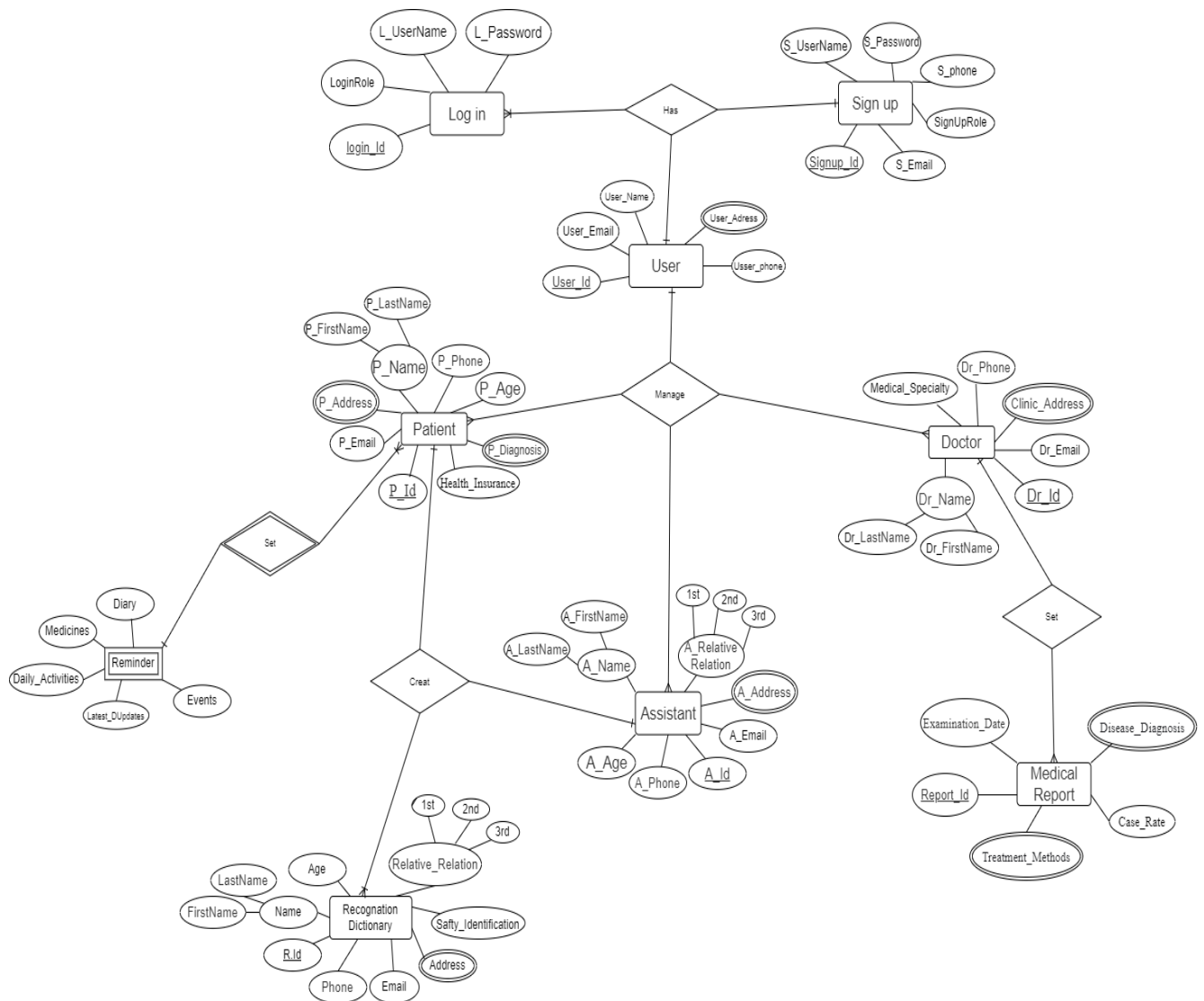


Figure 5. ERD

1.7.2 Use case diagram

Class diagram in the Unified Modeling Language is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods) and the relationships among objects.

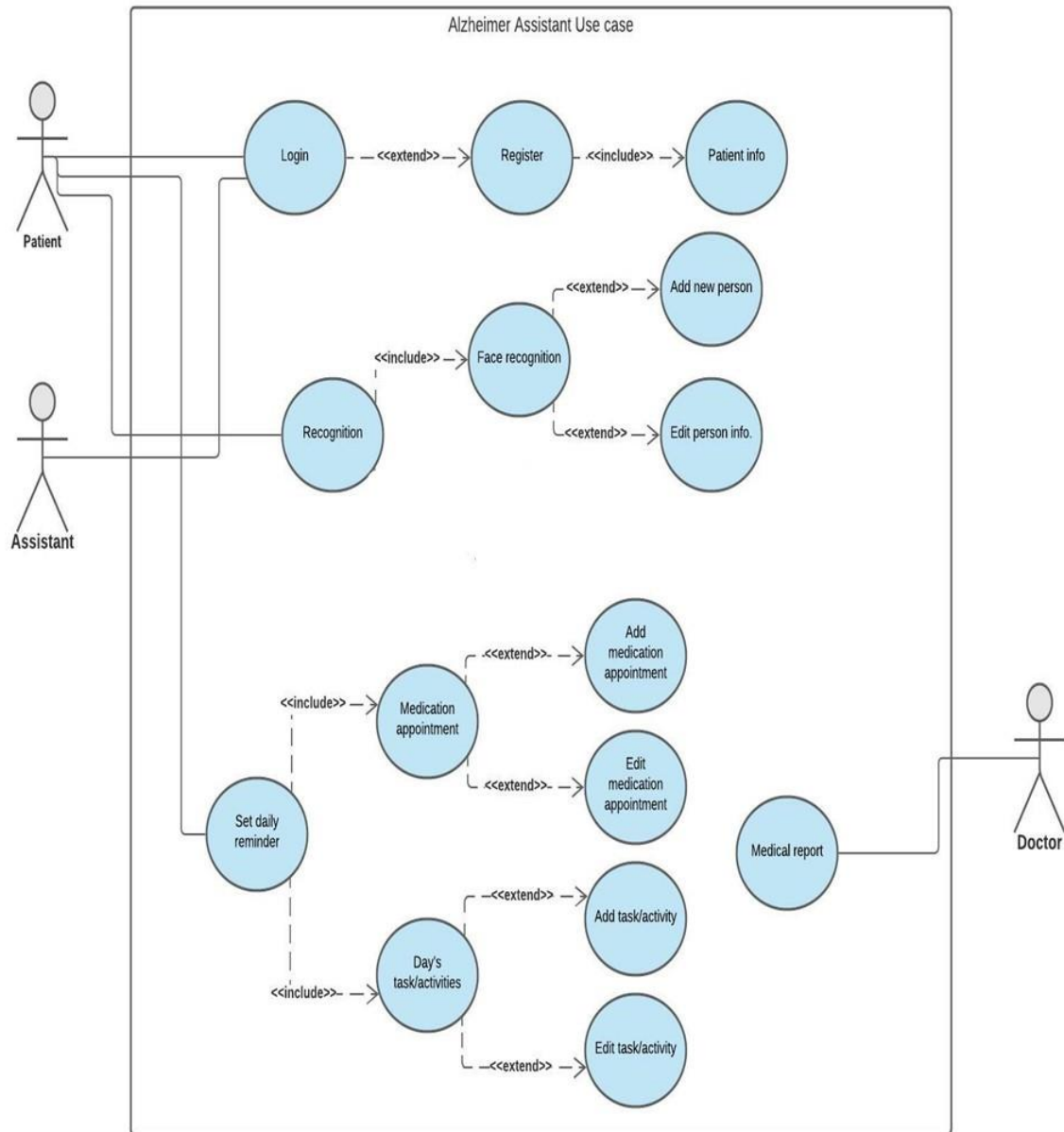


Figure 6. Use Case Diagram

1.7.3 System sequence diagram

A sequence diagram or system sequence diagram (SSD) shows object interactions arranged in time sequence in the field of software engineering. It depicts the objects involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of scenario. Sequence diagrams are typically associated with use case realizations in the logical view of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.[6]

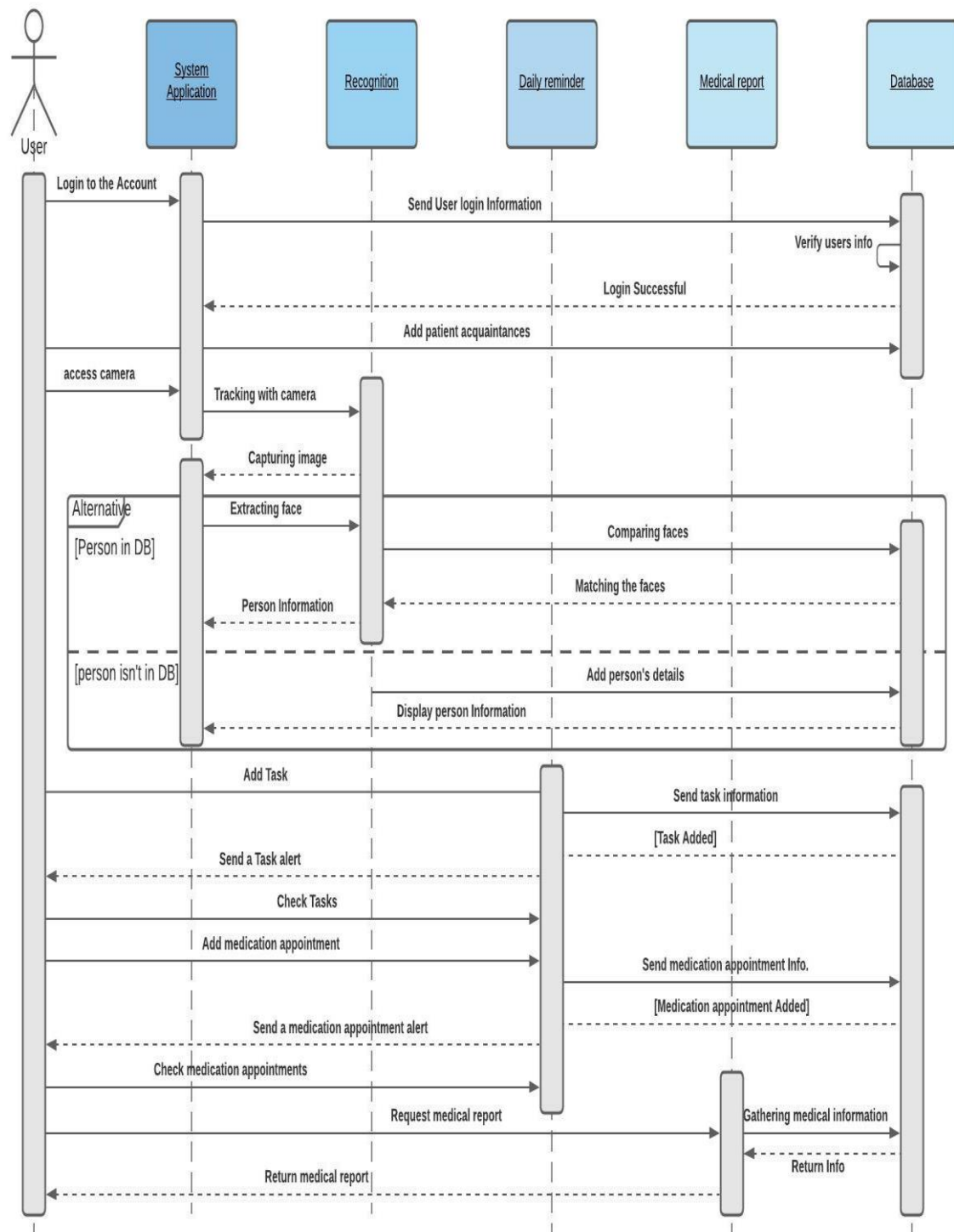


Figure 7. Sequence Diagram

1.7.4 Sequence diagram

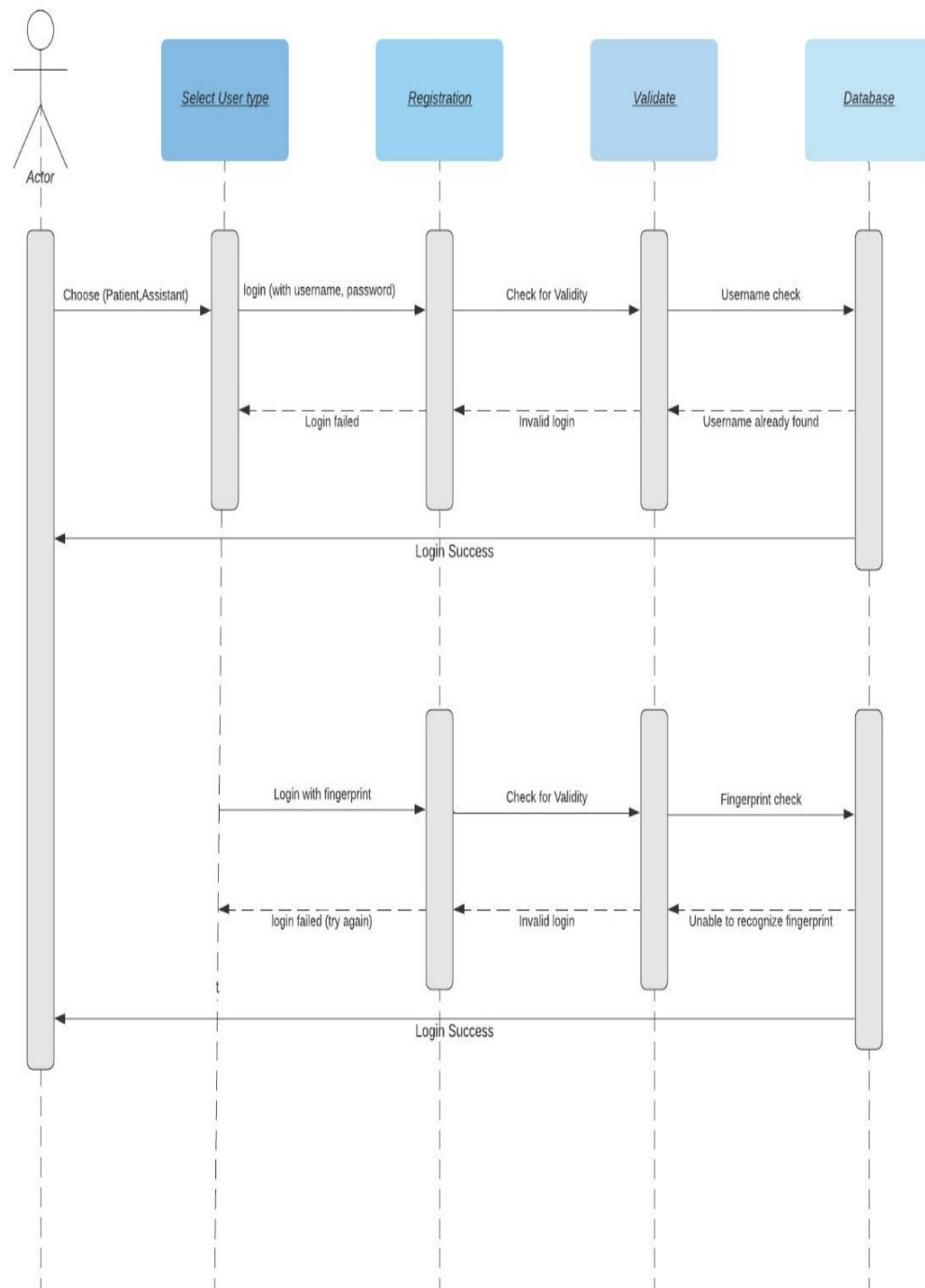


Figure 8. Sequence Diagram

1.7.5 Class diagram

Class diagram in the Unified Modeling Language is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods) and the relationships among objects.

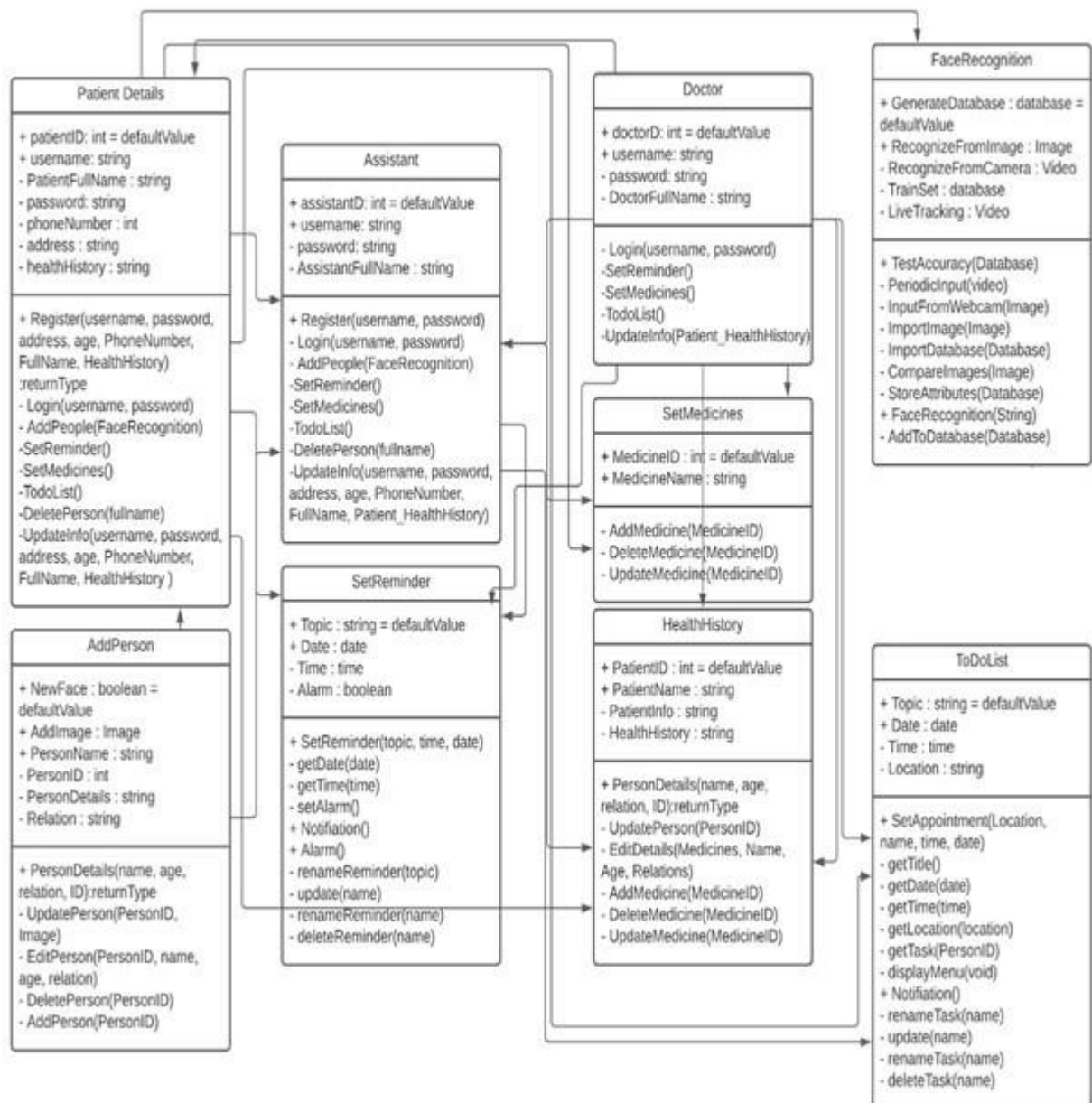


Figure 9. Class Diagram

1.7.6 Activity Diagram

Activity diagram is graphical representation of workflows of stepwise activities and actions with support for choice, iteration, and concurrency. In the Unified Modeling Language, activity diagrams are intended to model both computational and organizational processes (i.e., workflows). Activity diagrams show the overall flow of control.

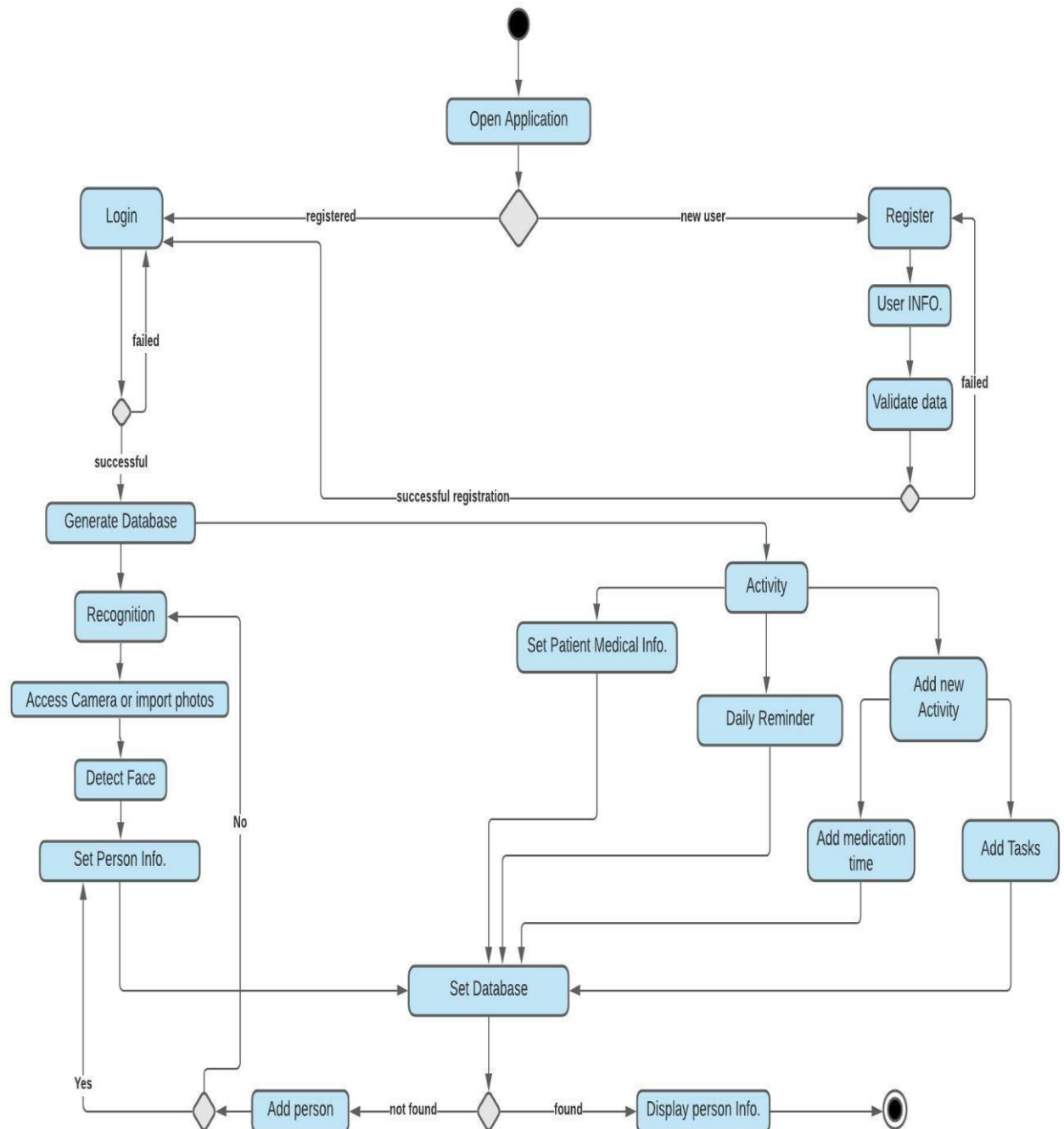


Figure 10. Activity Diagram

1.7.7 State Chart Diagram

A state diagram is a type of diagram used in computer science and related fields to describe the behavior of systems. State diagrams require that the system described is composed of a finite number of states' sometimes, this is indeed the case, while at other times this is a reasonable abstraction. Many forms of state diagrams exist which differ slightly and have different semantics.

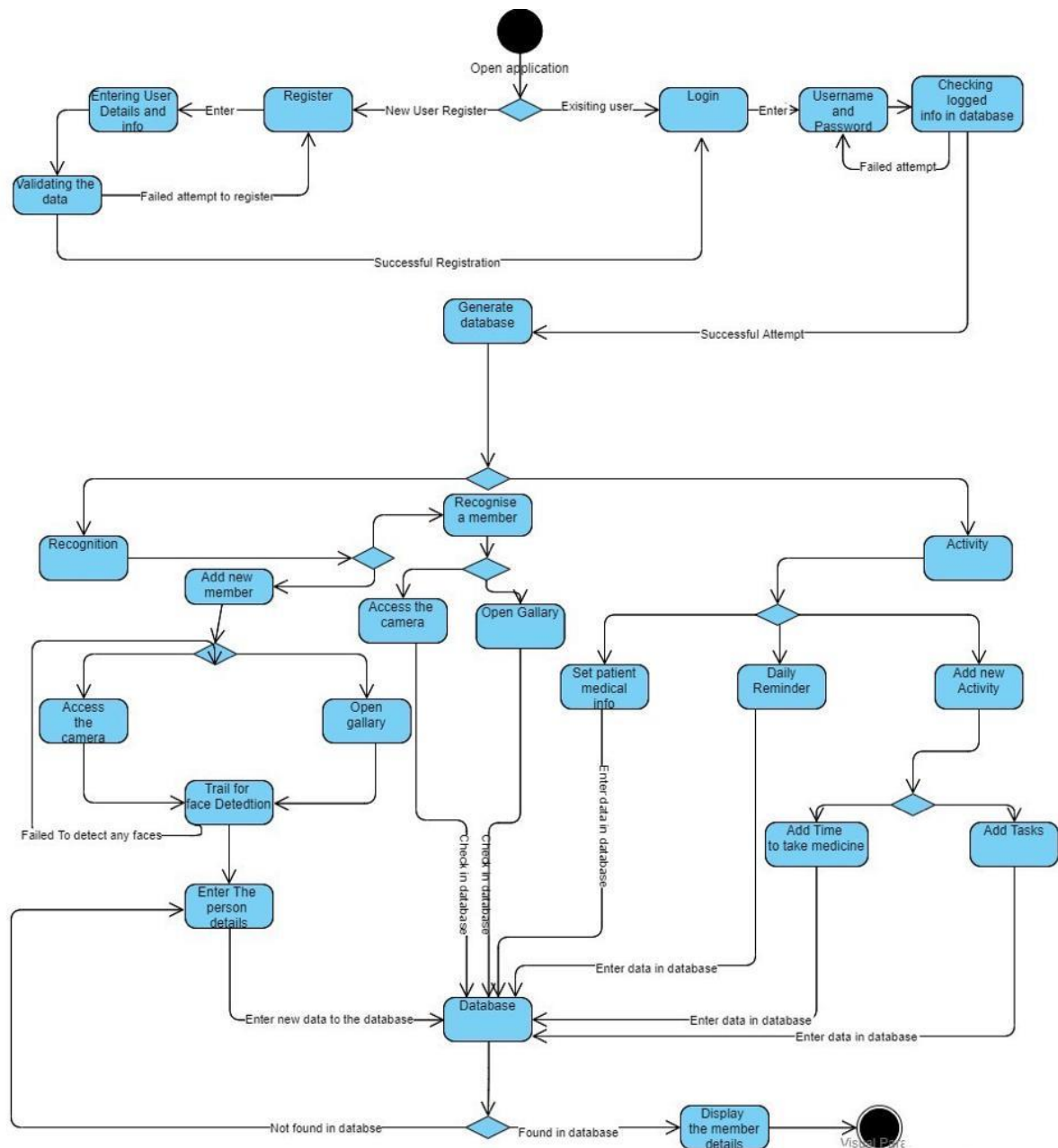


Figure 11. State Chart Diagram

Chapter Two

2 LITERATURE SURVEY AND RELATED WORK

2.0 Overview

In this chapter, we will search, study, and review some Papers/applications related to this research across different markets then summarize the advantages and disadvantages of each application.

We will begin the investigation with some Papers excelling in this field. Listing their history, features, and shortcomings before finally proceeding to the mobile/smartphone markets and reviewing the most relevant apps related to this project in mobile app markets.

2.1 Related papers for the system

In this section, we identify a group of research papers related to our project area to help Alzheimer's patients and perform an analysis.

2.1.1 A Review of Face Recognition Technology

With the development of science and technology, face recognition technology has made great achievements, but there is still room for its improvement in practical application. Face recognition technology is a biometric technology, which is based on the identification of facial features of a person. People collect the face images, and the recognition equipment automatically processes the images. The paper introduces the related research of face recognition from different perspectives. The paper describes the development stages and the related technologies of face recognition. We introduce the research of face recognition for real conditions, and we introduce the general evaluation standards and the general databases of face recognition. Face recognition has become the future development direction and has many potential application prospects.[4]

2.1.2 The role of M-health applications in the fight against Alzheimer's

Numerous M-health applications that fight against Alzheimer's have been surveyed and analyzed by using a scientific methodology in which inclusion and exclusion criteria have been used. Based on this analysis, we were able to present the current research foci and define potential future research directions.[9]

The methodology used is non-academic applications, which were collected by searching Google Play, and academic applications, which were collected by searching Google Scholar, Inclusion criteria are the work should provide a real solution and practical service.[9]

The extracted features are Enhancing human memory, ensuring safety, improving awareness, and Facilitating patients' daily activities by Providing tracking of movements, medicine, and food timing notifications, and a daily routine tracker as well as a quiz to increase cognitive function in providing a communication channel between doctors and patients.[9]

2.1.3 Intelligent Sensing Technologies for the Diagnosis, Monitoring and Therapy of

Alzheimer's Disease

The methodology used is focusing on the kind of intelligent sensing technologies that exist in the literature for the care of Alzheimer's disease and the purpose served by these technologies, in its management. Keeping in view the scope of the current article, we tend to focus on intelligent sensing technologies that can provide low-cost solutions and do not require dedicated labs or expensive equipment for the diagnosis, treatment, and monitoring of Alzheimer's disease patients focus on how the different stakeholders are involved in the design of these systems and devices and what are the challenges faced and limitations in the existing solutions. Emphasis is given on how the proposed designs or prototypes have used the user-centric design approach.[6]

The extracted features are These distributed systems included the installation of various sensors in a residential setting or a care home. These sensing nodes collected various signals from the patients and environment, sending them to the cloud or other processing units. After computations, suitable actuators in the homes were activated providing intelligent feedback to Alzheimer's patients. The remaining nine studies dealt with the implementation of solutions involving technologies such as smart devices, the development of software applications that run on these smart devices, and virtual assistants such as robots.[6]

2.1.4 Existing Mobile Phone Apps for Self-Care Management of People with Alzheimer Disease and Related Dementias

Of the 245 apps identified, 14 met the eligibility criteria and were included in this report. After duplicates were removed, 44 of the remaining search apps did not have a primary function assisting dementia care, 10 did not have an AD/RD patient focus, 2 were not available in English, and 3 were not available in the Google Play Store or Apple's App Store. Of the 14 included apps, 11 (78%) were supported by both Google Play and Apple's App Store. In addition, 1 (1/14, 7%) app was available only in Apple's App Store, and 1 (1/14, 7%) was available only in Google Play.[5]

However, we believe that the challenging behaviors of AD patients can be modified, and their health can be promoted through adequate mobile technology-based interventions designed to meet the needs of these patients and their caregivers. The evolution of mobile phone technology can have extensive influence on health care and promotion; therefore, apps focusing on dementia with comprehensive components may support AD patients in meeting their needs. Other suggested features include targeting the prevention of memory loss, communication and language skills, and connectedness with the community.[5]

2.2 Smartphone Applications

In this section, we have identified several applications that have been developed to assist Alzheimer's patients and we undertook a comparative analysis between these applications and ours. We have concluded that our application differs from these, in that it provides specific features to assist Alzheimer's patients.[7]

2.2.1 Alzheimer's disease pocket card

Manage Alzheimer's disease with confidence. The Alzheimer's Disease Pocket card app helps



physicians and other health care professionals care for patients with Alzheimer's disease (AD) at the point of care. The App features clinically relevant information on AD and interactive tools to help clinicians efficiently assess patients and interview their caregivers.

The main features in Alzheimer's Disease Pocketcard:

- Interactive tools to assess cognition and function, Clock Drawing Test, Saint Louis University Mental Status Exam, Functional Activities Questionnaire, and more
- An Annual Wellness Visit algorithm developed by national experts to help clinicians assess cognition more efficiently
- Current diagnostic criteria, the updated diagnostic criteria, and guidelines for Alzheimer's disease from the National Institute on Aging and the Alzheimer's Association
- Education/support packets (PDF brochures) from the Alzheimer's Association that can be e-mailed directly to patients and caregivers
- Bookmarking and notes capability[11]

2.2.2 It's Done!

A.J. Lester & Associates, Inc. has developed It's Done! (2019) which is an Alzheimer's app for iPhone that is tailored to help patients remember tasks more easily.

It's Done! (iOS): this reminder app helps confirm if you have completed tasks throughout the day. You tick 'Done' for each of your routine tasks, like locking the door, then later if you cannot remember if you locked the door, the It's Done! the app confirms that the task has been completed. The app can also send a text message or email to others when a task is done, so family or carers can be at ease that the oven has been turned off, etc.[8]

The main features in It's Done:

- Ability to categorize tasks based on time and importance.
- Reminder alarm for time-sensitive tasks.
- Attachable notes for additional task information.

2.2.3 MindMate

Founded by three former caregivers (MindMate, 2019), MindMate is one of the leading apps for healthy aging. Its multi-faceted app allows caregivers and their loved ones to participate in a variety of activities together. For patients with dementia, it features mental and physical workouts, such as puzzles and simple stretches, as well as nutritional tips inspired by the MIND Diet.

MindMate also features tools to help caregivers interact with their loved ones; Its entertainment section features classic hits from different eras to help stir emotional responses. There is also a diary section for caregivers to help record their loved one's memories to share with family and friends.[3]

The main features of MindMate:

- Games and other mentally invigorating tasks.
- Workout with a free personal trainer for each patient via the Internet.
- Facility to add daily tasks, notes, and even a 'to-do list.
- Facility to add pictures.
- Facility to add patient information.

2.2.4 Remember Me

Remember me (Remember me, 2019) is an interactive mobile application aimed at Alzheimer's family members. It is a household manager which aims to share tasks and remove the burden of caring for a dependent person alone.

The main features in Remember Me:

- Scheduling events or activities.
- Being updated in relation to all events that are occurring.
- Alerting everyone in the family when a new event is created in patient memories.
- Inserting and updating the patient data.

2.2.5 Alzheimer's Helper

Alzheimer's Helper (2019) is a mobile application that offers an alternative to more traditional paper-based systems, by assisting in the recording and storage of personal information on family and friends, for example, their contact details.

The main features of Alzheimer's Helper:

- Facility to add a picture.
- Facility to add patient information.[4]

2.2.6 Alzheimer's Manager

Getting the Full Picture of Alzheimer's Disease Through This App. When you are living with Alzheimer's Disease, the Alzheimer's Manager can help you or your caregiver manage the symptoms that affect you every day. For many, the best part of using Alzheimer's Manager is seeing moods, pain, and medications When your health journey is presented this way, it is easier to spot trends, notice strengths, and identify areas of concern.

When You Download Alzheimer's Manager and Register, You Can:

- Track your progress and symptoms • Manage your medications and treatments, including reminders
- Use the photo upload feature to share visible symptoms with care providers
- Connect to care providers so they can monitor your progress between visits and better understand how your condition is affecting you • Stay up to date with the latest information on Alzheimer's.

2.2.7 Luminosity

Luminosity's "Brain Training" app has been so popular that it has been used in cognitive functioning studies. Its research-based activities are specifically designed to challenge cognitive capabilities. The app has seven different types of activities to choose, each targeting a different ability. For example, users can test their memory, logical reasoning, speed, and other functions through specially tailored games. The free version allows users to play three games a day, which supplies them with plenty of material to try out the app.[1]

By harnessing the power of technology, apps can help a person connect with old memories and even make new ones.

2.3 Comparison Regarding Market Stats

2.3.1 A Comparison between the smartphone apps based on the app markets.

	<i>Alzheimer's disease pocketcard</i>	<i>It's Done!</i>	<i>MindMate</i>	<i>Remember Me</i>	<i>Alzheimer's Helper</i>	<i>Alzheimer's Manager</i>	<i>Luminosity</i>
<i>Platforms</i>	IOS	IOS / Android	IOS	IOS / Android	Android	IOS / Android	IOS / Android
<i>Pricing</i>	Free	Cost: \$2.99	Free	Cost: \$2.74	Free	Free	Free
<i>Avg. Store Rating</i>	3.1/5.0	3.7/5.0	4.8/5.0	4.5/5.0	4.6/5.0	3.7/5.0	4.4/5.0
<i>Installs</i>	300+	100+	3.3K+	453+	4.2K+	100+	2K
<i>Release Date</i>	April 8, 2014	2019	2019	2019	2019	2017	2020

Table 6. A Comparison between the smartphone apps based on the app markets

2.3.2 Applications services Comparison.

	<i>Face Recognition</i>	<i>Task Reminder</i>	<i>Medication Timings</i>	<i>Adding People</i>
<i>Alzheimer's disease pocketcard</i>				
<i>It's Done!</i>		✓		
<i>MindMate</i>		✓		✓
<i>Remember Me</i>		✓		
<i>Alzheimer's Helper</i>				
<i>Alzheimer's Manager</i>		✓	✓	
<i>Luminosity</i>		✓		
<i>Minder</i>	✓	✓	✓	✓

Table 7. Applications services Comparison

Our application is an interactive memory care assistant for engaging seniors, especially those living with early-stage Alzheimer's. The app contains two core parts: A camera (for recognizing faces) and a Reminder section. It also helps users with memory loss, we provide our users a reminder section where either the patient or his assistant can add reminder notes and a to-do list to help the patient with doing the daily routine tasks and check it when the task is done. Then the camera section is responsible for recognizing people's faces. The mobile camera can detect faces using certain algorithms and recognize them using the user's saved database on our application, which tells the user the name of this detected face.[2]

Chapter Three

3 METHODOLOGY

3.1 The Main Methodology

In this project we adapted the Agile Methodology for more than one reason and after long researches we concluded it will be the best method to implement, so

In order to be able to express why we used this Methodology we have to explain all parts of this Methodology.[9]

3.2 What is the Agile Methodology?

The Agile methodology is a practice that encourages continuous development and testing throughout the software development lifecycle of a project, and also it allows parallel development and testing.

3.3 How does the Agile Methodology work?

Agile methodologies attempt to produce the proper product through small cross-functional self-organizing teams that produce small pieces of functionality on a regular basis, allowing for frequent customer input and course correction as needed. In doing so, Agile tries to address the issues that traditional "waterfall" methodologies of delivering huge products over extended periods of time encounter, such as client requirements changing frequently and resulting in the delivery of incorrect products.

3.4 Phases of Agile Methodology:

Agile development is not that tough when broken down to its core concepts. While the number of meetings involved may appear unnecessary, it saves a lot of time by optimizing development tasks and avoiding the errors that can occur during the planning stages.[14]



Figure 12. Agile Methodology

3.4.1 Phase 1: Requirements:

Before starting with any project, we had to create the initial Documentation which include the description of the project's needs.

Expressed as following,

- The eventual result that the initiative will attain. For example, a text editor.
- The functionality will provide. For example, different font sizes.
- The features that it will not originally support. For example, adding text animations or the ability to embed video.

Also, one of the general goals is to reduce the initial needs as much as possible, by that we mean including only the necessary elements and discarding the elements that will be used frequently, after that Developers can work on them once the application has been released and the core features have been tested.

3.4.2 Phase 2: Designs

3.4.2.1 Software Design:

In this phase the project team introduces the requirements developed during the previous stage during the first iteration. The team then explores how to approach these objectives and suggests the tools required to obtain the best outcome. The developers debate feature implementation and the internal structure of the come in subsequent iterations.[12]

3.4.2.2 UI/UX Design

In this phase the team members start to build a rough mock-up of the user interface during this stage of SDLC, and when it comes to consumer products, the user interface and user experience are crucial, also it is brought up to look at potential competitors to conclude what they are doing correctly and what flaws and deficiencies they have, knowing in this phase that this is a basic design and subjected to be refined and reworked to accommodate the new features in subsequent iterations.

3.4.3 Phase 3: Development and Coding

Within the software development process, the development phase includes producing code and translating design documentation into actual software. This is the most time-consuming stage of the **SDLC (software development life cycle)** because it forms the foundation of the entire process.

There aren't many differences between iterations in this case.

3.4.4 Phase 4: Integration and Testing

During this stage, the developers team ensure that the software is bug-free and compatible with

everything else they've built previously. The team also runs a series of tests to check that the code is clean and that the solution's business goals are satisfied.

Testing grows more comprehensive as this SDLC stage progresses, and includes not only functional testing but also systems integration, interoperability, and user acceptance testing, among other things.[13]

3.4.5 Phase 5: Implementation and Deployment

The program is installed on the servers and made available to the beta testers, either as a demonstration or for actual use. Iterations after that update the existing software, adding new features and fixing issues.

3.4.6 Phase 6: Review

The Team Leader gathers the Development Team once more after all previous development phases have been completed to discuss the progress achieved toward meeting the requirements. The team presents their ideas for correcting the issues that developed during the previous phases, and the Product Owner considers their suggestions.

The Agile software development lifecycle phases then begin over, either with a new iteration or by progressing to the next stage and scaling Agile.

3.5 Types of Techniques in Agile Methodology:

After doing some researching, we found out that the two most prominent tools for supporting The Agile Development life cycle are Scrum and Kanban.

3.5.1 Scrum:

Ken Schwarber and Jeff Sutherland created the Scrum approach, which provides a basic framework for working on big projects. Agile software development approaches are iterative, which means the work is divided into iterations or Sprints in Scrum's instance. Scrum is carried out by small groups of 5-9 persons, who include a Scrum Master and a Product Owner.[11]

Projects in Scrum are broken into Sprints, which are typically two or three weeks long. A Sprint is a set of features that must be produced within a certain amount of time. Multiple sprints may be merged to make a Release, which is the formal delivery of software/product to the customer/market.

The Product Owner breaks down the overall product functionality into smaller pieces. Each Sprint or Iteration prioritizes and tackles these Stories. The goal of the process is for the team to be able to show the Product Owner working bits of the product at the conclusion of each Sprint to ensure that it is operating as intended.

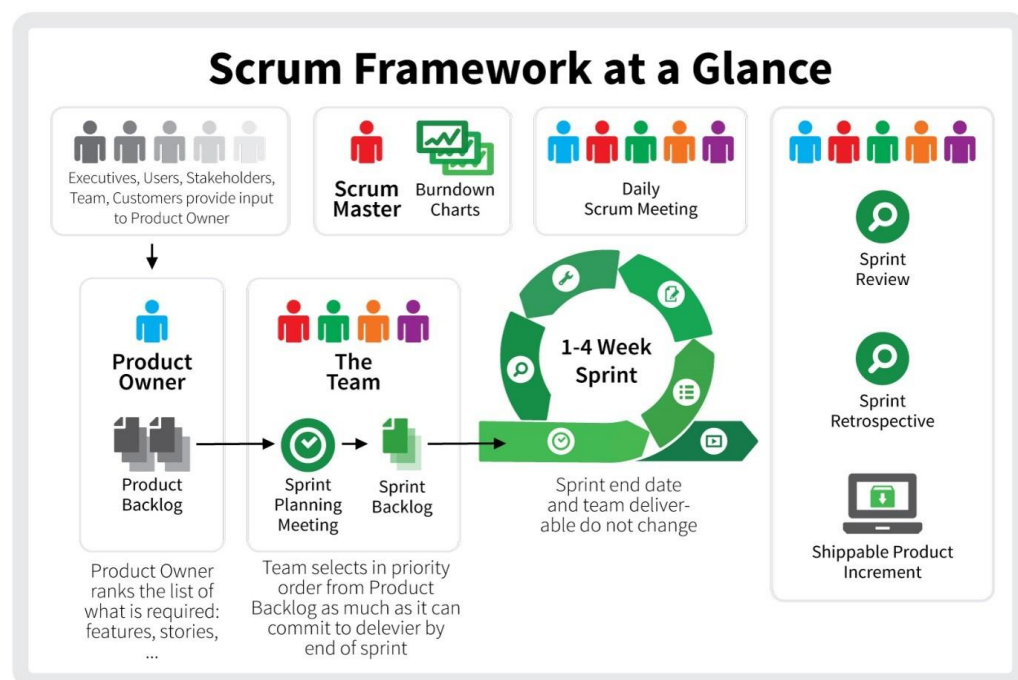
Overall, the Scrum technique divides the long waterfall process into smaller cycles, allowing product teams and end-customers to assess functioning software on a regular basis and ensure that it satisfies their business needs. This guarantees that the completed product fulfils the customer's ultimate specifications.

The Daily Stand-up meeting, the Sprint Review Meeting, the Demo to the Product Owner, and the Sprint Retrospective meeting are all part of the Scrum methodology. All of these meetings allow the team to collaborate and review the project to verify that it is moving as planned and that any concerns are immediately remedied.[2]

3.5.2 Kanban:

In the early to mid-2000s, David Anderson established the Kanban Method in reaction to some of the issues of other Agile methodologies, particularly Scrum. While attempting to address the issues with traditional/waterfall approaches, these methods fell victim to some of the same issues.

The 2–3-week sprint cycle was too long for many business contexts, and the associated changes in organizational structure and project management/planning processes put firms under too much strain,



and many teams found themselves failing to meet even sprint-level scope and quality com

Figure 13. SCRUM Framework

mitments. Implementing these strategies was quite disruptive for most firms.

The Kanban method was designed as the polar opposite of that – a non-disruptive evolutionary method for improvement that allows teams to deliver continuously rather than in timeframes of 2-3 weeks, receive feedback faster and shorten the time it takes to offer value to customers.

Kanban is a visual management approach for tracking work as it progresses through a process. Kanban depicts both the process (workflow) and the actual work that passes through it. Kanban's goal is to identify and eliminate potential bottlenecks in your process so that work can flow at a cost-

effective rate.[8]

3.5 Benefits of Agile Methodology

Agile's advantages are directly related to its faster, lighter, and more involved mindset. In a nutshell, the process ensures that the consumer gets what they want when they want it. There is far less time spent developing in the wrong direction, and the entire system responds to changes much faster. [7]

- **Faster** **is** **Better**
 One of the most significant advantages of Agile Methodology is its speed. A shorter software development life cycle means that there is less time between paying and receiving payment. As a result, the company will get more profit.
- **Customer Satisfaction** **has** **Improved**
 Customers don't have to wait months or years for exactly what they don't want with Agile. Rather, they receive fast iterations of something that is extremely near to what they desire. The system adapts swiftly to changes in the overall environment in order to refine the successful client solution.
- **Employees** **are** **Valued**
 Employees who are encouraged to contribute their ideas are far more productive than those who are told to follow a set of rules. Employees are respected in the Agile Methodology because they are given an objective and then trusted to achieve it. Employees are in the best position to respond to problems and fulfill the goals at hand because they have their hands on the controls and witness the difficulties that arise every day.
- **Rework** **is** **No** **Longer** **Necessary**
 The project stays on track and in tune with customer needs at every level by involving the client in more than just the requirements and delivery phases. Between the time we complete the task and the time the customer proposes adjustments, there will be less backtracking and "going out on a limb" time.[4]

3.6 Interviews

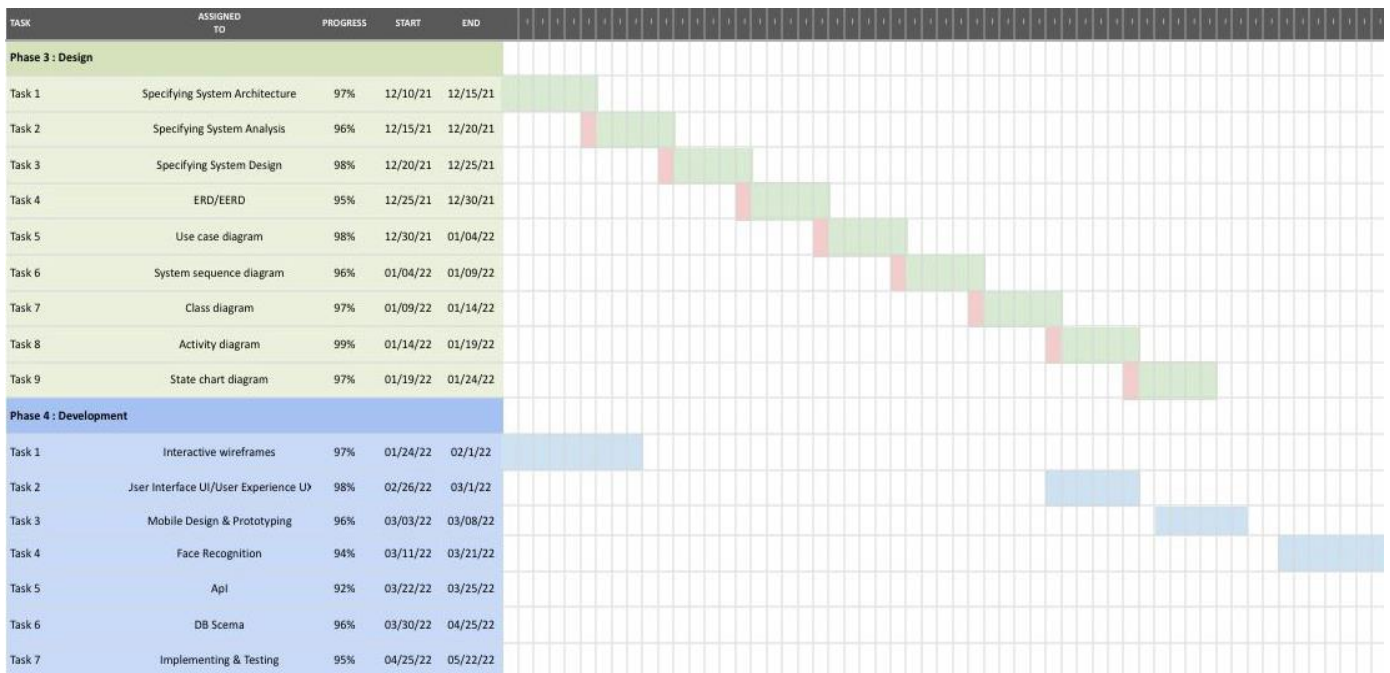
Knowing that to be able to be a part of a successful project we had to check the customer needs, also to check the challenges they face to be able to implement a solution in our application, so after interviewing some of our family, friends, and people online to check their struggles with the Alzheimer's patient that they are dealing with, and in conclusion we figured the following

- Patients that have been diagnosed with Alzheimer recently in their early stages they tend to forget people they don't deal with on daily bases, and they forget simple tasks.
- Patients that have been diagnosed with Alzheimer for more than 10 years they tend to have trust issues with their personal human assistant, and they try to be dependent on themselves, which can be dangerous in some cases.

- Patients in their early stages and late stages will be in need of assistance in reminding them with their medications and simple mind tasks just to be able to maintain some sort of brain activity.
- It's difficult on the Alzheimer patients to ask for any kind of assistance from their family or



friends because they don't want to feel that they are unreliable. [10]



3.7 Time plan

Chapter Four

4 RESULTS AND OUTCOME

The findings from this Alzheimer Assistant is an application specifically developed to assist Alzheimer's patients by: helping to identify people by referring to the album on the application that has classified each person by their face, along with displaying information regarding their relationship; sending notifications to remind patients of what they have to do on any given day. Hence, this application motivates Alzheimer's patients to be more confident when participating in everyday activities, thus improving their ability to engage in social events on a daily basis. This application has clearly demonstrated its capacity to provide assistance to the caregivers and families of Alzheimer's patients. [7]

Thus, the user interfaces for this application are shown in the following figures

The usability of an application is an important consideration in ensuring that its users can optimize and reap the benefits associated with its usage. In order to gain the greatest usability of the application we concerned on six main criteria as described in the points below.

- **Checkability:** There is a verification process in place, where any data either being entered into or extracted from the system can be checked for accuracy.
- **Confidence:** This is a good system and users feel confident in their ability to use it.
- **Control:** This system is easy to manage, especially any data that users are either inputting or extracting from it.
- **Ease of Use:** This is a user-friendly system.
- **Speed:** The system is fast and efficient.
- **Understanding:** Both the system itself and the information that it produces are easy to understand.

As Alzheimer Assistant has an verification system in place in order to check the accuracy of data either being entered or extracted to make the users feel confidence in their ability to use it to be sure that the system itself is effective when they found it is easy to manage the system, especially when either inputting or extracting data as the application was found to be user-friendly , It is considered to be a fast and efficient system both the application and the information that it produces were found to be easy to understand.[9]

The limitation of this application is the lack of a facility for caregivers to monitor patients remotely. Thus, the development and incorporation of this additional feature into the application would enrich its functionality and it will, accordingly, be included in future editions. Future work will also focus on face recognition through the use of deep learning algorithms, given their significant impact in terms of face recognition, evidenced by their delivery of superhuman performance and high accuracy output results.

Thus, the functional evaluation of the app described in the points below.

- **Costs:** Free

improve the quality of care and quality of life for AD/RD patients, which could potentially reduce public health costs, finding more efficient methods reducing the overall cost and burden of the healthcare system

- **Environmental impact:** positive effect

this application highlights the benefits in adopting advanced technologies so face recognition in this specific case when developing healthcare applications which can have a significant impact on the community

- **Manufacturability:** implemented

pursuance physical production and operations with smart digital technology and machine learning to create a more holistic and better-connected ecosystem of patients that focus on manufacturing the easiest way of helping

- **Ethics:** built

we built a responsible consumerism in order to realize the utility of instantaneous communication without allowing ethics to be distracted by focusing on is designing unique experiences that drive up user retention

- **Health and Safety:** fulfilled

increasing app usage can improve health outcomes and health quality, ultimately reducing health disparity and equity thus Improved productivity: Manual data collection, better data quality: gather superior quality of data and facilitate faster decision making, checklists, taking notes.

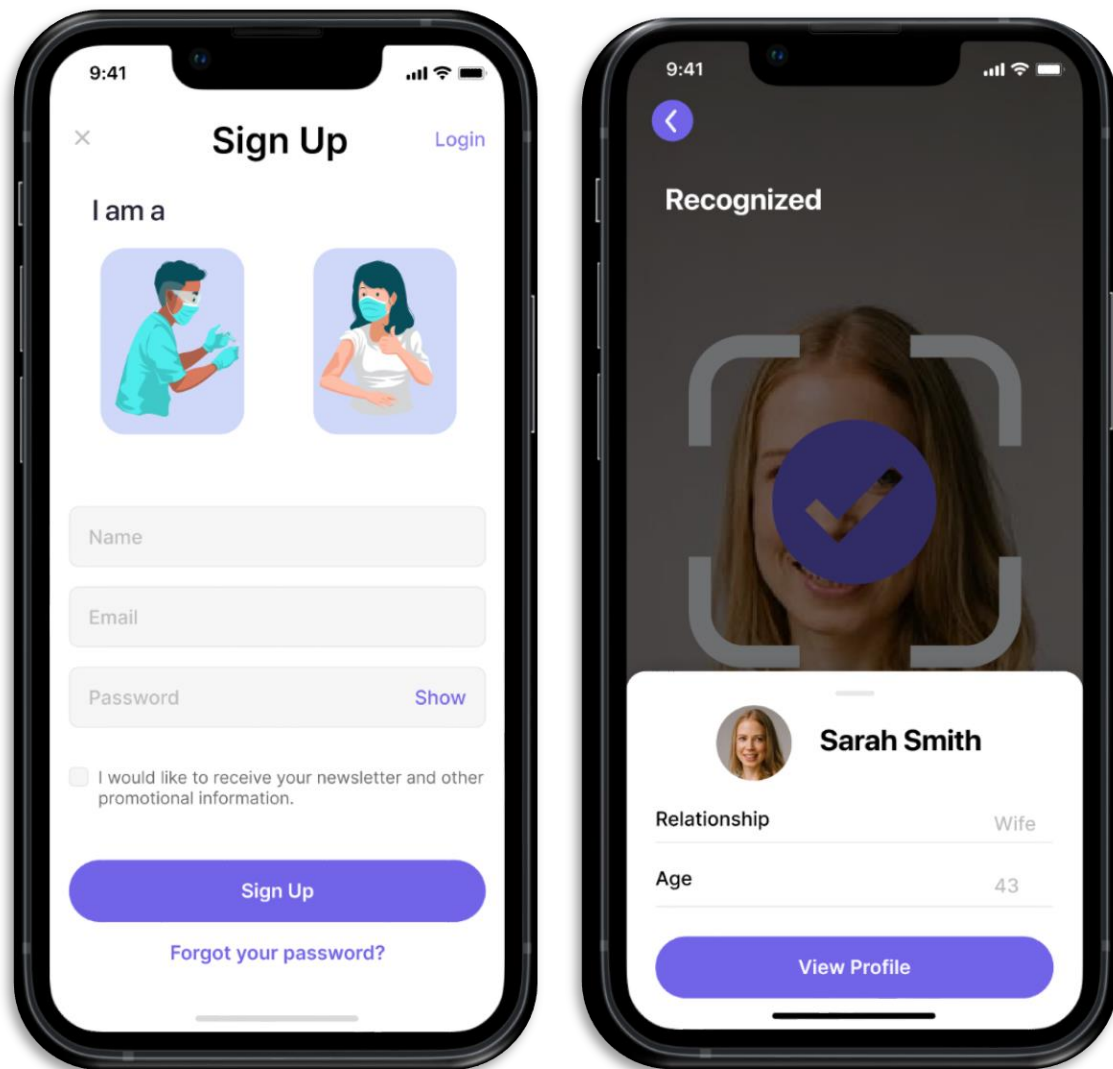
Preventing losses: When faced with a potentially dangerous situation, users can share the information on-line by writing daily notes or add new tasks. Disseminating the warning in real-time can assist in evacuation efforts and minimize damage to property and prevent loss of lives.

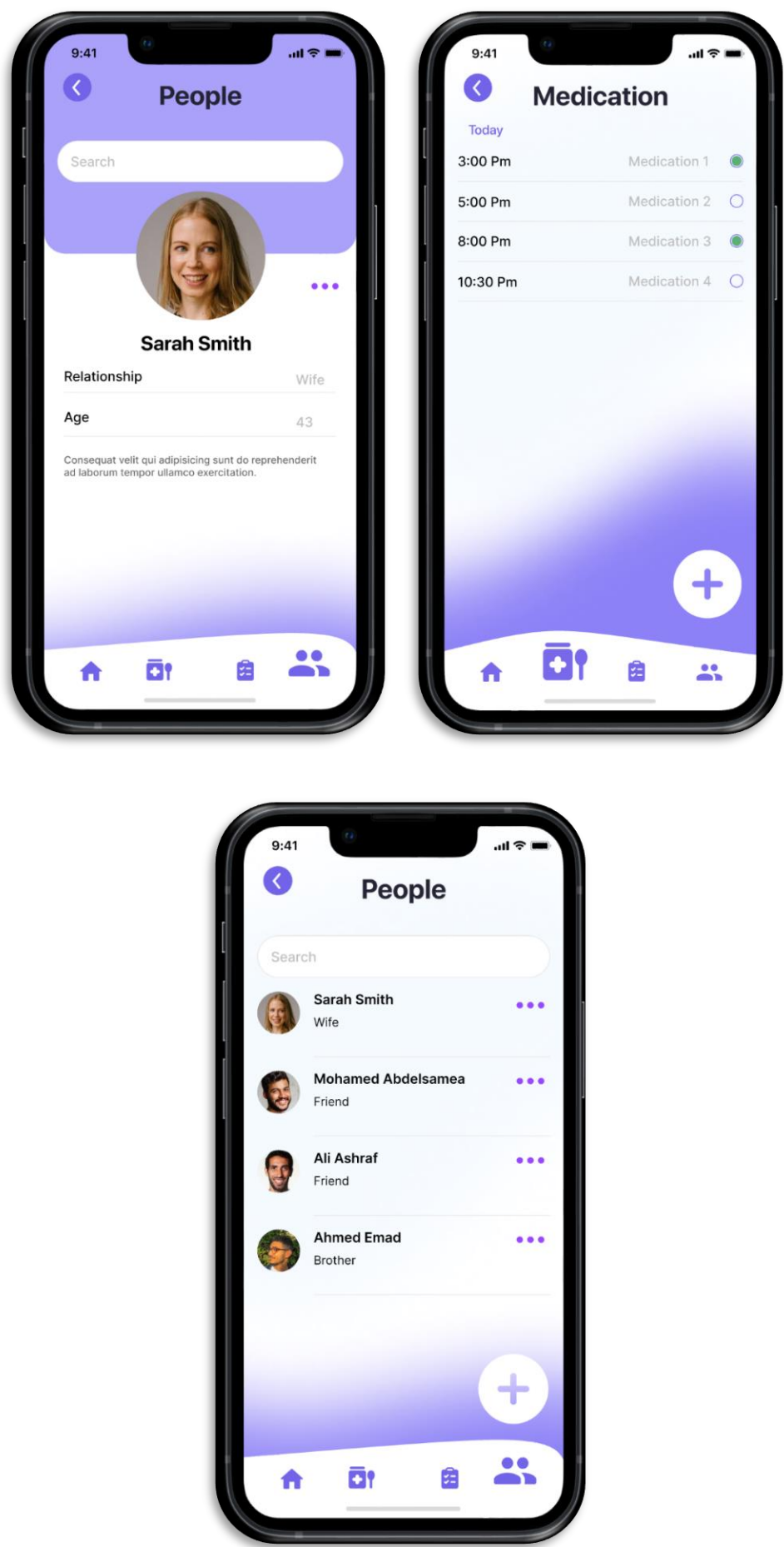
- **Sustainability:** fulfilled

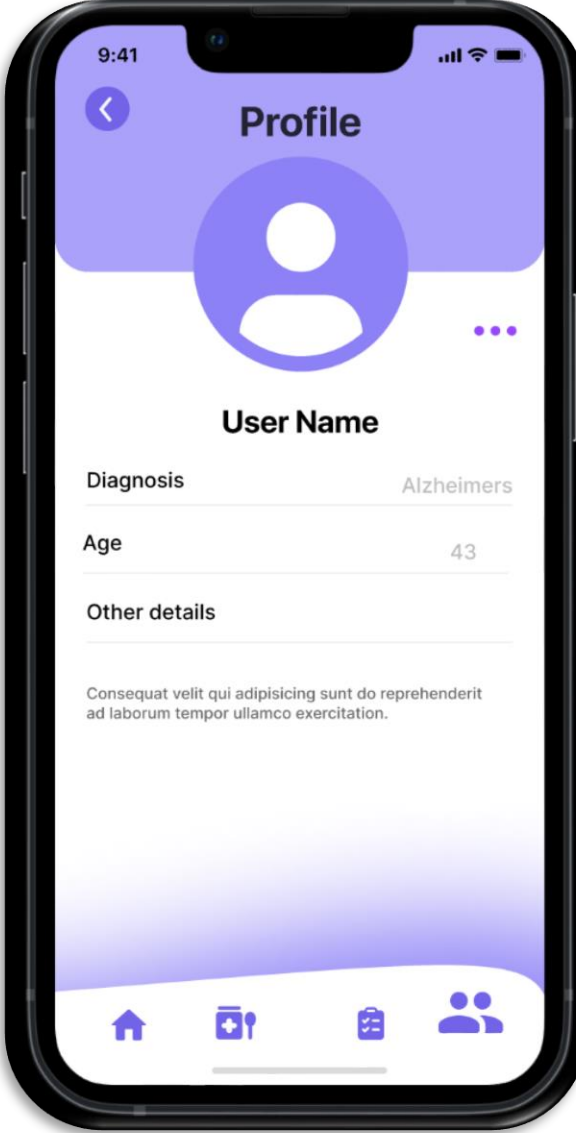
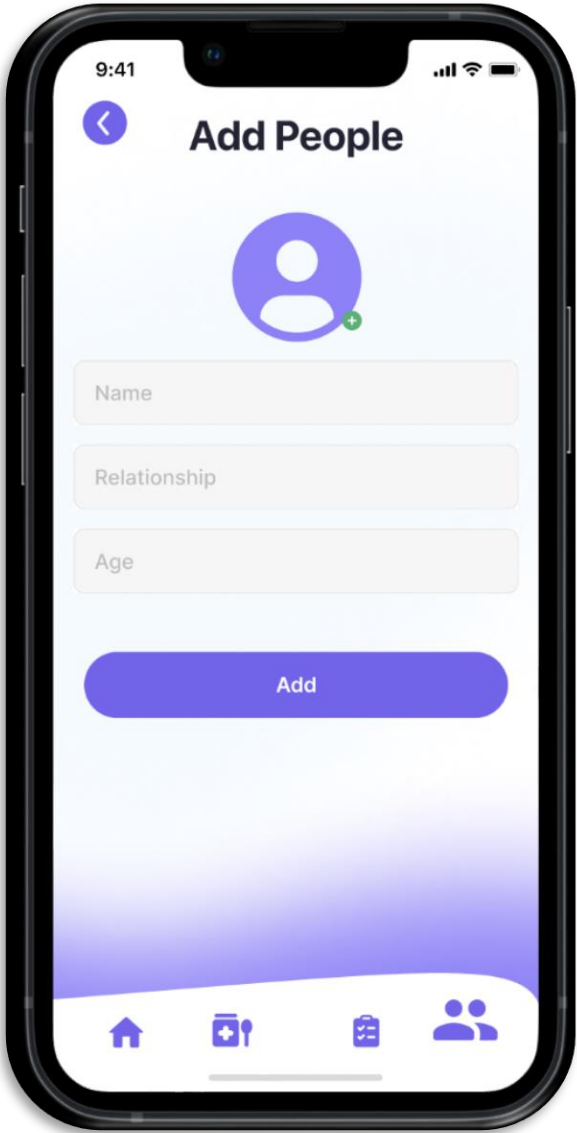
facilitate monitoring: make data more available and easily understood, presents available data across all indicators, pay attention to multiple cross-cutting issues. [6]

The Alzheimer Assistant application builds on the existing suite of software solutions currently available to support those with Alzheimer's to continue to participate in social activities with their family and friends. Accordingly, the necessary knowledge, skill levels and enthusiasm have been resolutely applied in the design of this application, to address the challenges associated with this condition in society today. In addition, this application highlights the benefits in adopting advanced technologies, most notably, face recognition to achieve this goal, given that, over the last number of years, there is growing evidence to suggest that such systems can be used in multiple settings.

Here shows screenshot of the mobile application interface:









Chapter Five

5 CONCLUSION/DISCUSSION

Alzheimer Assistant is a mobile application which its main aim to assist Alzheimer's patients to recognize and identify people faces using mobile camera. We have designed Face Recognition section using machine learning and AI to help in converting an image to a useful data which can match people's faces and identify them. We have given a thorough review of machine learning methods for intelligent data analysis and applications in this work. We've briefly reviewed how several sorts of machine learning algorithms can be used to solve various real-world problems, as per our goal. A successful machine learning model is dependent on both the data and the learning algorithms' performance. Before the system can aid with intelligent decision-making, the sophisticated learning algorithms must be taught using the collected real-world data and knowledge connected to the target application. We also addressed many common machine learning application areas to show its relevance in a variety of real-world problems.[5]

This application is specifically developed using machine and deep learning to help in identifying faces. After the comprehensive investigation and review the advantages and disadvantages of various algorithms libraries, we decided the best choice and most suitable for our application is Face SDK; an API algorithm that implements the most advanced techniques in the field of artificial neural networks and machine learning. It provides uncompromised performances to identify and recognize individuals. It is a library for iOS and Android platforms that provides a solution for biometric verification by leveraging the power of Regula Face SDK Web Service. It has several sections to enhance patient's mind and develop their memory such as: Reminder Section, Medication Section. This helps an individual to increase the intellectual level of them by doing such daily activities like this to enhance their memory in remembering their daily routines. People relatives are stored in database in mobile gallery and the patient can import saved image from their phone or opens the camera for photo shooting individual faces. The camera then identifies faces using Face SDK algorithm which works as an array of the face using bitmaps, then it recognize the person if its already stored in the database, if the application couldn't detect the face this means that its new person and then the user can use Add Person function to add them. [13]

The Application sends updated notification of patient's medical condition to remind patients of what they have to do on any given day. Hence, this application motivates Alzheimer's patients to be more confident when participating in everyday activities, thus improving their ability to engage in social events daily. This application has clearly demonstrated its capacity to provide assistance to the patients assistant and families of Alzheimer's patients.

To conclude, Alzheimer Assistant application expands on the current array of software tools that help people with Alzheimer's disease continue to engage in social activities with their family and friends. As a result, the essential knowledge, skill levels, and enthusiasm have been relentlessly employed in the design of this application in order to handle the issues associated with this current societal state. Furthermore, this application emphasizes the advantages of using advanced technologies, most notably facial recognition, to achieve this goal, given that there has been rising evidence in recent years that such systems can be employed in a variety of scenarios. [14]

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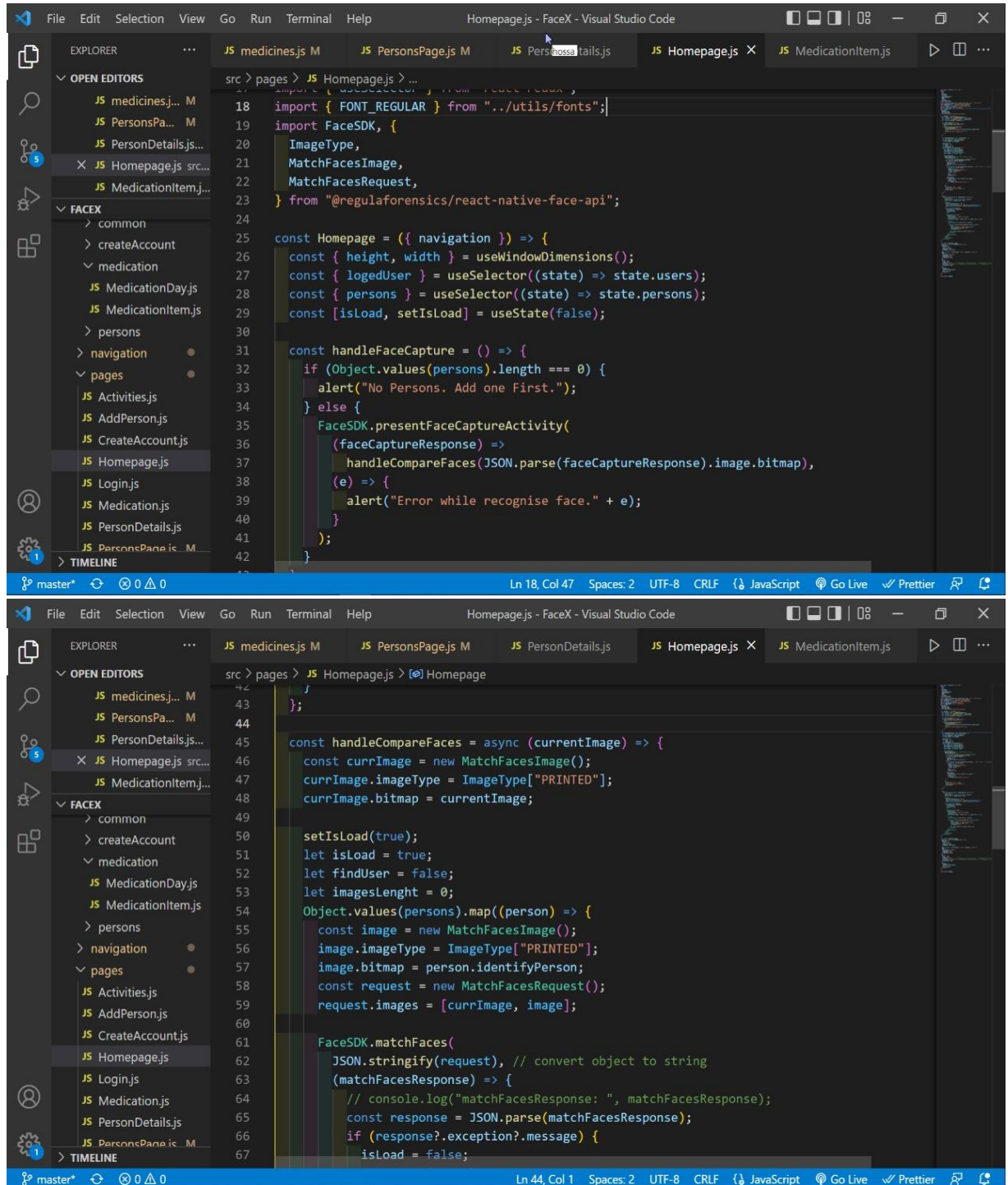
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APPENDICES²

Appendices A: Screenshot of running code



The top screenshot shows the 'Homepage.js' file in Visual Studio Code. The code includes imports for 'FONT_REGULAR' from './utils/fonts' and 'FaceSDK' with its methods. A navigation object is defined, and a 'handleFaceCapture' function is implemented. The function checks if there are any persons in the state, and if not, it alerts the user. If there are persons, it uses 'FaceSDK.presentFaceCaptureActivity' to capture a face and then 'FaceSDK.matchFaces' to compare it with the stored faces.

```

src > pages > JS Homepage.js > ...
18 import { FONT_REGULAR } from "../utils/fonts";
19 import FaceSDK, {
20   ImageType,
21   MatchFacesImage,
22   MatchFacesRequest,
23 } from "@regulaforensics/react-native-face-api";
24
25 const Homepage = ({ navigation }) => {
26   const { height, width } = useWindowDimensions();
27   const { loggedUser } = useSelector((state) => state.users);
28   const { persons } = useSelector((state) => state.persons);
29   const [isLoading, setIsLoad] = useState(false);
30
31   const handleFaceCapture = () => {
32     if (Object.values(persons).length === 0) {
33       alert("No Persons. Add one First.");
34     } else {
35       FaceSDK.presentFaceCaptureActivity(
36         (faceCaptureResponse) => {
37           handleCompareFaces(JSON.parse(faceCaptureResponse).image.bitmap),
38           (e) => {
39             alert("Error while recognise face." + e);
40           }
41         );
42     }
43   };
44 }

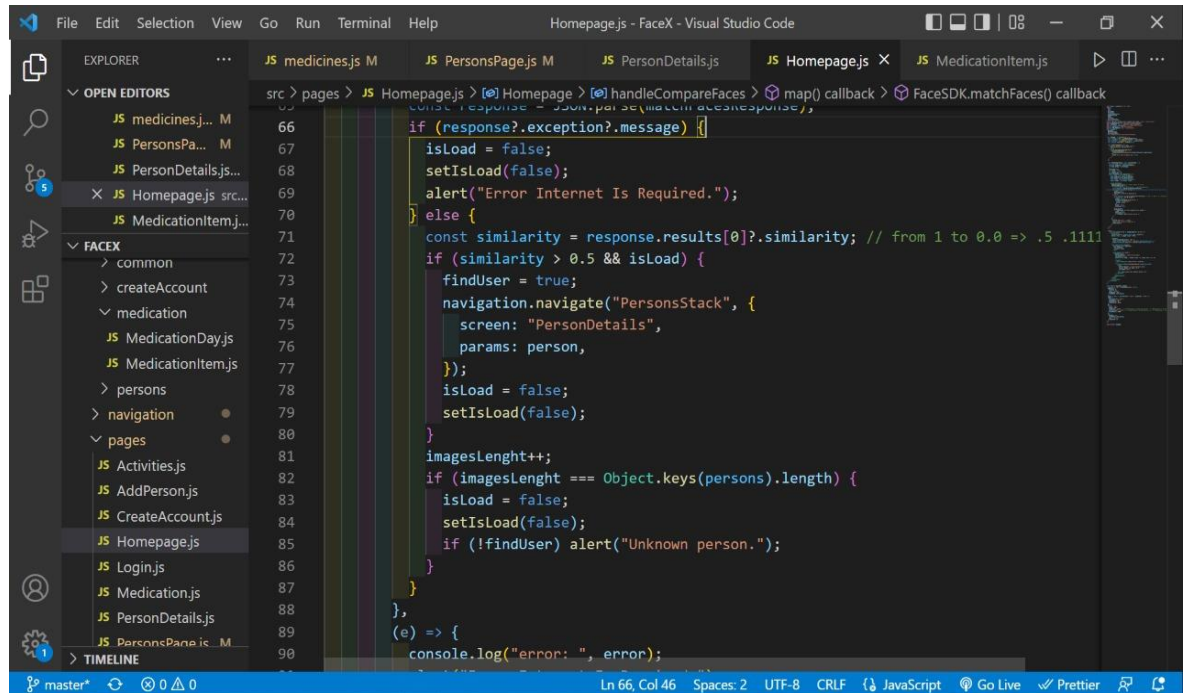
```

The bottom screenshot shows the 'handleCompareFaces' function in 'Homepage.js'. It takes a 'currentImage' as an argument and performs the following steps: creates a 'MatchFacesImage' object, sets its 'imageType' to 'PRINTED', and sets its 'bitmap' to the 'currentImage'. It then sets 'isLoading' to true and 'findUser' to false. It maps over the 'persons' array to create a 'MatchFacesRequest' object for each person. Finally, it uses 'FaceSDK.matchFaces' to compare the current image with the stored faces, converting the request to a string and logging the response.

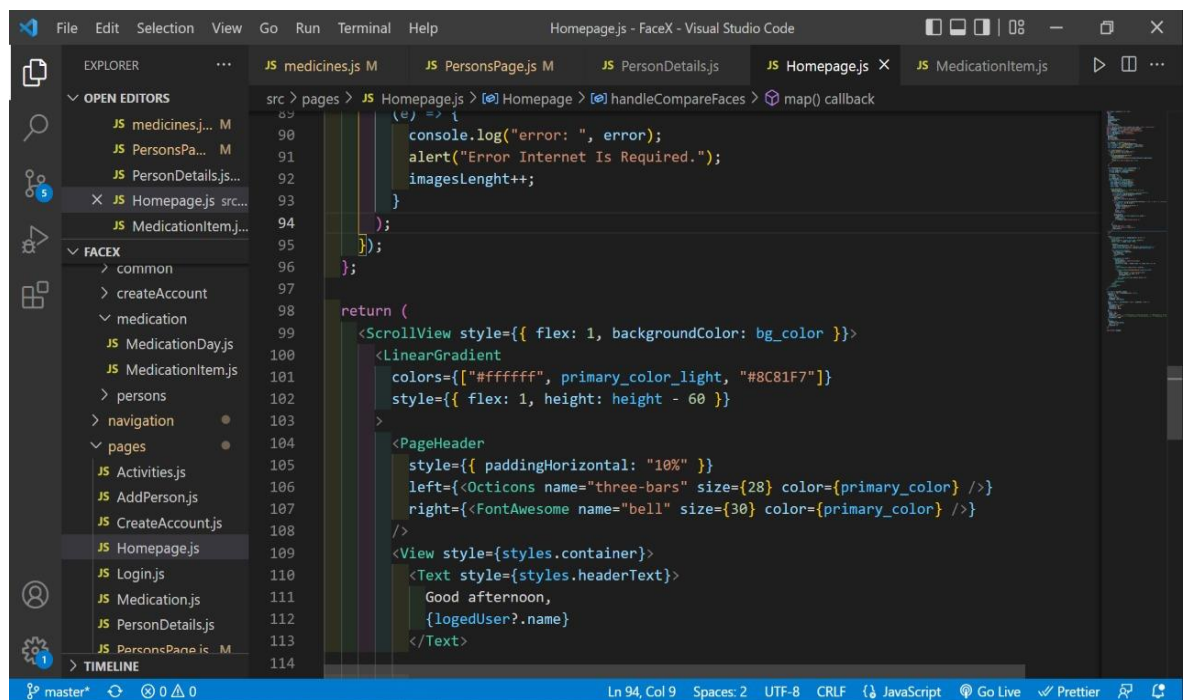
```

44 }
45
46 const handleCompareFaces = async (currentImage) => {
47   const currImage = new MatchFacesImage();
48   currImage.imageType = ImageType["PRINTED"];
49   currImage.bitmap = currentImage;
50
51   setIsLoad(true);
52   let isLoading = true;
53   let findUser = false;
54   let imagesLenght = 0;
55   Object.values(persons).map((person) => {
56     const image = new MatchFacesImage();
57     image.imageType = ImageType["PRINTED"];
58     image.bitmap = person.identifyPerson;
59     const request = new MatchFacesRequest();
60     request.images = [currImage, image];
61
62     FaceSDK.matchFaces(
63       JSON.stringify(request), // convert object to string
64       (matchFacesResponse) => {
65         // console.log("matchFacesResponse: ", matchFacesResponse);
66         const response = JSON.parse(matchFacesResponse);
67         if (response?.exception?.message) {
68           isLoading = false;
69         }
70       }
68   );
69 }

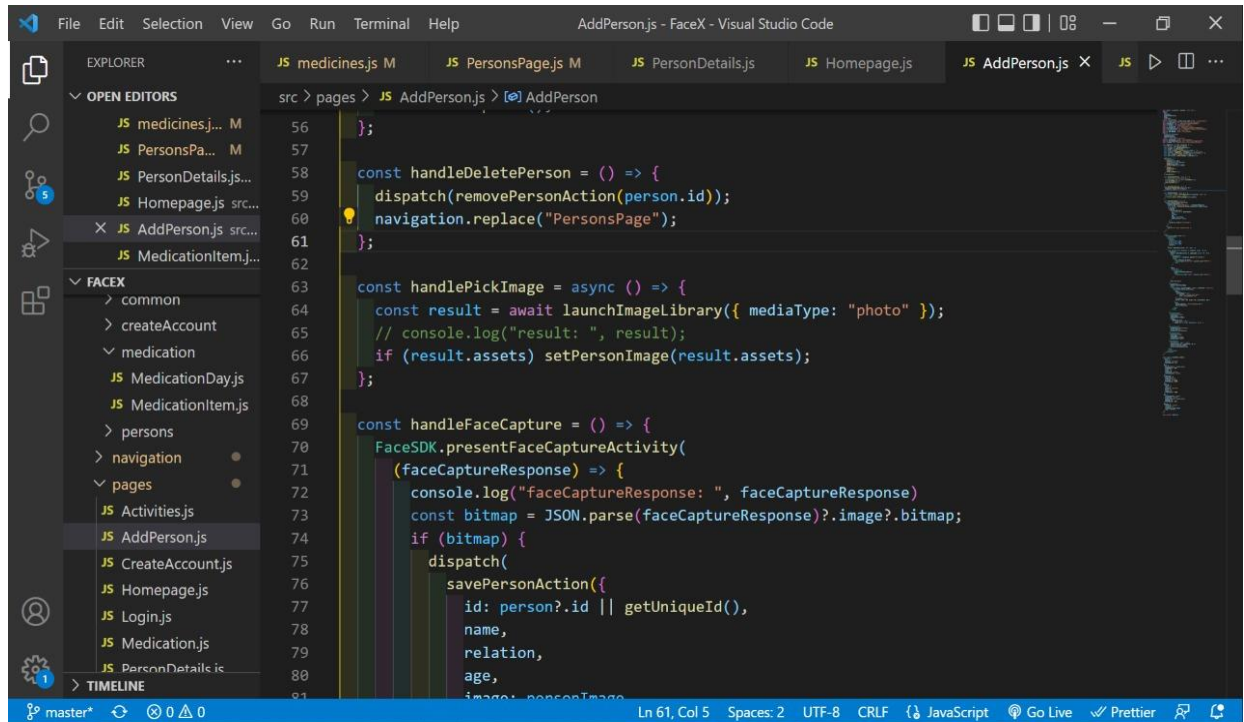
```



```
src > pages > JS Homepage.js > [0] Homepage > [0] handleCompareFaces > [0] map() callback > [0] FaceSDK.matchFaces() callback
const response = JSON.parse(matchFacesResponse);
if (response?.exception?.message) {
  isLoad = false;
  setIsLoad(false);
  alert("Error Internet Is Required.");
} else {
  const similarity = response.results[0]?.similarity; // from 1 to 0.0 => .5 .1111
  if (similarity > 0.5 && isLoad) {
    findUser = true;
    navigation.navigate("PersonsStack", {
      screen: "PersonDetails",
      params: person,
    });
    isLoad = false;
    setIsLoad(false);
  }
  imagesLenght++;
  if (imagesLenght === Object.keys(persons).length) {
    isload = false;
    setIsLoad(false);
    if (!findUser) alert("Unknown person.");
  }
},
(e) => {
  console.log("error: ", error);
```



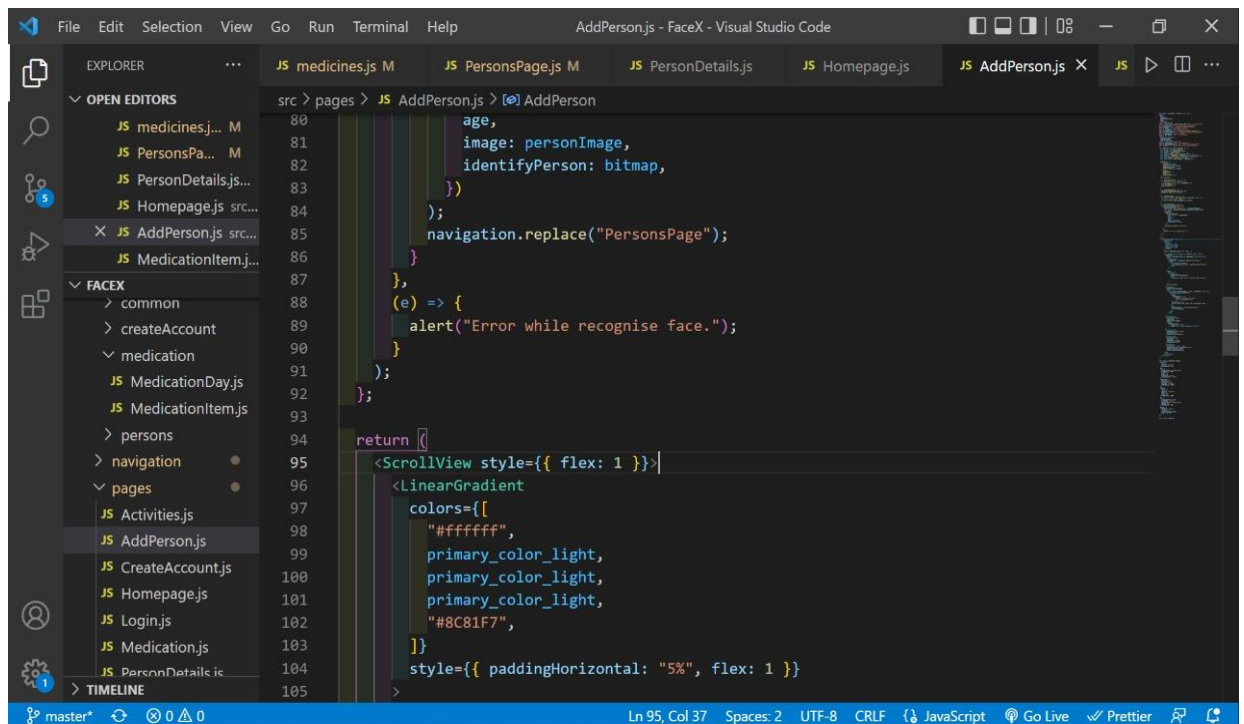
```
(e) => {
  console.log("error: ", error);
  alert("Error Internet Is Required.");
  imagesLenght++;
};
return (
  <ScrollView style={{ flex: 1, backgroundColor: bg_color }}>
    <LinearGradient
      colors={['#ffffff', primary_color_light, "#8C81F7"]}
      style={{ flex: 1, height: height - 60 }}
    >
      <PageHeader
        style={{ paddingHorizontal: "10%" }}
        left={ <Octicons name="three-bars" size={28} color={primary_color} /> }
        right={ <FontAwesome name="bell" size={30} color={primary_color} /> }
      />
      <View style={styles.container}>
        <Text style={styles.headerText}>
          Good afternoon,
          {loggedUser?.name}
        </Text>
      </View>
    </ScrollView>
  )
);
```

```

src > pages > JS AddPerson.js > AddPerson
56  };
57
58  const handleDeletePerson = () => {
59    dispatch(removePersonAction(person.id));
60    navigation.replace("PersonsPage");
61  };
62
63  const handlePickImage = async () => {
64    const result = await launchImageLibrary({ mediaType: "photo" });
65    // console.log("result: ", result);
66    if (result.assets) setPersonImage(result.assets);
67  };
68
69  const handleFaceCapture = () => {
70    FaceSDK.presentFaceCaptureActivity(
71      (faceCaptureResponse) => {
72        console.log("faceCaptureResponse: ", faceCaptureResponse)
73        const bitmap = JSON.parse(faceCaptureResponse)?.image?.bitmap;
74        if (bitmap) {
75          dispatch(
76            savePersonAction({
77              id: person?.id || getUniqueId(),
78              name,
79              relation,
80              age,
81              image: personImage,
82              identifyPerson: bitmap,
83            })
84          );
85          navigation.replace("PersonsPage");
86        }
87      },
88      (e) => {
89        alert("Error while recognise face.");
90      }
91    );
92  };
93
94  return [
95    <ScrollView style={{ flex: 1 }}>
96      <LinearGradient
97        colors={[
98          "#ffffff",
99          primary_color_light,
100         primary_color_light,
101         primary_color_light,
102         "#8C81F7",
103       ]}
104       style={{ paddingHorizontal: "5%", flex: 1 }}
105    >

```



```

src > pages > JS AddPerson.js > AddPerson
80    age,
81    image: personImage,
82    identifyPerson: bitmap,
83  })
84  );
85  navigation.replace("PersonsPage");
86  }
87  },
88  (e) => {
89    alert("Error while recognise face.");
90  }
91  );
92  };
93
94  return [
95    <ScrollView style={{ flex: 1 }}>
96      <LinearGradient
97        colors={[
98          "#ffffff",
99          primary_color_light,
100         primary_color_light,
101         primary_color_light,
102         "#8C81F7",
103       ]}
104       style={{ paddingHorizontal: "5%", flex: 1 }}
105    >

```

