Health care project (use Artificial intelligence to detection of covid-19)

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DEPARTMENT OF COMPUTER SCIENCE GC
UNIVERSITY LAHORE

Declaration

Date:_____ **Signatures of Deponent**

Research Completion Certificate

It is certified that the research work contained in this thesis titled **Campus Online** has been carried out by **Usama Naseer** Roll. No **307-BSCS-17** under my supervision.

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Abstract

In the era of digital modernization and digital platforms, mobile phone transformed our daily life. Out of whole internet users, 88 percent of the people accessing internet through their mobile phones. There are many web based video streaming platforms for short courses, but there is a huge gap for mobile based live broad casting application for education sector. Our application is covering these gaps by providing live broadcasting and other features. User can log in by single click. Teacher can create course, upload assignment, start quiz and assign grades while student can submit assignment,take quiz and take lectures online from their mobile phones.

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Chapter 1

Introduction

The system is used for help to resolve the current pandemic situation the world which is faced the disaster called covid-19.this application help to detect the Covid-19 people this technique help to separate the patient and help to stop this pandemic basically the technique used is Artificial intelligence to detect the feature and image processing techniques to recognize the things effectively and efficiently.so the modern approaches also help to resolve in a modern manners .No doubt the test accuracy which is stored in biologically is more efficient but the coast and resources is used in biological test is comparative more higher then intelligent machine. But in artificially they addressed they problems quickly and millions of test has been taken. The modern approaches get higher chance to overcome and control this pandemic

Purpose and Aims of project:

The purpose of this project in coming future if the world has faced this type of problem the intelligent machine also serve this country and the front line of doctor has also save his life when the machine work in these dangerous and pandemic diseases I know in this time is very difficult to work in intelligent machine in feature the digital word and intelligent machine used in our real life and in feature the big companies NASA ,space_X ,google and some other has become more worked in this field so this project is also a bit initiative to describe pandemic situation to solve modern approches

- To develop an application which will provide health care and detect the virus in the approaches of Artifical machine
- We use same techniques which is used for pattern matching
- Load the data sets
- Both which is infected in covid-19 and not infected
- These images load in data base
- They seprated in the form of batches and traning

- This help to detect the covid-19

- This type of project is also help to protect the people for vast damage

- And stop to spread in country and save human life

1.2 Scope of the Project

The scope of the project to detect the infected and non-infected people

And in feature all train and build this type of machine to help pandemic situation if machine worked in this stage we protect our doctor who fight against virus in front line and also controlled the death ratio of doctor who has died in this services so modern and digital approaches get higher result and overcome and control the situation

Scenario:

Machine learning can be applied to any scenario where data is analyzed. ML is used in every industry to gain a strong business advantage, medical health ,space system problem by minimizing overhead costs, predicting user activity, and discovering new insights and untapped opportunities in each market.

I am choosing the earl world example that is related to the medical scan with the help of using artificial intelligence and machine learning example. Now a days all the world is faced crises which named is corona virus. This is pandemic situation the Al is also help full to recognize the lungs and testified which is infected or not

In this example, high-resolution lung scans are examined for lesions, using anomaly detection and image recognition. Here, we can see how image recognition identifies lung segmentation, revealing lesions which are then evaluated by a professional for malignancy. In this way, human doctor time is used much more efficiently, as they don't have to sift through all image scans on their own, and they only have to focus on the scans showing potential issues. But it has demonstrated constant improvements in accuracy and detection

Chapter 2

Requirement Specification

These requirement specifications have two types.

- Functional Requirement

- Non Functional Requirements

2.1 Functional Requirements

Functional Requirements are the requirements which defines the functional behavior of the

application. The functions performed by the system can be elicited as a functional requirement

2.1.1 Login:

Login is an essential Function requirements of the patient record which person is take his test and also take data which people is infected the also help to accurate the result which people get infected or how many people get test to check this so the basic information collected the patient is

1-user name
2-cnic
3-addres
4-date and time

Scanner :

Which scanner is used which is appropriate to the system and highly efficiency and precision They get the scan of his lungs the scientifically and medically approved they infected and damage his lungs so they get the scan of the patient

Data base:

Create a data base to get and stored in it.so in database they also stored thousands of images of infected people and non-infected to help to train and test the images

Data set:

Apply principal component analysis and also get help to medical team to get infected and non-infected images and some feature detection they are in highly manner they get these type of data in to different values and apply different algorithm to create data sets values and PCAs values.

Image processing:

Image processing techniques used to detect the pattern recognition so they have also applied some machine learning algo and deep learning to detect the images so they have also test and train the images data sets and rescale the images in binary 0 and 1 to detect in yes or no manner.

Image recognition:

In image reorganization we also classified the data with the help of clustering algorithm to classified the images so in this approach we also used many technique such as CNNS,RNNS,and deep learning and neural network so in reorganization we also testing and training the data set to get output

CNNS, and other layer and Technique:

We apply CNNS ,RNNS, and deep learning and neural network to train and testing so these layer and filter are used to detect the feature highly effective and precisely so in CNNS also using pooling layer padding stride and other algo to train and test the machine so these are algorithm which applied in this section

Training, Testing and Validation test:

So the data set are in data base and apply all the algo and technique to test train the data and in some time the training the more data so they create over fitting problem so this problem get harm the result and get low accuracy and result so we use cross validation process which stop the machine to over fit the data

Optimization and activation Function: so apply training and testing the data set so to minimize the error to use optimization algo and then we apply activation function to categorize the final input they get the input in the form of yes or no.

Evaluation and accuracy:
So all the algo apply then we check the final result and machine also get the accuracy result they get also result in graphic presenation.

2.2 Non-Functional Requirements

Non-Functional requirements are those requirements which defines the systems behavior. How the system will behave in terms of non-functional aspects such as: performance,flexibility etc

2.2.1 Performance

Application should be optimized so it can perform well. Assignment Submission , quiz and other features require timely and smooth completion of tasks. So it will generate output timely and work well on different devices. Response time should be fast

2.2.2 Security

Security of the application is our top priority so no one can access or bypass any submissions/- course/quiz or personal information.

2.2.3 Usability

System should be user friendly. So that anyone can understand and use the ’campus online application’.

2.2.4 Flexibility

System should be designed in a way that can adjust any future changes easily. It should not be complex

2.2.5 Reliability

Application should be reliable. It should be available in any need of hour. It will work when it is required.

2.2.6 Maintainability

System should be easy to maintain without any huge cost involve in maintenance.

2.2.7 Scalability

System should be scale able. So it can be updated with the newer versions of the application.

2.2.8 Modification

System can be modifying anytime without affecting other modules.

2.2.9 Safety Requirements

If the database gets damaged due to crash or failure, recovery methods are applied, that will restore the data.

2.2.10 Security Requirements

Database must be selected carefully that fulfills all the security requirements.

Software Quality Attributes

2.2.12 Availability:

Information of current academic and golden opportunities must be available at time. So that, students will be up to date with opportunities.

2.2.13 Correctness:

Is should be assured that correct information is provided. Any false or fake information should be blocked.

2.2.14 Usability:

System should satisfy all types of users.

3: Software Process Model

Evolutionary process model is suitable for our term project.

Reasons behind this are:

3.1: User Interaction:

Evolutionary process model is mainly used when you are making a system that has user interaction. Time by time, user's requirements will be

changed, and user will expect more from system. User's opinion will be taken from feedback. By evolving your system time by time, user's involvement will be increased. As, user will be satisfied from current system. This will require evolutionary process.

3.2: Modifications:

Evolutionary process model will be used because our application is required to be modified time by time. As we go, we will find more appropriate manner in which system run (according to requirement) and feedback given by users (students).

3.3 **Feedback:**

According to the feedback given by the users, new version will be made which will inherit the old version's functionalities. Now, this system will satisfy the user's requirements and needs.

3.4: Re-implementation:

Re-implementation will be required in more structured way to fulfill the current requirements

3.5: Exploring New Demands:

Technology is growing rapidly in modern world. Every day, latest features are being introduced in market. In order to keep system up to date, new requirements and features are to be explored according to the latest inventions in technology.

Chapter 3

Project Design

This chapter defines the design phase of the application. Design patterns, methodology and the process which will be used to design the project is illustrated in this chapter.

3.1 Methodology

A methodology for a software system defines how a system should be designed, what should be the planning and how to control the development of the system.

Salient Features of Evolutionary Process Model

Some of the salient features of evolutionary process model are;

Unavailability of Detailed Requirements:

Evolutionary process model will be applicable where detailed requirements are not presented at initial stage. Developer at initial stage does not know the deep requirements which are to be implemented. In the phase of **Communication,** customer will only identify the basic requirements and will not describe the deep requirements which he/she expects. Due to this, developer will be unfamiliar with the detailed needs. In our case, we are also unfamiliar will detailed requirements, as user will define his/her requirements time by time.

Prototyping:

Prototyping means the abstract implementation of system. At initial stage, developer doesn't know the deep requirements in detail, here prototyping

will work. This situation may also occur when developer misunderstood the requirements because he/she was not entertained with detailed requirements.

Output of prototyping will be a system which will be the user interface. If the system is fulfilling all the needs, then this prototype will be implemented completely.

Iterative Nature:

Evolutionary process model is iterative in nature. “Iterative” in sense that evolutionary process model is implemented sequentially to meet the objectives of this system. User is involved in your system throughout the process of development. Therefore, this application will be implemented over time. Due to this iterative nature, system will be developed with complete features and requirements defined by the user, as well as, market.

Agile Design Methodology

Agile Design methodology is a process which involves continuous iterative development and testing. It is a development process with adaptive changes which bring advantage to small teams. We are a small team with short development team. Our project demands continuous communication with all stakeholders with adaptive changes during development life cycle. For this agile development process reduces cost because it is adaptive to rapidly occurring changes. This is the reason agile design methodology is the best approach we can use for the software

development life of our system.

1- Waterfall Model:-

1. Planning is in early stage.
2. Risk is high.
3. Cannot return to earlier Phase.
4. Not good at handling large Projects.
5. Cost is low.
6. Requirement specification at first.
7. Time frame is very large.

2- Incremental Model:-

1. Planning in Early Stage.
2. Risk is low.
3. Can return to earlier stage.
4. Not good at handling large Projects.
5. Cost is low.
6. Requirement specification at first.
7. Time frame is large.

3- Spiral Model:-

1. Planning is in early stage.
2. Risk is Medium But sometimes high.
3. Can return to earlier stage.
4. Documentation is Necessary.
5. Cost is high.
6. No Overlapping Phases.
7. Maintenance is required.

4- Prototype Model:-

1. Planning is in early stage.
2. Can return earlier stage.

3. Need a model for user.
4. Cost is high.
5. User Involvement throughout the project.
6. Risk is low.
7. Maintenance is required.

5- Rad Model:-

1. Planning is not an early stage.
2. Can return to earlier stage.
3. Cost is low.
4. User Involvement requires only in the beginning.
5. Overlapping Phases.
6. Time frame is short.
7. Risk Involvement is low.

6- V- Shaped Model:-

1. Risk is high.
2. Poor model for long and ongoing projects.
3. Time frame is large.
4. Easy to manage.
5. Used when requirements are well defined.
6. Not good for large projects.
7. Cost is high.

3.1.1 Design Patterns

Object Oriented Analysis and Design has several design patterns techniques which are used to solve different problems in different situations.

1. Singleton

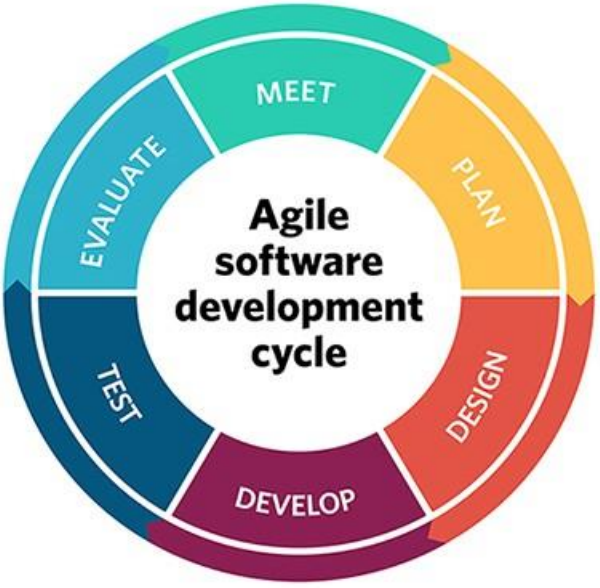


FIGURE 3.1: Agile Methodology

3.2 UML Diagrams

3.2.1 Use Case 01:

TABLE 3.1: UC-01: Login

Use Case ID	**UC-01**
Use Case Name	**Login**
Actors	**Patient/data analyst**
Description:	Patient and Analyst are two actors who can logged in by their existing account
Pre-Conditions:	1. Application is installed 2. Student has opened the Application .
Post conditions:	1. User was logged in
Priority:	Essential
Frequency of Use:	Normal
Basic Flow:	1. User clicks on the application and login screen appears 2. User fill the information
Exceptions:	• Invalid Email. • Internet not stable. • Device damaged. • Network failure.
Alternate Flow:	2a. User wants to add another account 1. User clicks on Add Account 2. System opens the account sign up panel 3. User adds email,name,password 4. User clicks on sign up to create account 5. User successfully created new account
Secondary actors:	None

3.2.2 Use Case 02:

TABLE 3.2: UC-02: Join Class

Use Case ID	**UC-02**
Use Case Name	**Scanner**
Actors	**Patient**
Description:	Patient can do his san for his lungs by used highly intelligent machines
Pre-Conditions:	1. User is logged in .
Post conditions:	1. patient scan the lungs
Priority:	Essential
Frequency of Use:	High
Basic Flow:	1. they don't scanner properly 2. machine not work well 3. machine can be dumb 4. highly heated
Exceptions:	• Invalid Code. • Internet not stable. • Device damaged. • Network failure.
Alternate Flow:	Attach another scanner Use another appropriate method to resolve the problem Wait to resolve the problem
Secondary actors:	None

3.2.3 Use Case 03:

TABLE 3.3: UC-03: Create Class

Use Case ID	**UC-03**
Use Case Name	**Image processing**
Actors	**Data analyist**
Description:	The provide technique image processing to conert these images in to gray scale and apply image processing pipeline
Pre-Conditions:	1. Application is running
Post conditions:	Convert in to data set
Priority:	Essential
Frequency of Use:	Low
Basic Flow:	1. Create data set 2. Convert data set images to gray scale 3. Then apply image processing algo
Exceptions:	• Algo not working and get error
Alternate Flow:	Fix the bug 1.
Secondary actors:	none

3.2.4 Use Case 04:

TABLE 3.4: UC-04: View Class

Use Case ID	**UC-04**
Use Case Name	**Image recognition**
Actors	**Patient/analyst**
Description:	Then apply Image processing then these image to resize it and apply detection algo to recognize the images
Pre-Conditions:	Previous all condition is also satisfied.
Post conditions:	Class dashboard was appeared on the screen
Priority:	Normal
Frequency of Use:	Continues/High
Basic Flow:	1. Rescale the image 2. Gaussian blur detection 3. Apply CNNS algo 4. Apply cv algo also
Exceptions:	• Get erroe in algo and detection problem
Alternate Flow:	Fix the bug and review the process
Secondary actors:	None

3.2.5 Use Case 05:

TABLE 3.5: UC-05: Start Assignment

Use Case ID	**UC-05**
Use Case Name	**Test and train**
Actors	**Analyst**
Description:	Train and test the data set if we applied all the previous algo working properly then we test train the layes
Pre-Conditions:	1. All previous condition must satified
Post conditions:	Test and train the data
Priority:	Essential
Frequency of Use:	Normal
Basic Flow:	1. Problem in data set 2. Previous algo not working well 3. Test and train system not worked well
Exceptions:	• System not supported • Bugs in the previous process
Alternate Flow:	Highly supported system recommended
Secondary actors:	None

3.2.6 Use Case 06:

TABLE 3.6: UC-06: Start Quiz

Use Case ID	**UC-06**
Use Case Name	**Classified the images**
Actors	**Data analyst**
Description:	Then we train and test the data we applied optimization and activation function to get the output so they have highly probabilistic model in softmax activation function they classified its infected or not
Pre-Conditions:	Previous all condition is satisfied .
Post conditions:	Get the out of the result
Priority:	Essential
Frequency of Use:	Normal
Basic Flow:	1. They don't get to classify the images clearly 2. Some regularization problem 3. Over fitting problem
Exceptions:	• Internet not stable. • Device damaged. • Network failure.
Alternate Flow:	none
Secondary actors:	none

3.2.7 Use Case 07:

TABLE 3.7: UC-07: Share

Use Case ID	**UC-78**
Use Case Name	**Evaluation and accuracy**
Actors	**Patient/data analyst**
Description:	They get the percentage and result in the form of accuracy the accuracy get the result which u have been believed in our reports for better accuracy repeat the process again
Pre-Conditions:	.previous all condition is satisfied
Post conditions:	Get accuracy of the report
Priority:	Normal
Frequency of Use:	High
Basic Flow:	1. They show not much higher accuracy
Exceptions:	• Bugs in our process
Alternate Flow:	
Secondary actors:	none

3.2.8 UML Diagrams

3.2.8.1 Use Case Diagram

ACTIVITY DIAGRAME:

LOGIN:

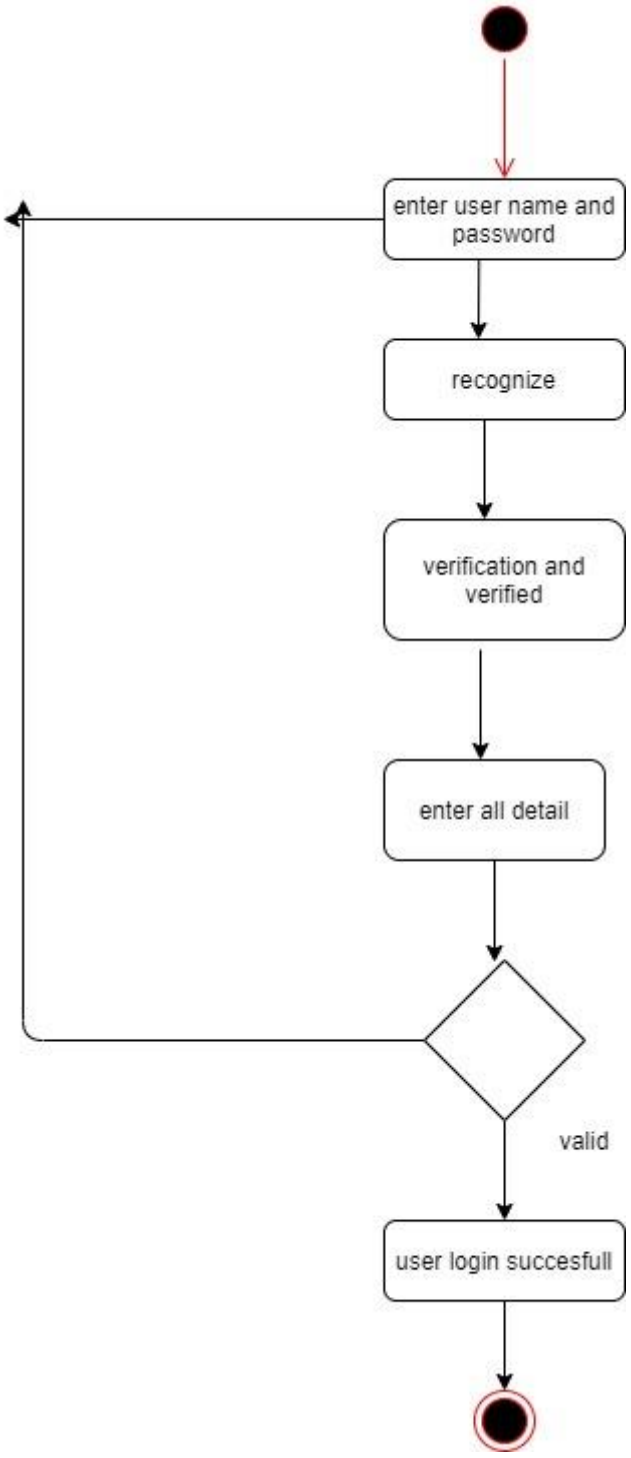


Image-processing :

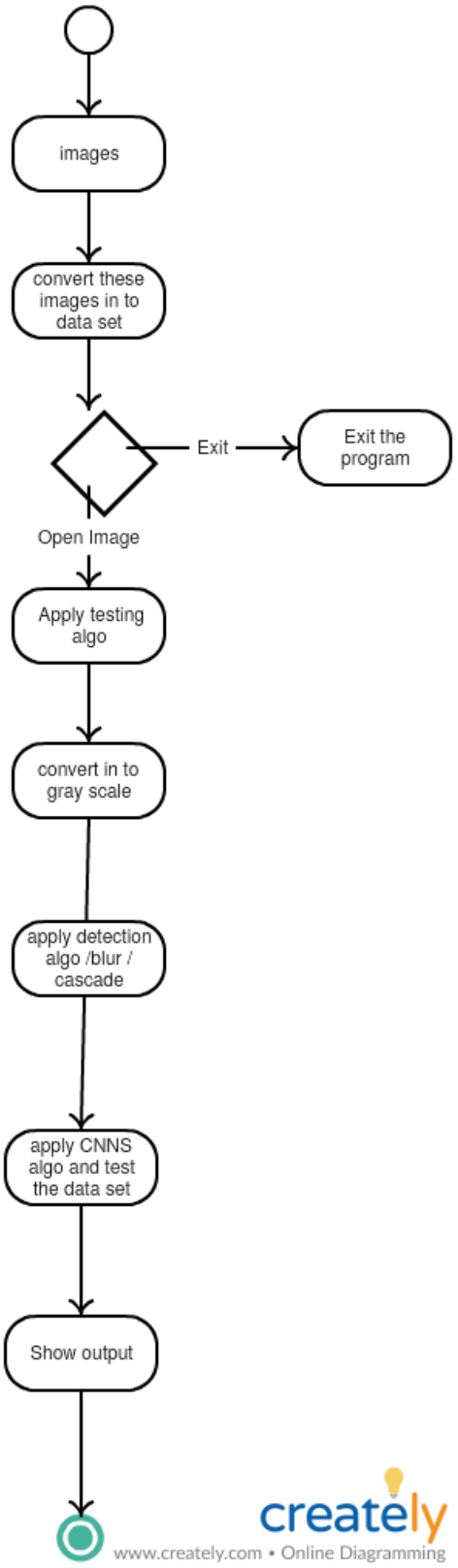
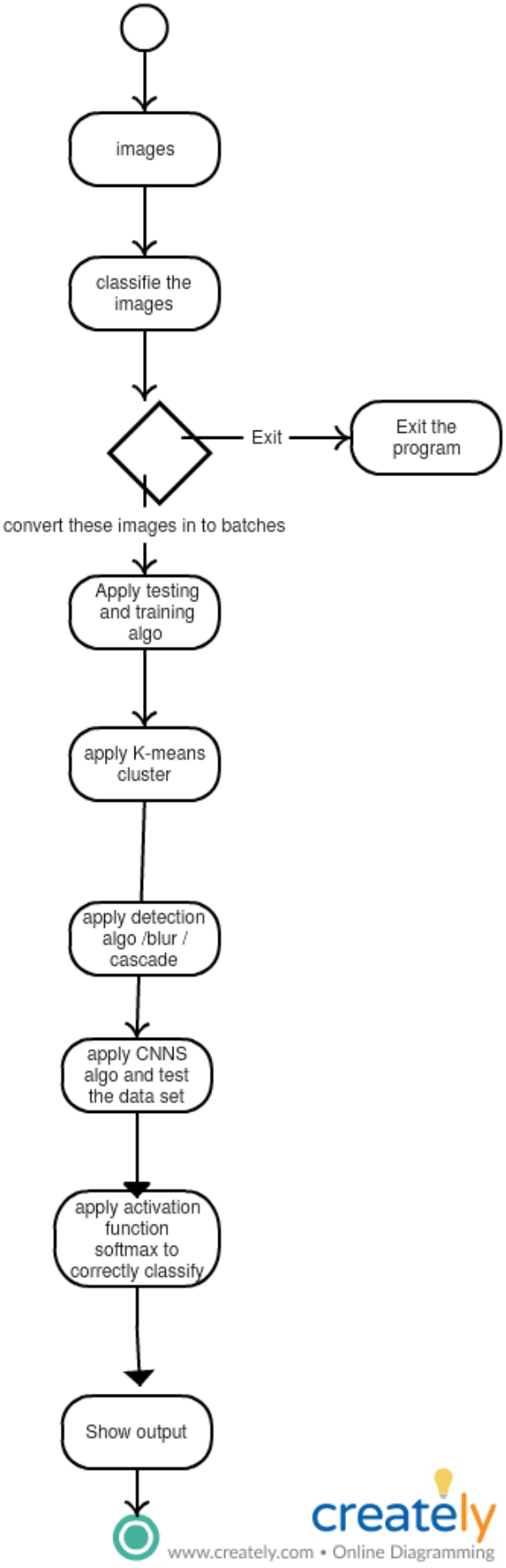
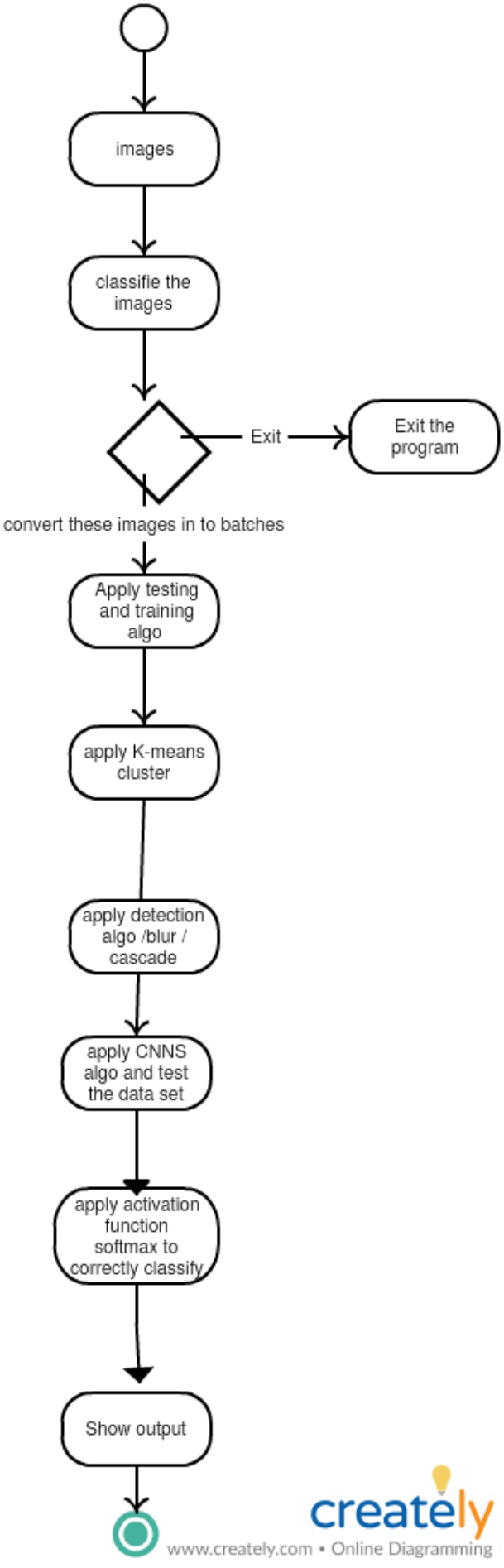


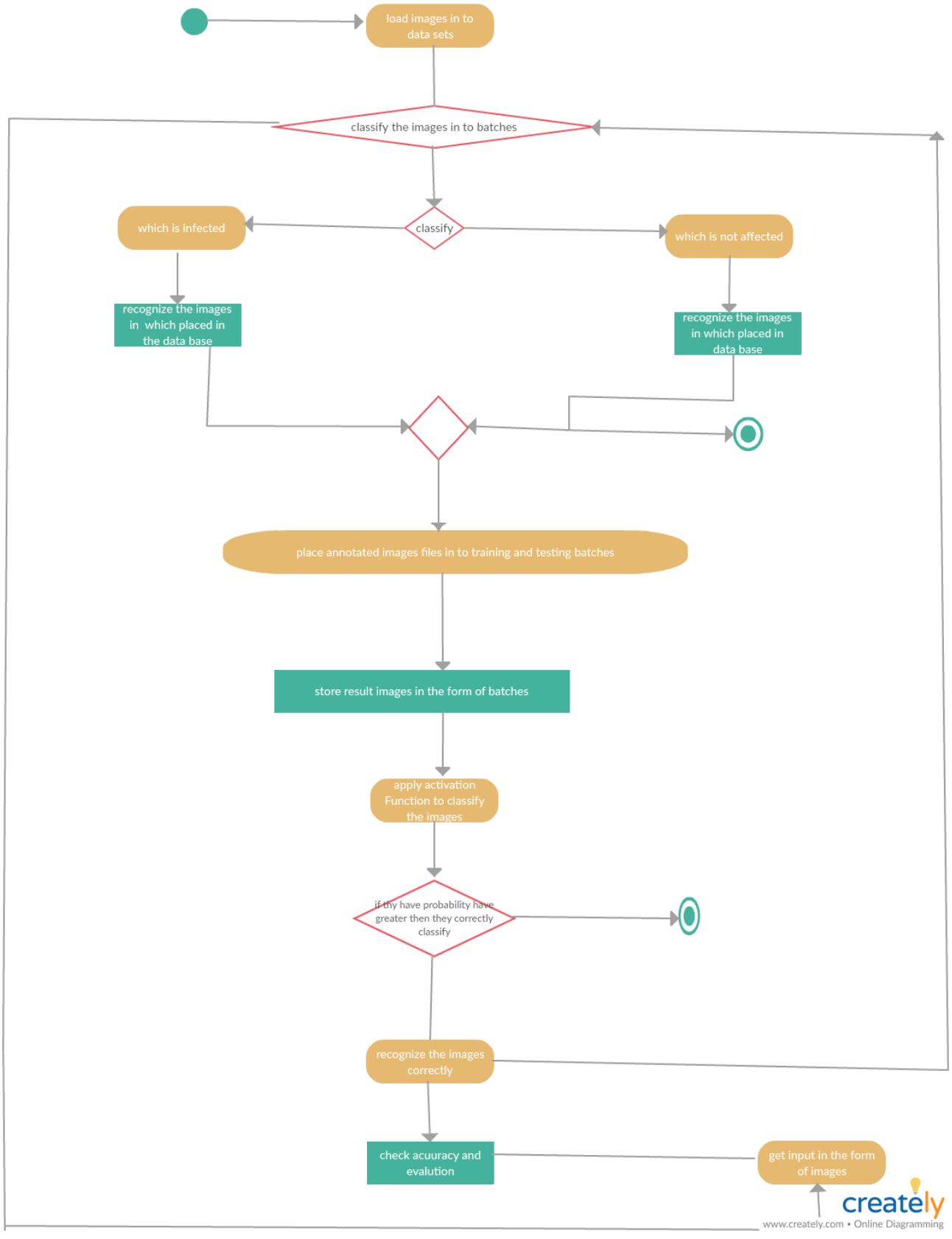
Image recognition:



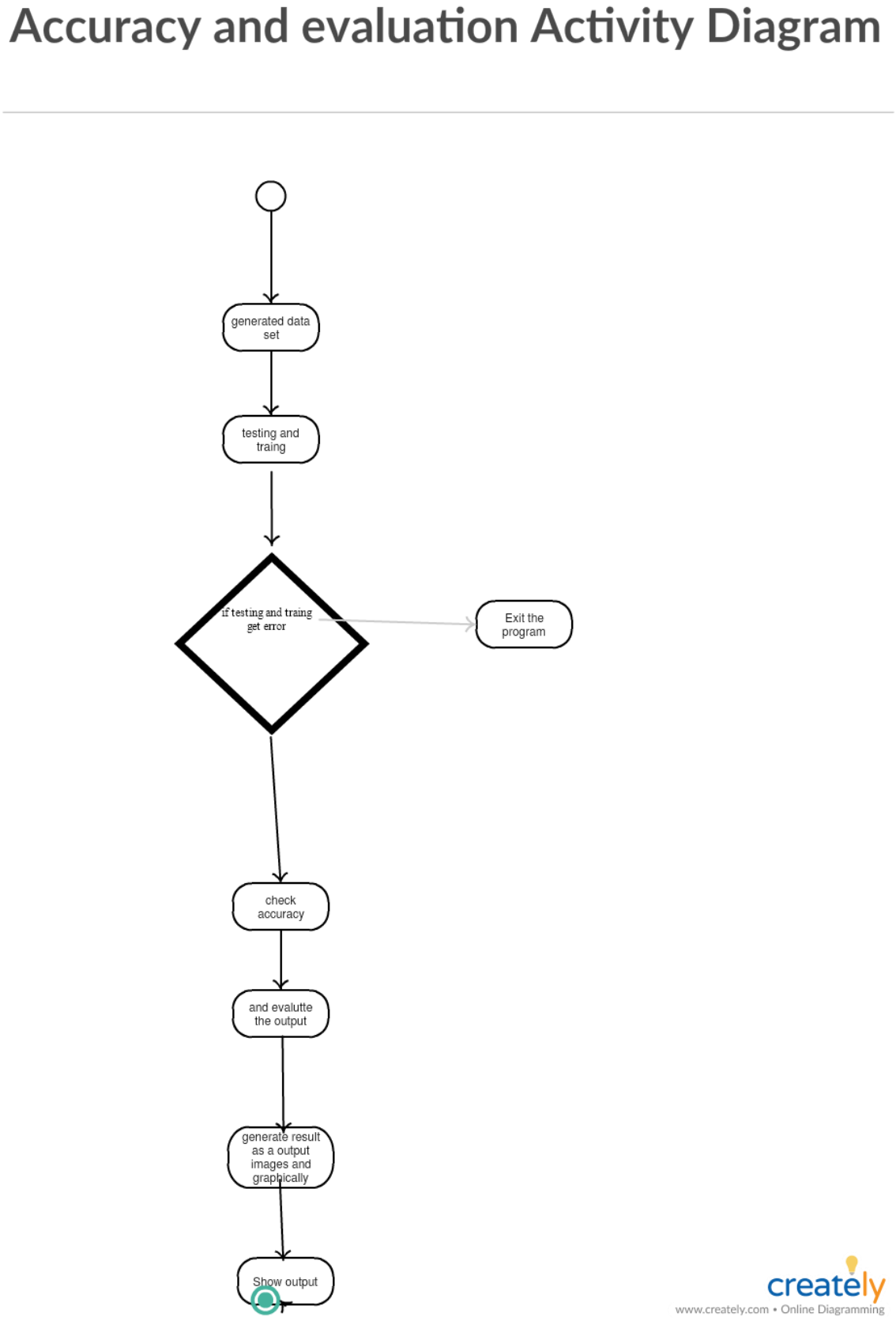
TESTING AND TRAINING:



Classified the images:

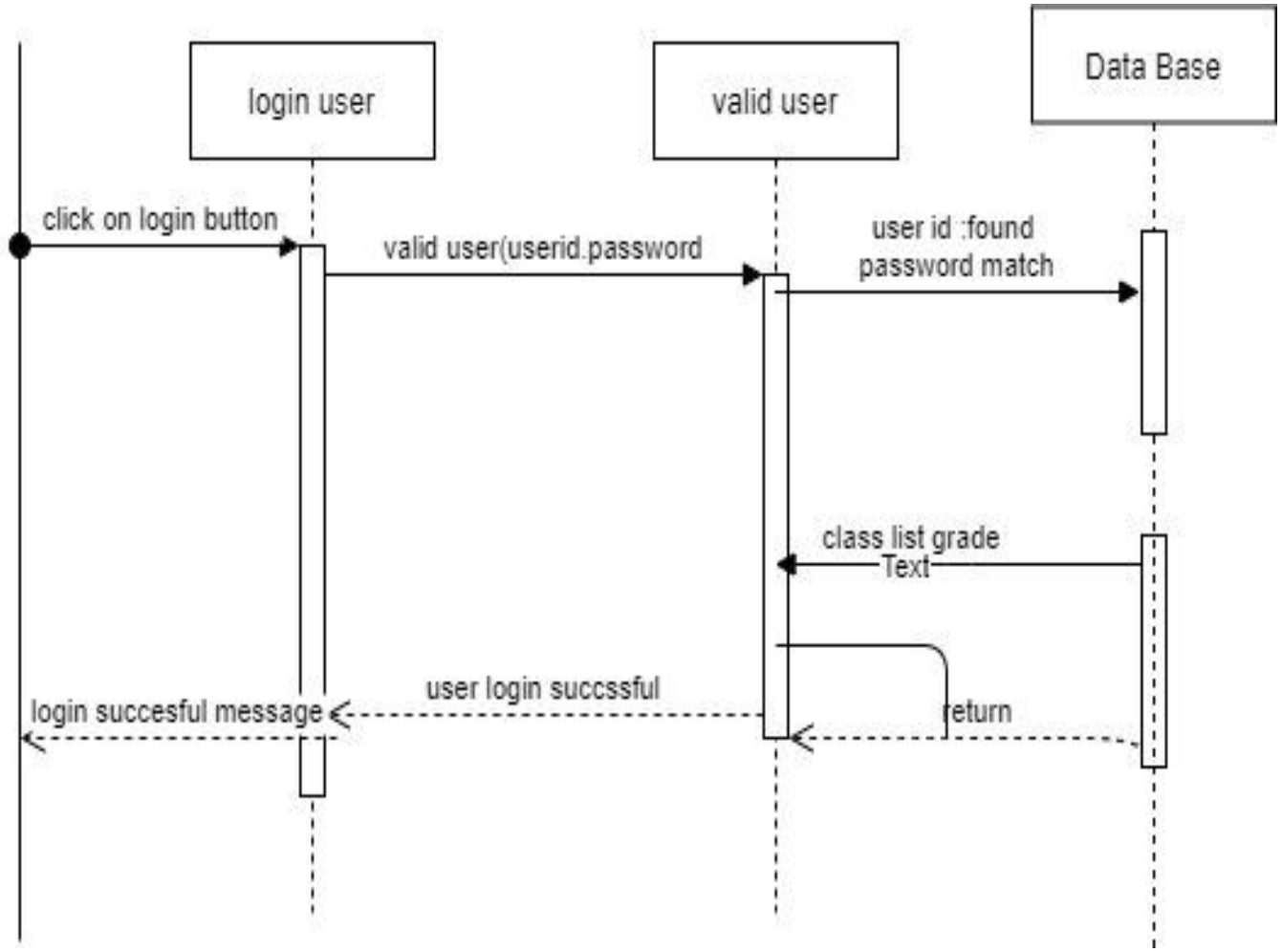


Evaluation and Accuracy:

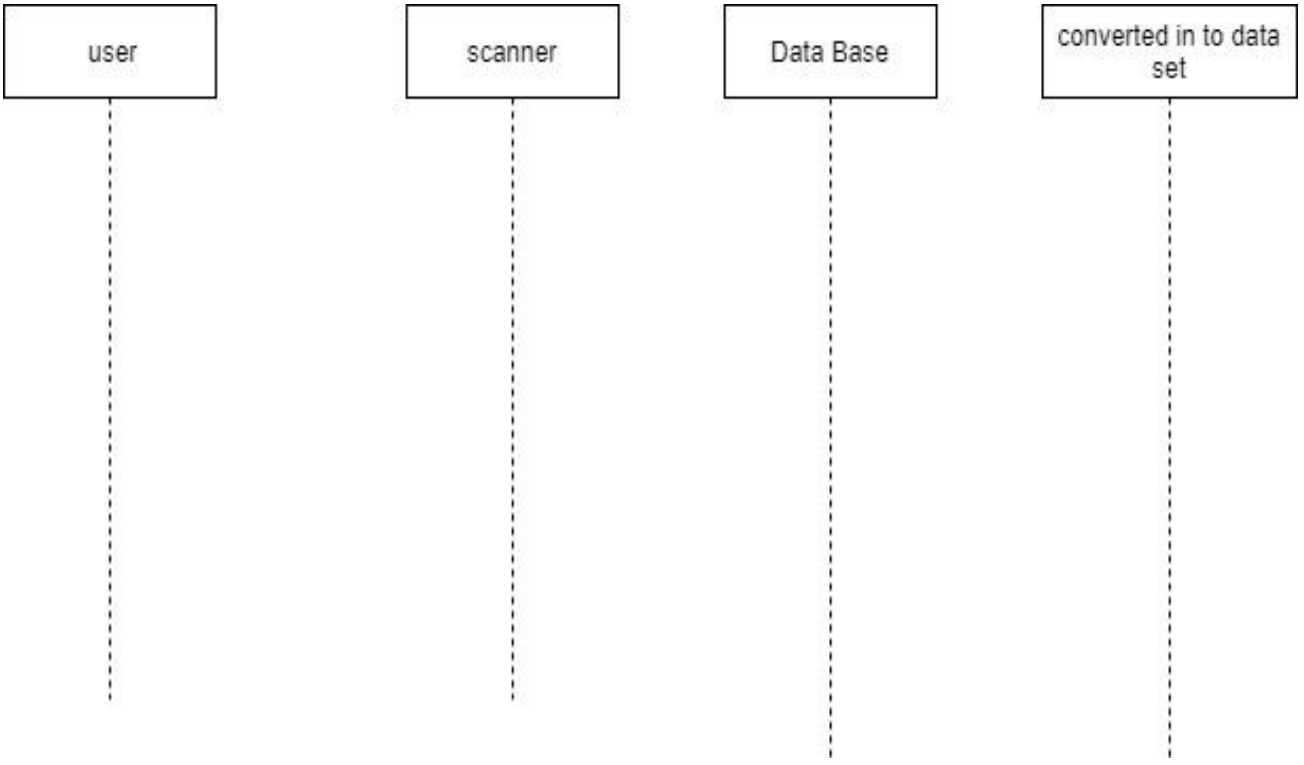


SEQUENCE DIAGRAM:

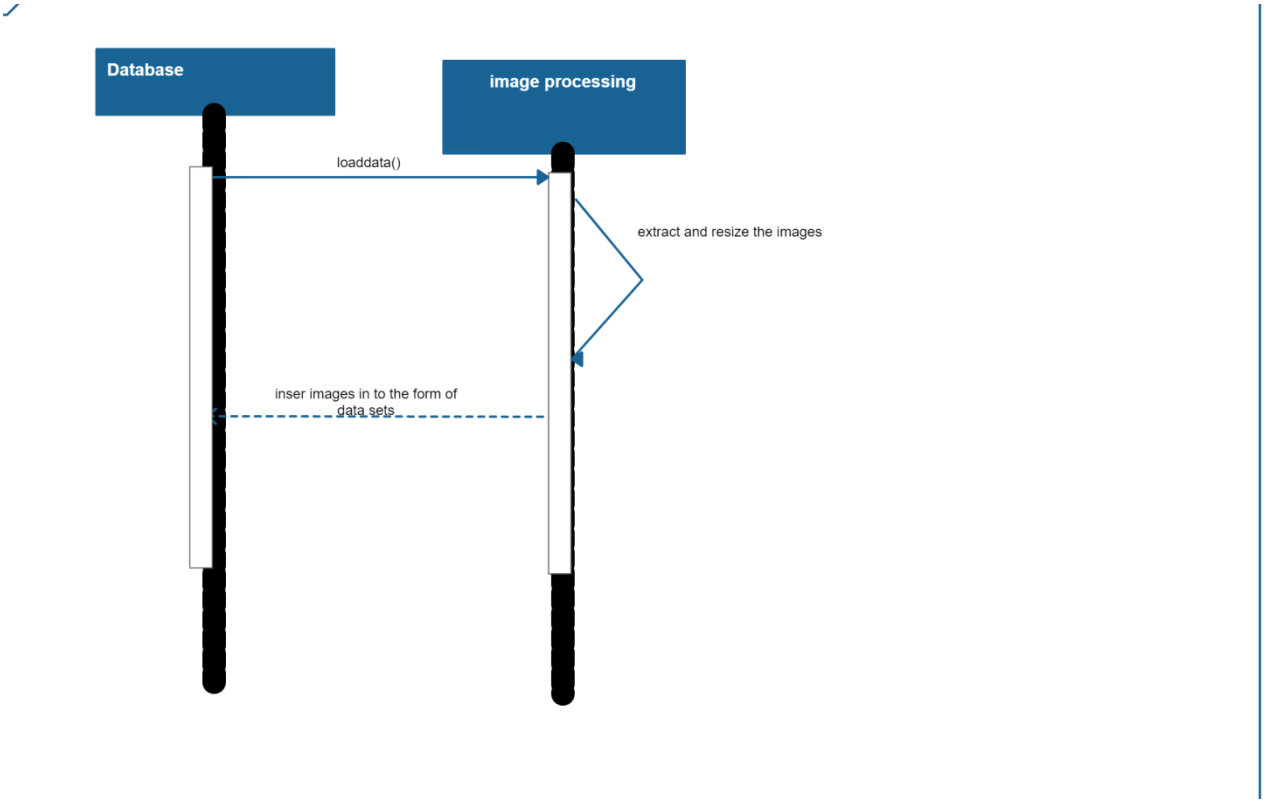
SEQUENCE DIAGRAM OF LOGIN:



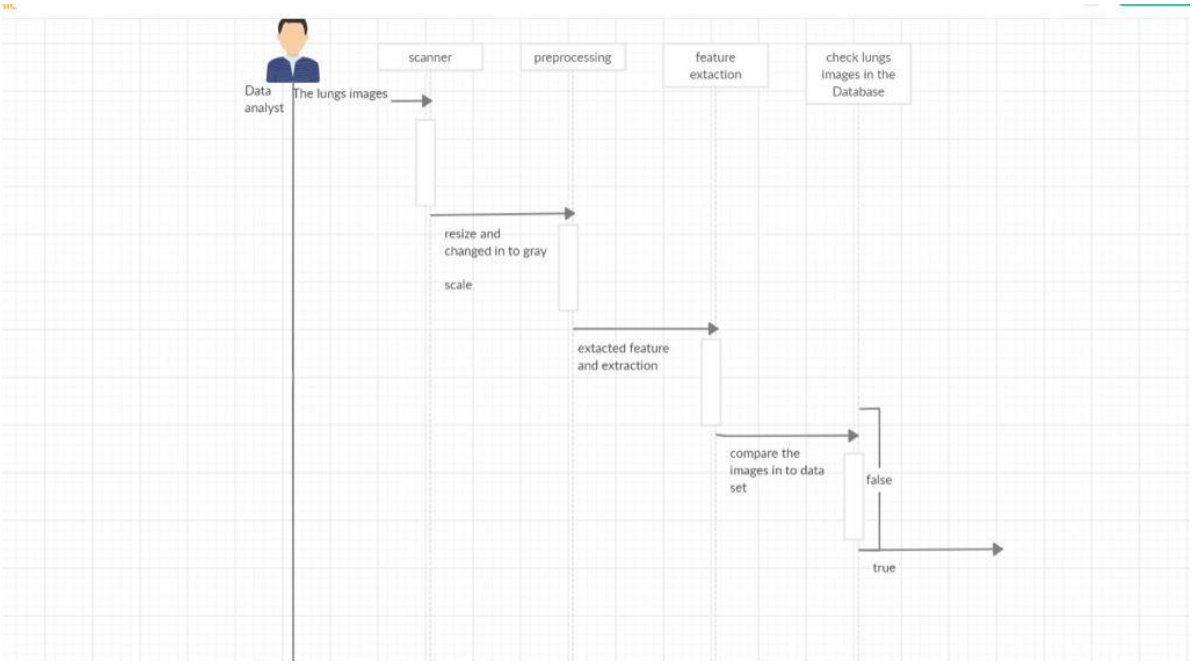
Sequence diagram of scanner:



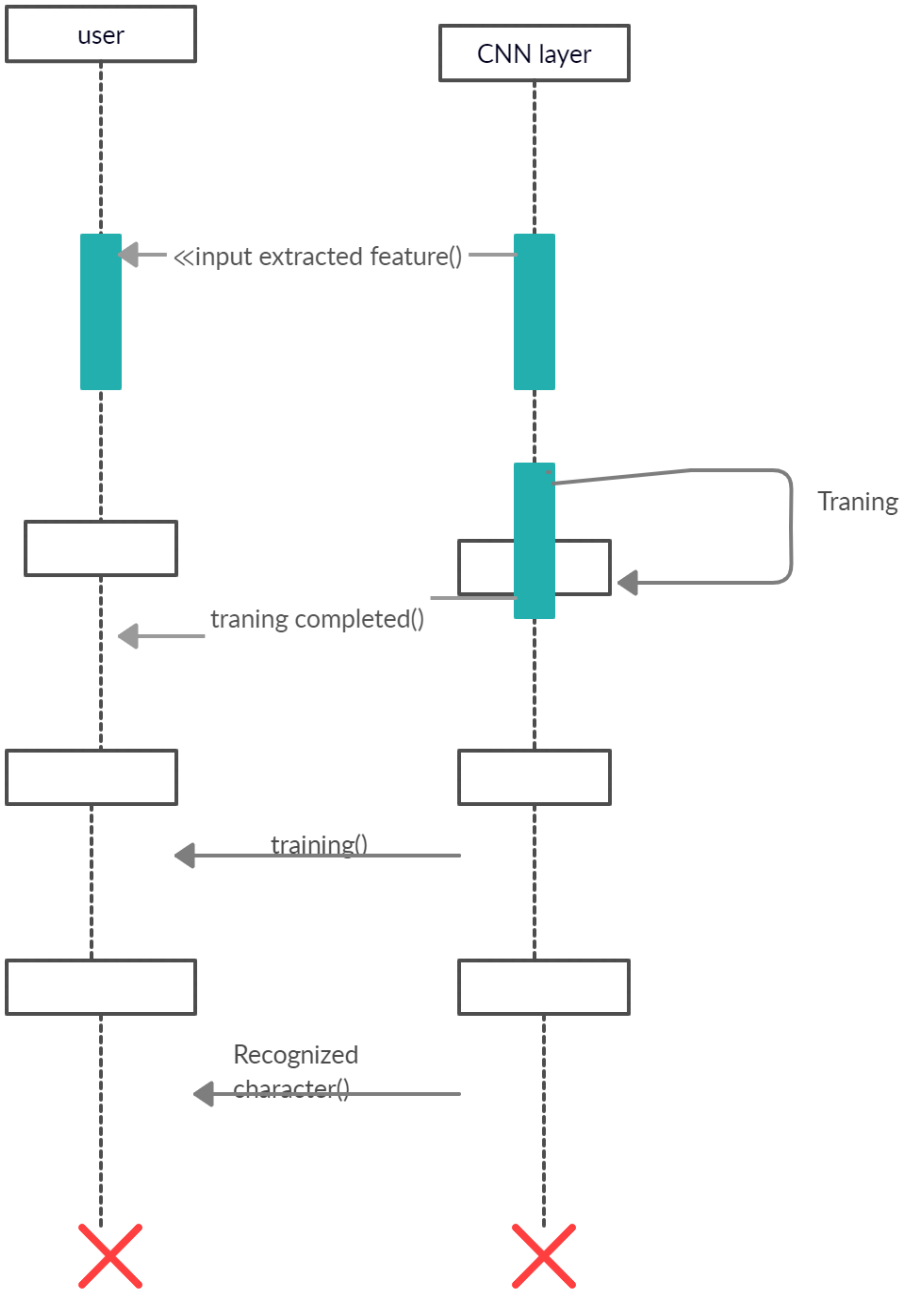
Sequence diagram of image processing:



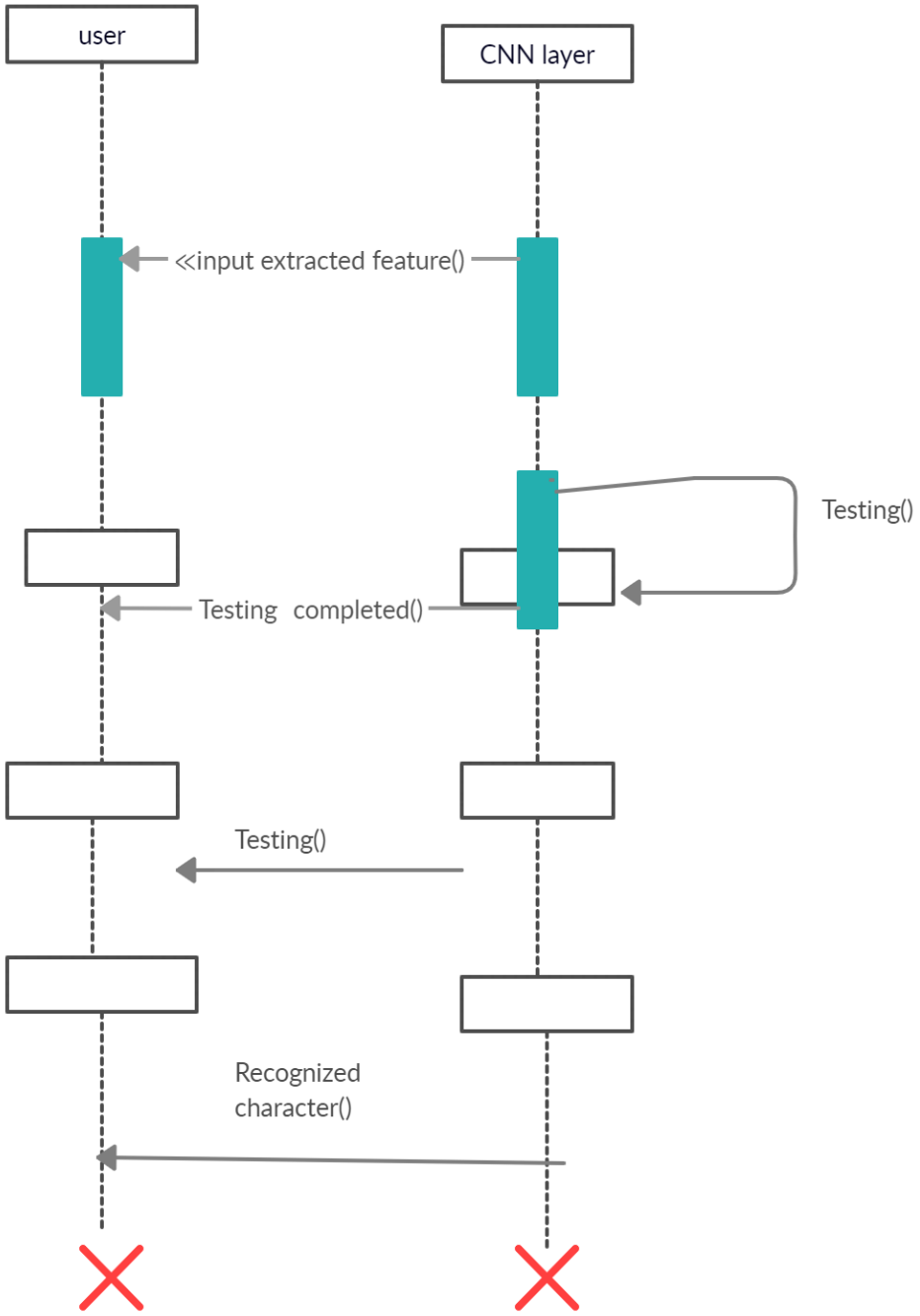
Sequence diagram of image recognition:



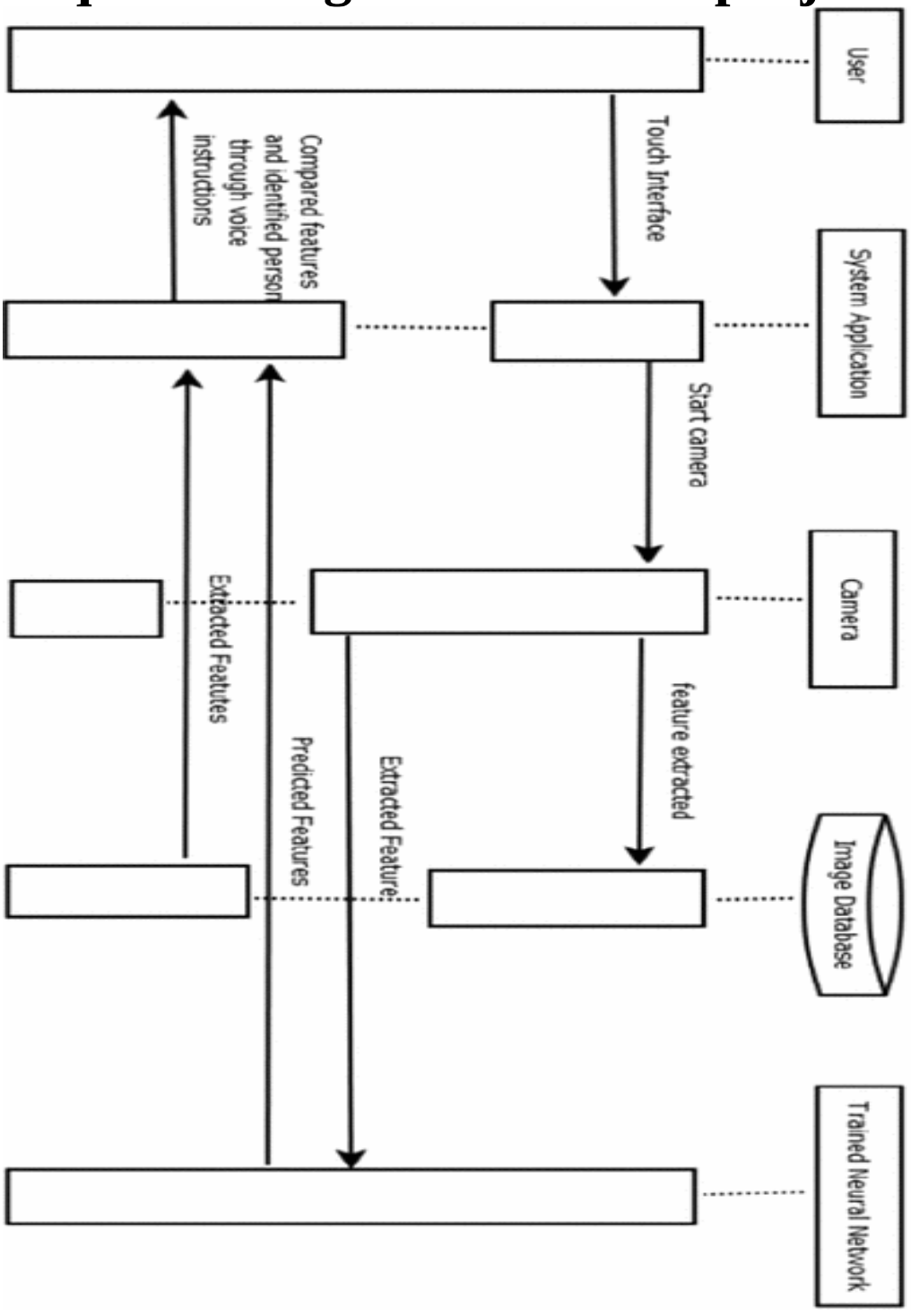
Sequence diagram of training:



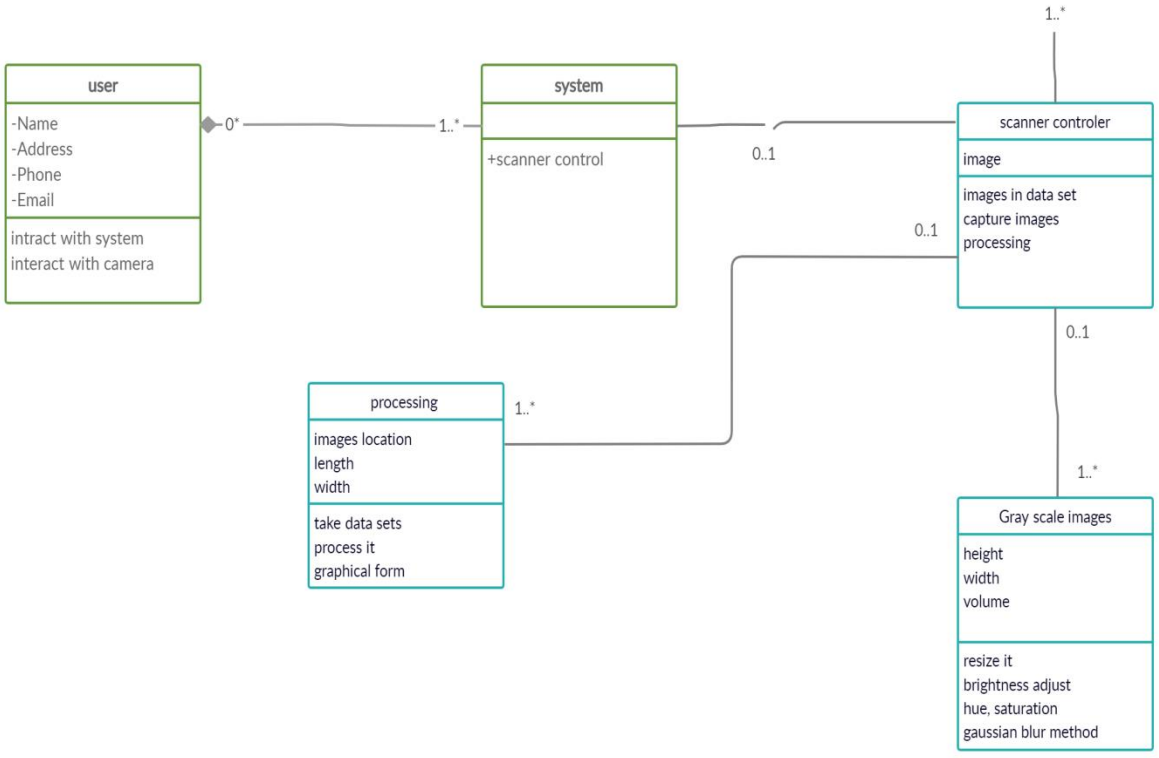
Sequence diagram of Testing

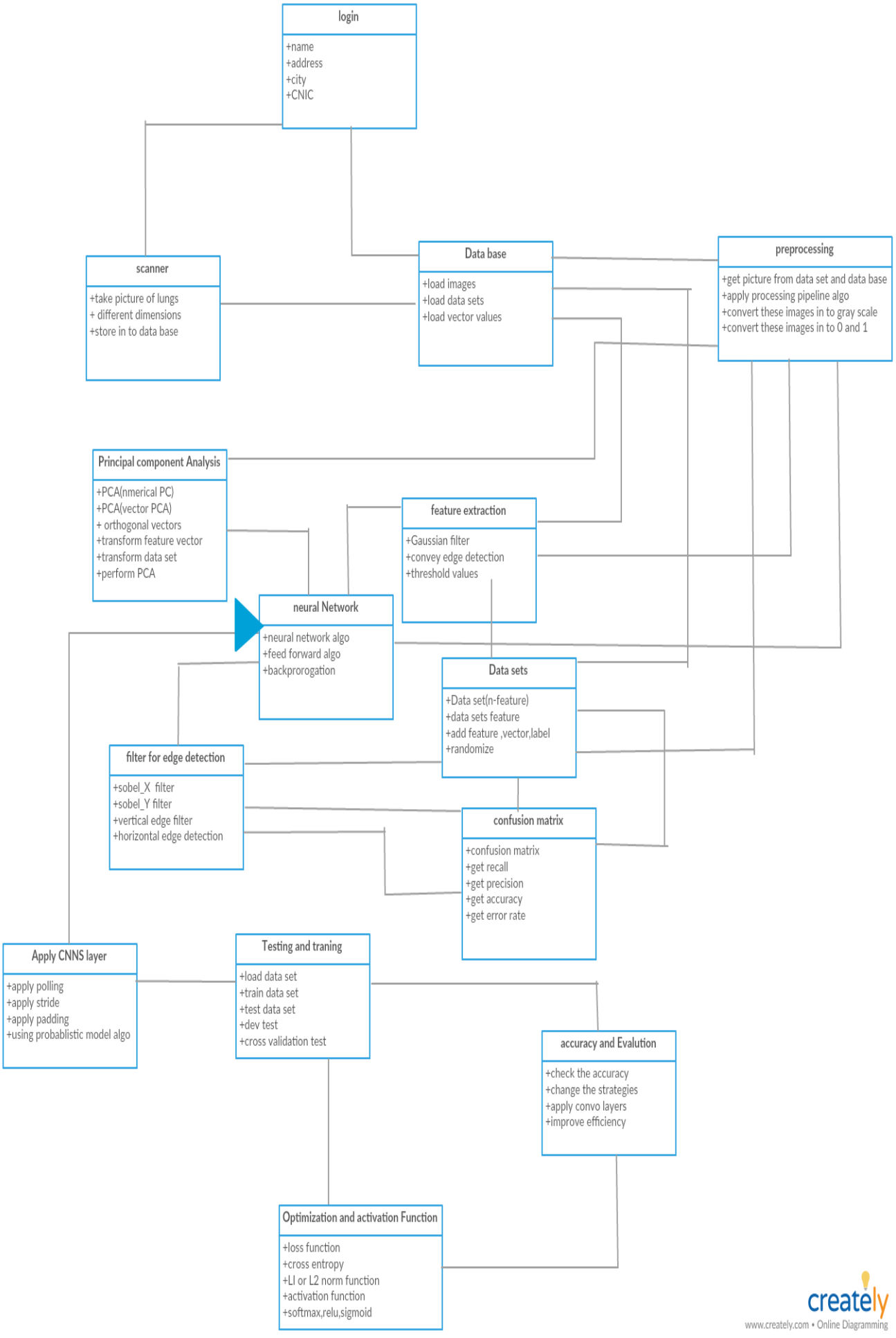


Sequence diagrame of whole project:



Class Diagram:





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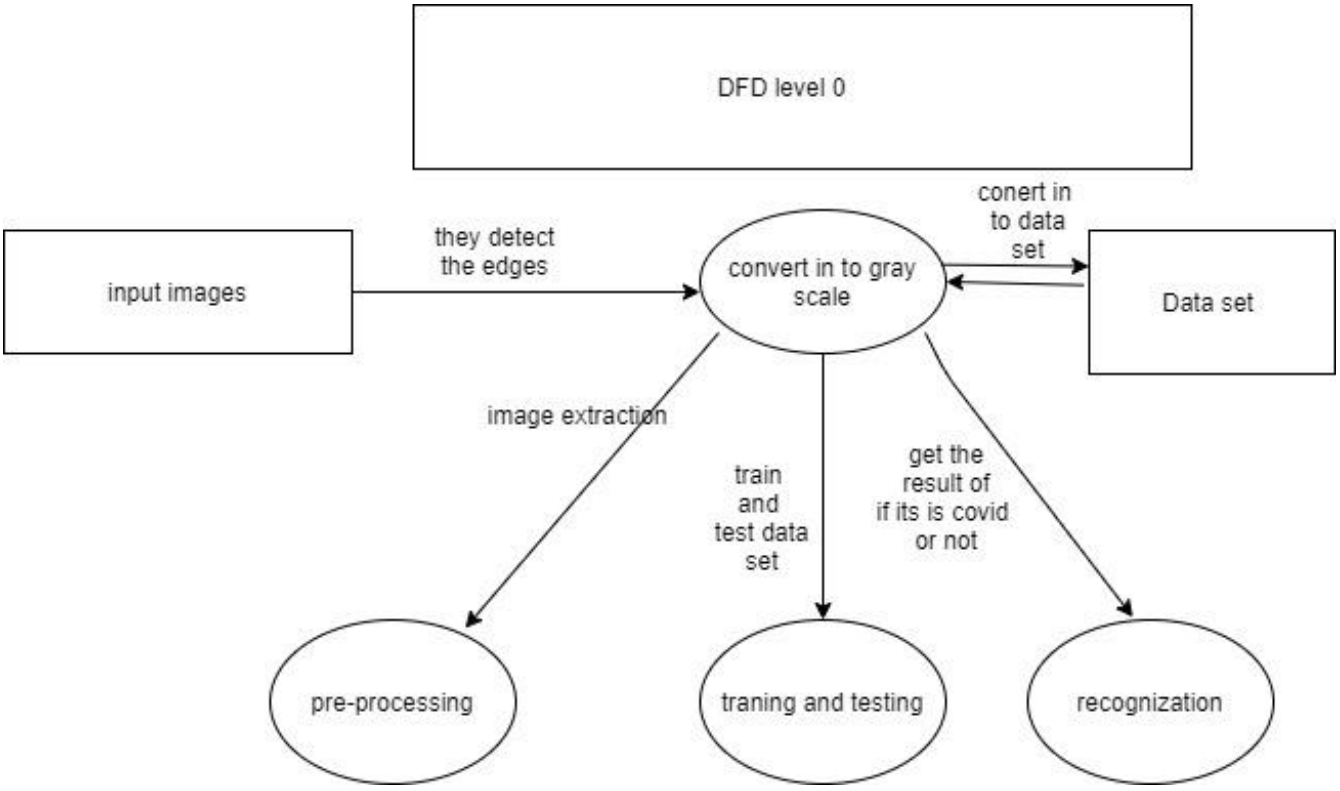
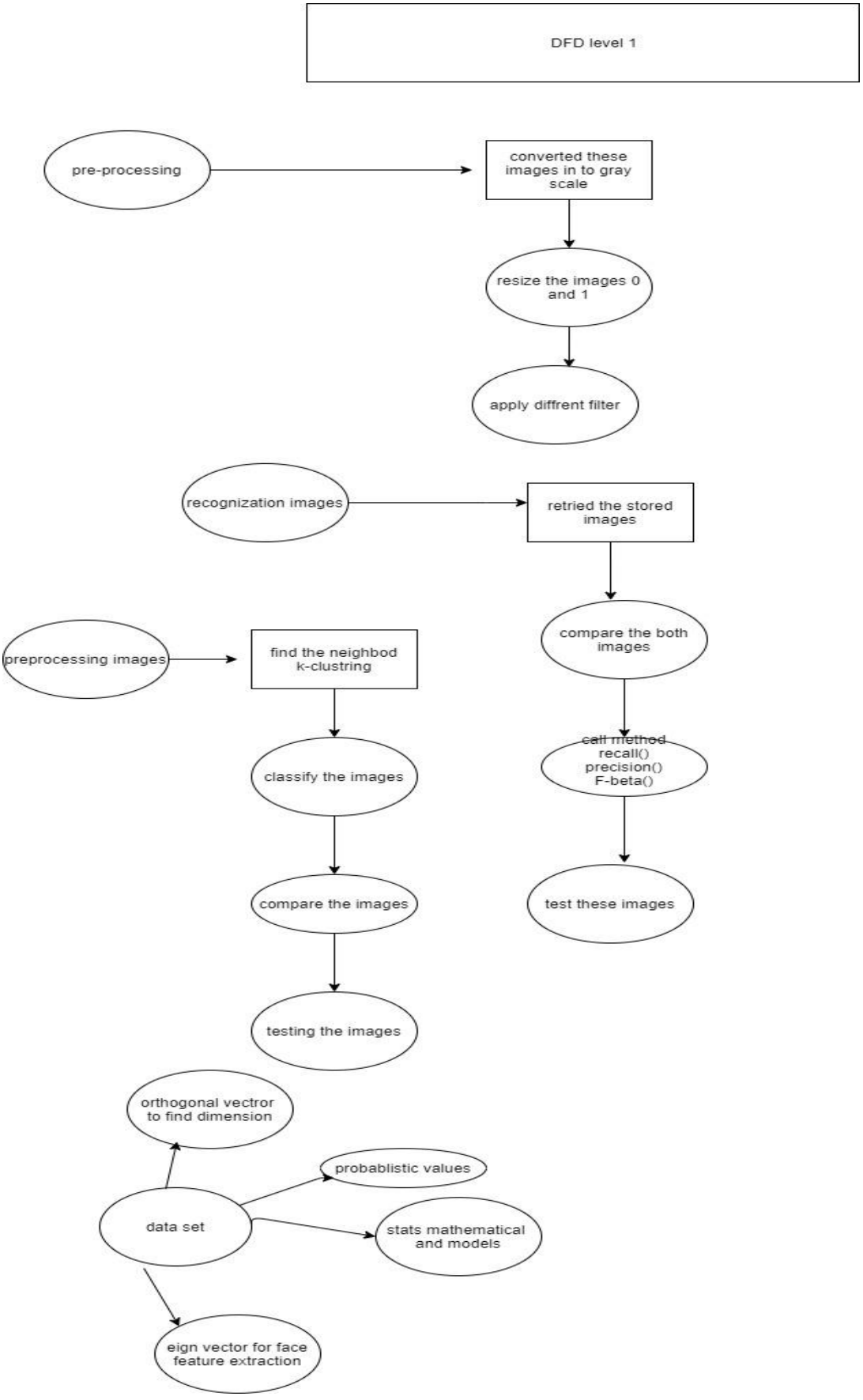
Data Flow Diagram:

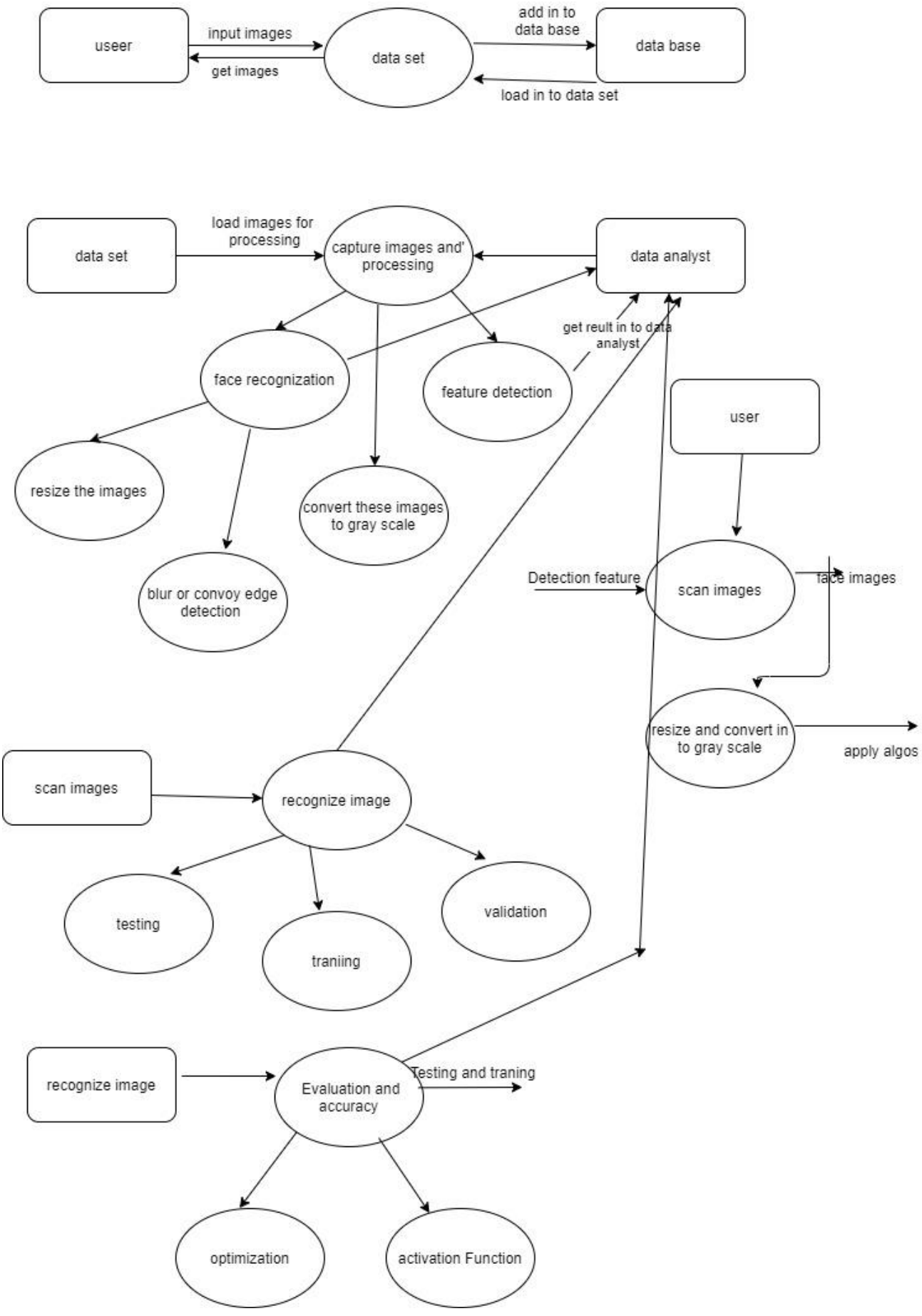
Dfd-level-0



DFD level-1


DFD level 1
pre-processing
converted these images in to gray scale
resize the images 0 and 1
apply diffrent filter
recognization images
retried the stored images
compare the both images
call method
recall()
precision()
F-beta()
test these images
preprocessing images
find the neighbod k-clustring
classify the images
compare the images
testing the images
orthogonal vectror to find dimension
probablistic values
data set
stats mathematical and models
eign vector for face feature extraction

DFD level-2


useer
input images
get images
data set
add in to data base
data base
load in to data set
data set
load images for processing
capture images and' processing
data analyst
face recognization
feature detection
get reult in to data analyst
user
resize the images
convert these images to gray scale
blur or convoy edge detection
Detection feature
scan images
face images
resize and convert in to gray scale
apply algos
scan images
recognize image
testing
traniing
validation
recognize image
Evaluation and accuracy
Testing and traning
optimization
activation Function