Pneumonia diagnosis system

Under Supervision of **Dr. Ibrahim Zaghloul**

Project Team

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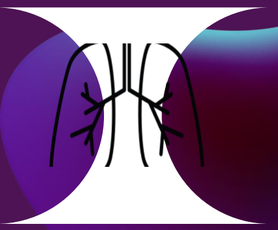
CONTENT

1. overview of the project
2. Dataset that used
3. Deep learning (CNN) models
4. API using flask
5. system design

overview of project

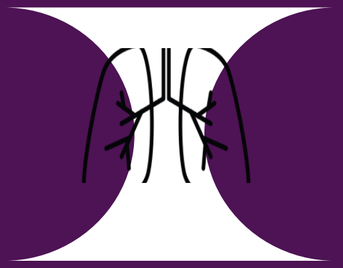
Project motives	project idea	Solutions already in the field and what we will add	System software diagrams	open source used libraries and frameworks

PROJECT MOTIVES



- Pneumonia is a leading cause of death in children and the elderly people around the world.
- Chest X-rays are the most thorough method of detecting pneumonia because:
  - It's the cheapest way.
  - No direct contact with the medical staff.
- Due to an erroneous diagnosis and treatment, a person died because of the inconvenient method of diagnosing pneumonia.
- It is now possible to construct an autonomous system for identifying pneumonia and treating the condition, especially if the patient is in a distant area with few medical services

PROJECT IDEA

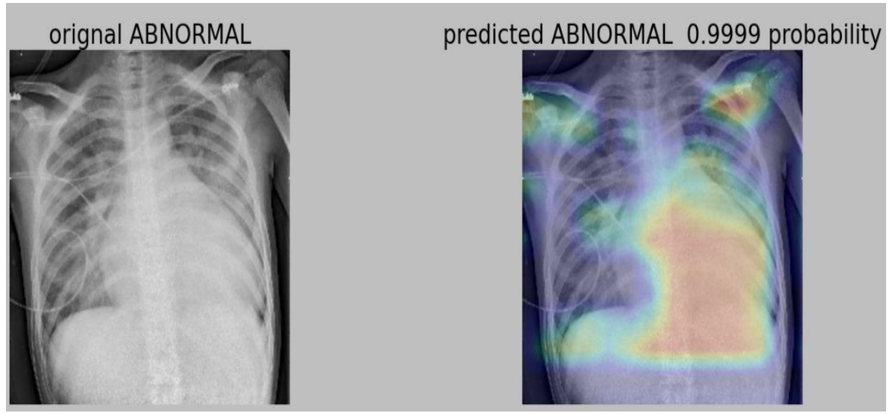


- We will be using Deep Learning Algorithms to detect Pneumonia cases (Normal, Pneumonia, Covid-19) in this project. There are different methods to diagnose Pneumonia using Chest X-Ray images, but we'll examine different algorithms, test overall accuracy, and select the best algorithm for detecting Pneumonia.

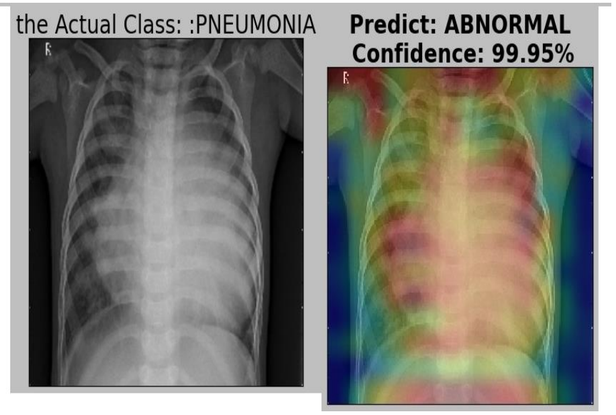
- We'll use Flask and HTML to create a Web app to view the results after choosing the best algorithm from the pre-trained ones.

Solutions already in the field of pneumonia detection

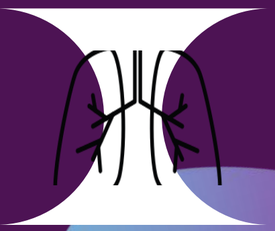
- Pneumonia doctors can detect this case if it is (**NORMAL or ABNORMAL**) but cannot detect ABNORMAL cases which it suffering from.



- The ABNORMAL case would be **pneumonia or covid-19** but the doctor cannot know this difference



BLOCK DIAGRAM OF THE SYSTEM



Select X-ray image. (Reading the datasets)

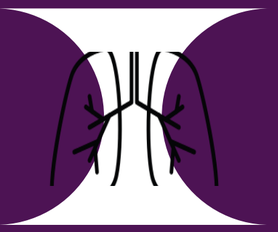
Image preprocessing (clean image data for model input)

Augmentation (Rescaling, zoom range, horizontal flip)

CNN Model.

detection of disease (Normal, pneumonia, Covid-19)

visualization the Result with **Grad-CAM**



open source used libraries and frameworks

scikits-image
image processing in python

seaborn

NumPy

Keras

scikit learn

OpenCV

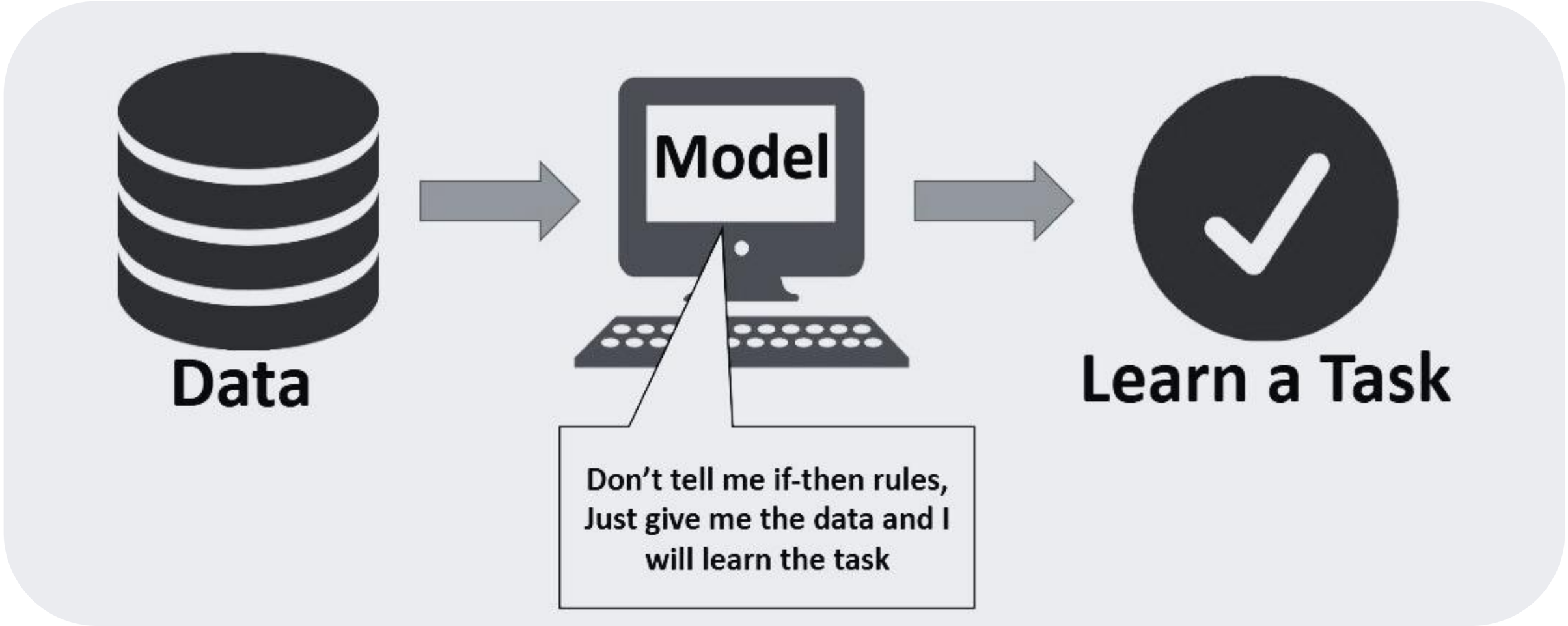
pandas

matplotlib

Flask

TensorFlow

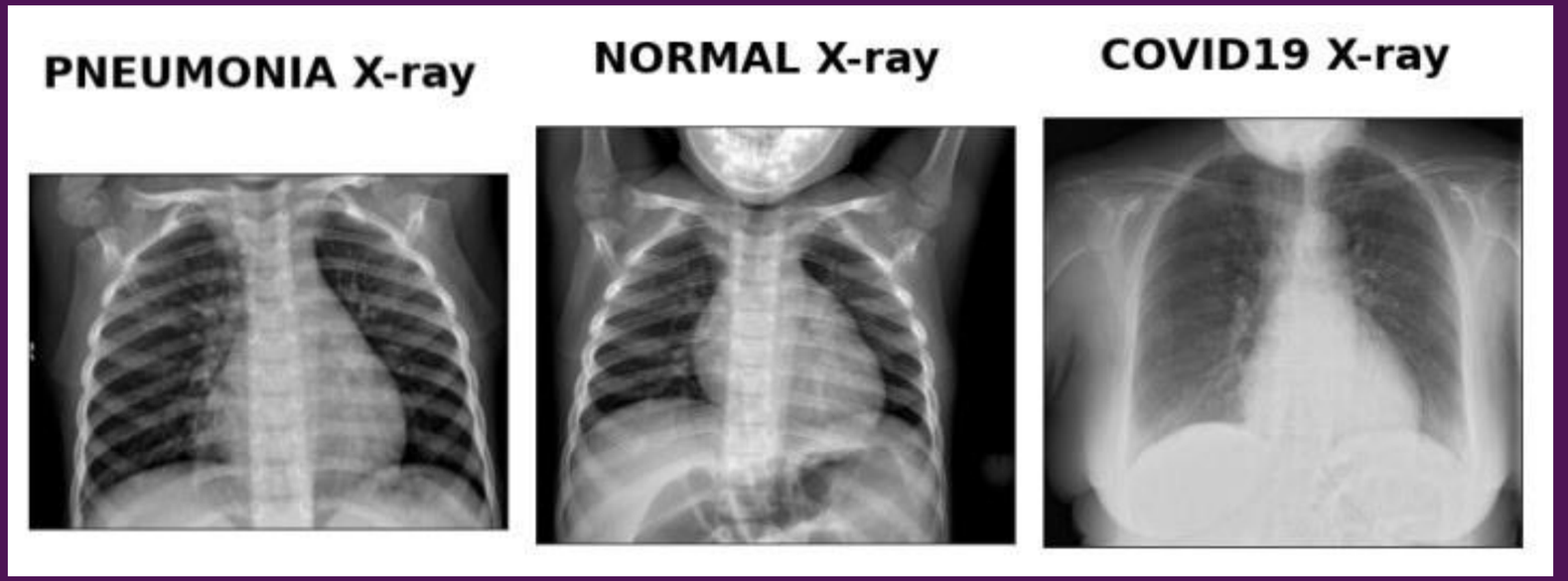
2) Dataset that used



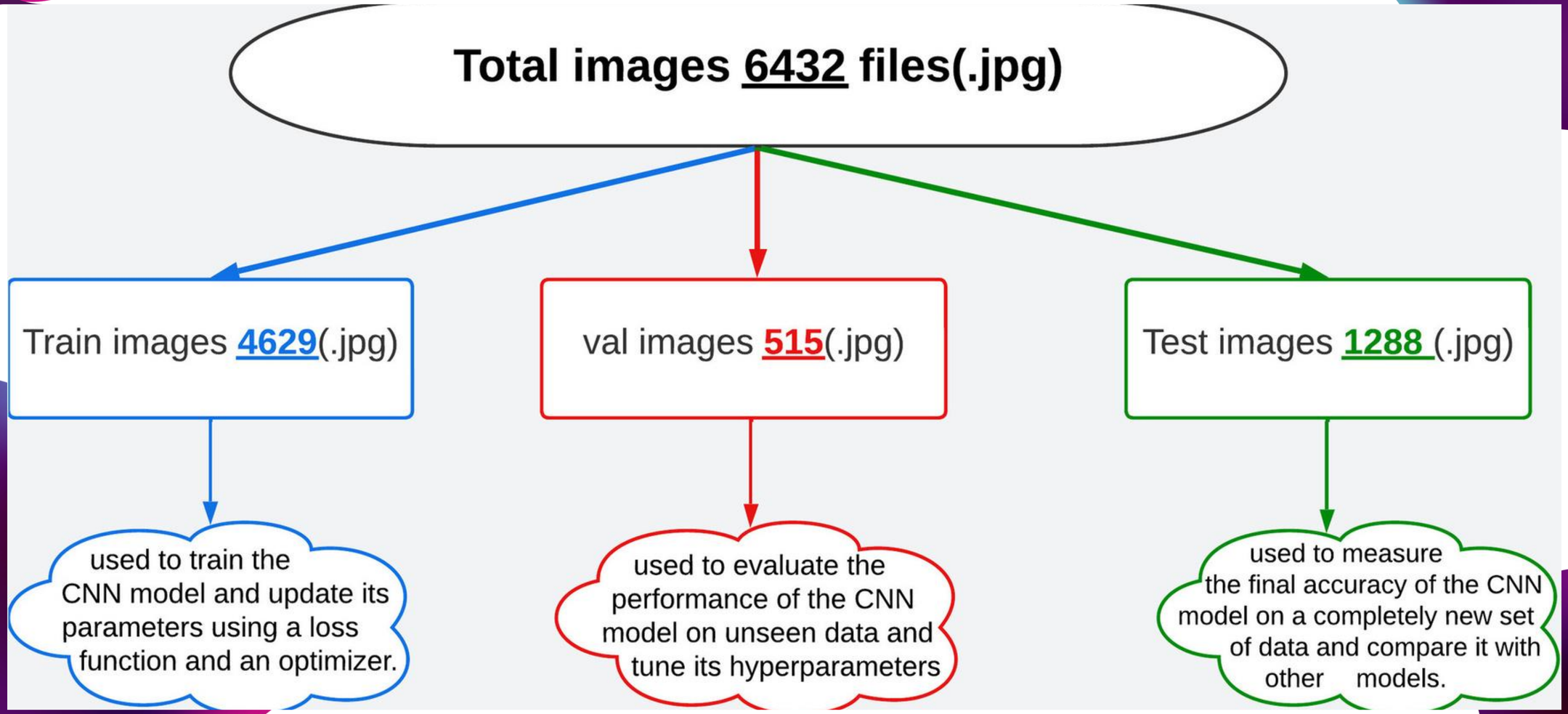
About Dataset from Kaggle

Chest X-ray (Covid-19 & Pneumonia)

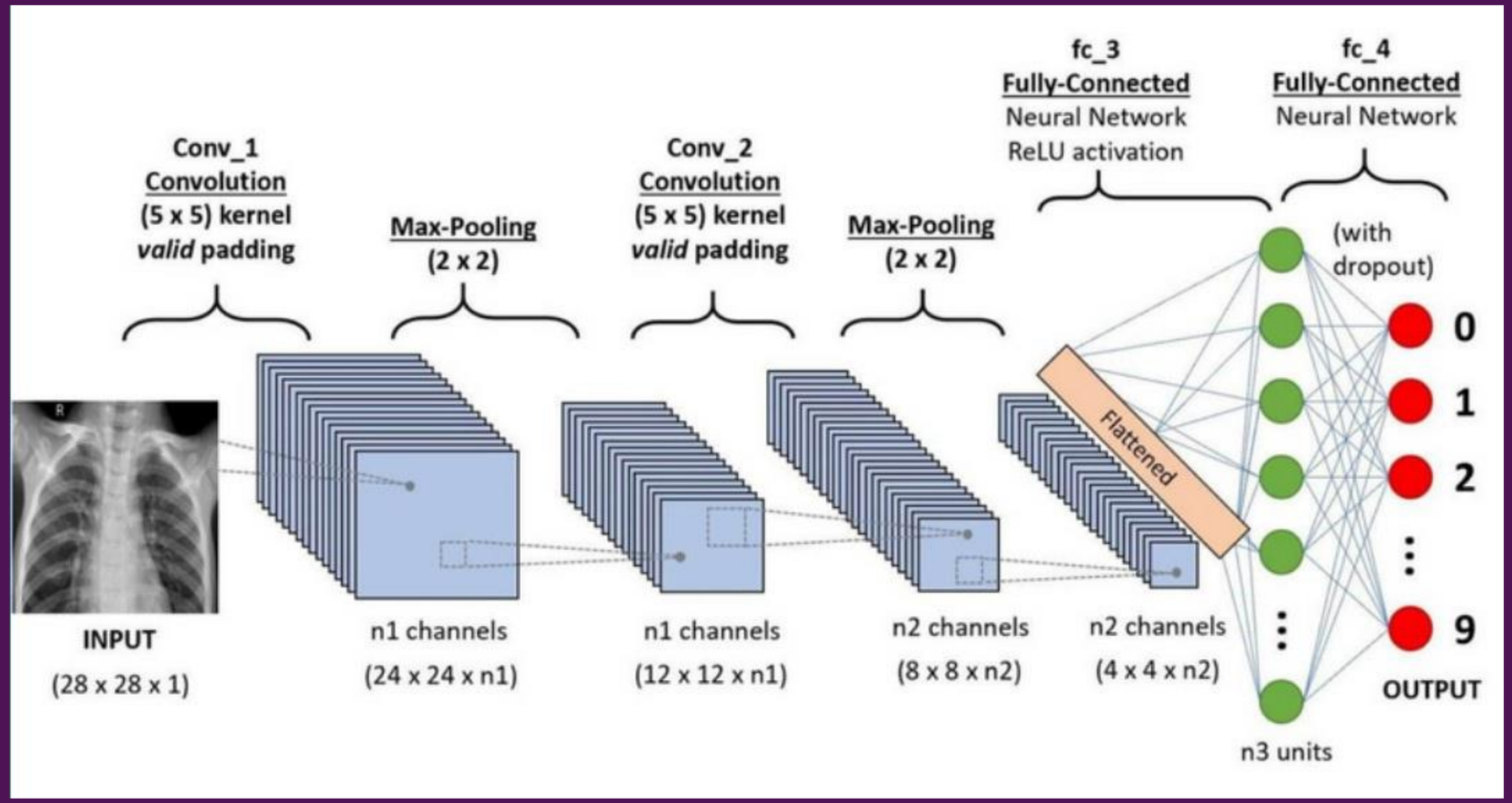
Dataset contains chest x-ray images of Covid-19, Pneumonia and normal patients.



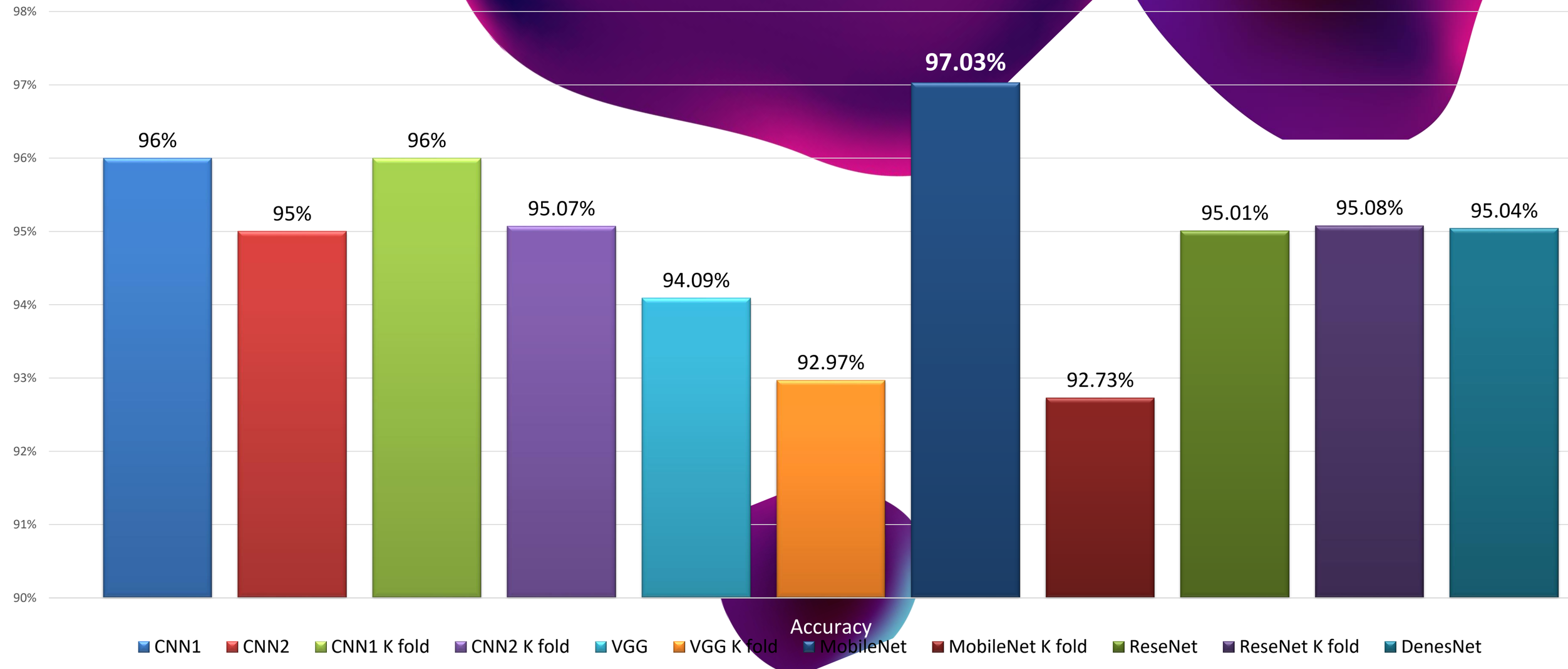
Splitting the dataset



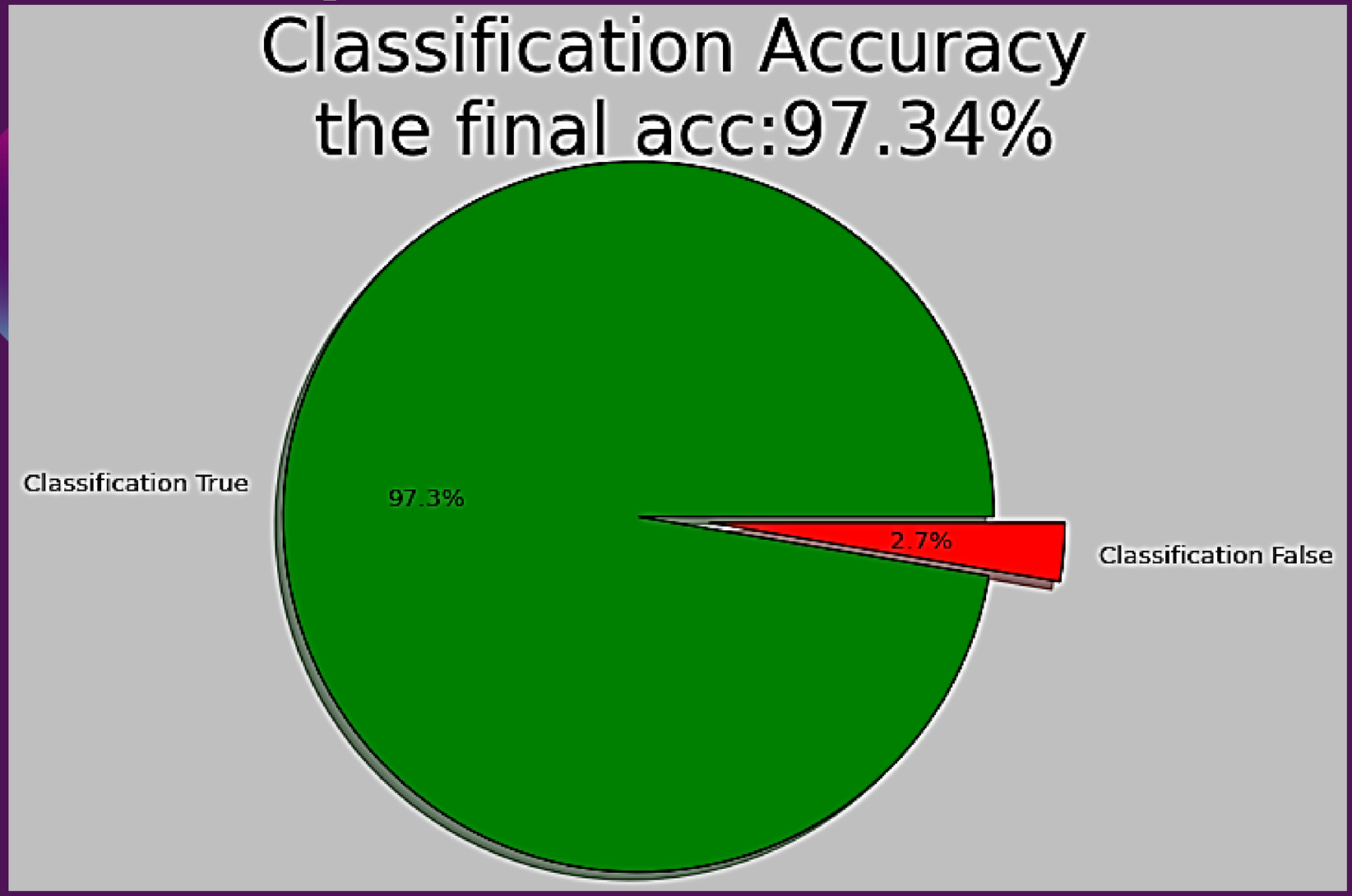
3) Deep learning (CNN) models



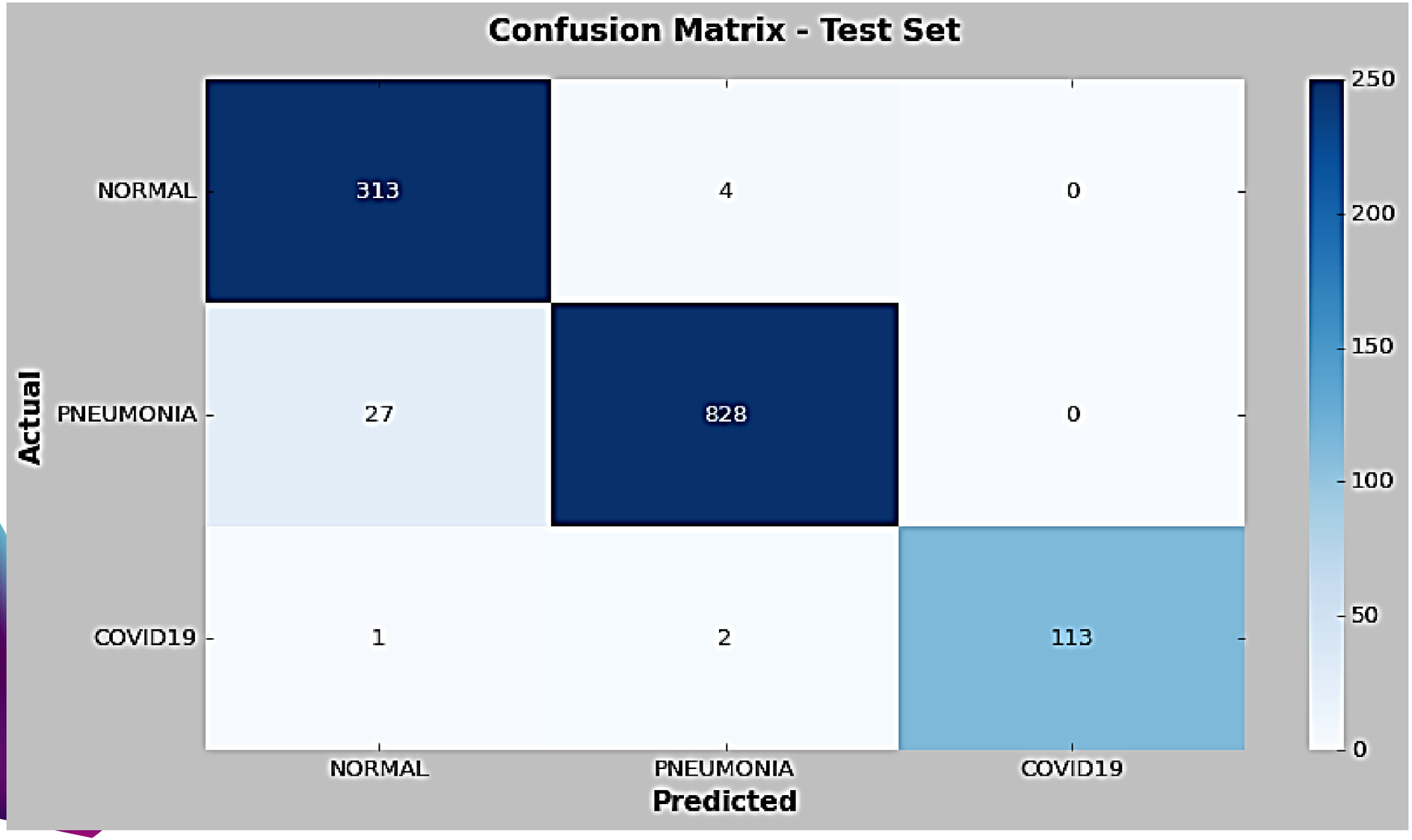
Accuracy of All models



Accuracy score for the best model



Confusion Matrix for the test dataset



From Confusion Matrix

total 1288 test images

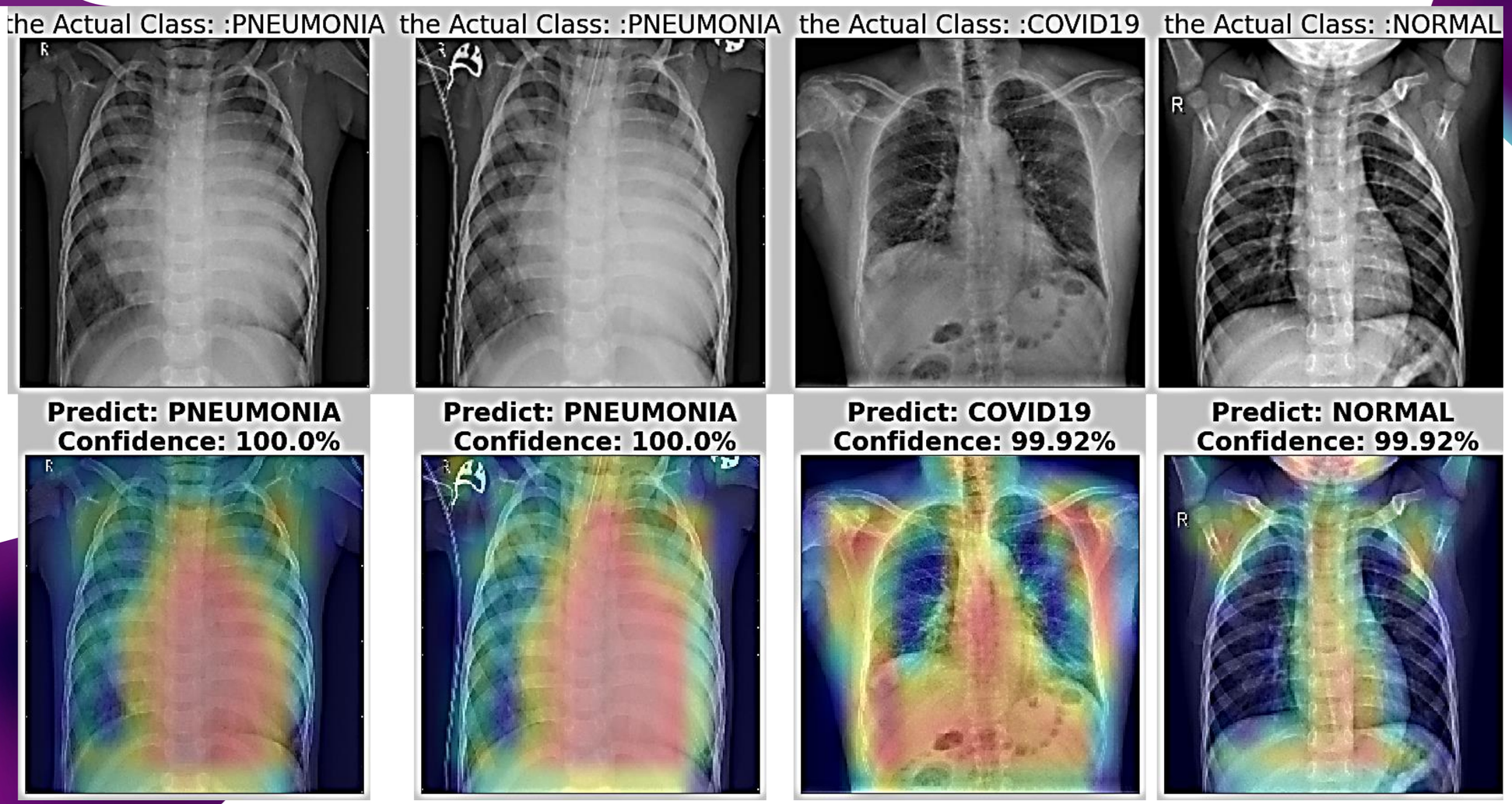
1254 correct matches

34 wrong matches

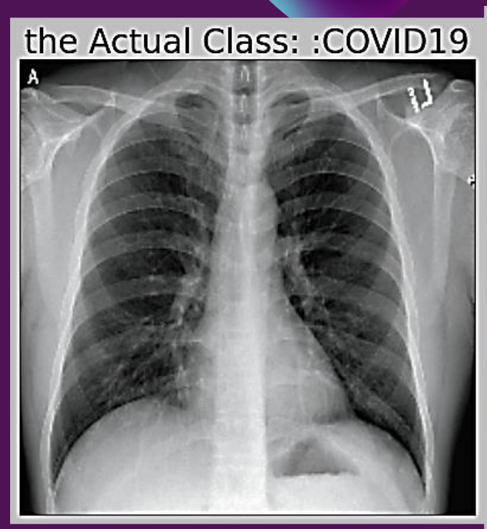
Classification Report

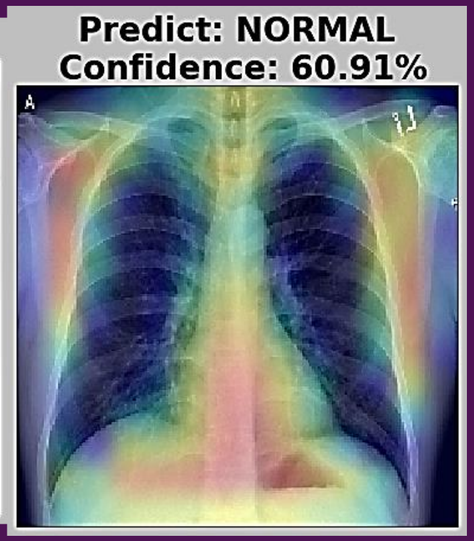
classes	precision	recall	F1-score
normal	0.89	0.91	0.90
pneumonia	0.97	0.96	0.96
covid19	0.99	0.97	0.98

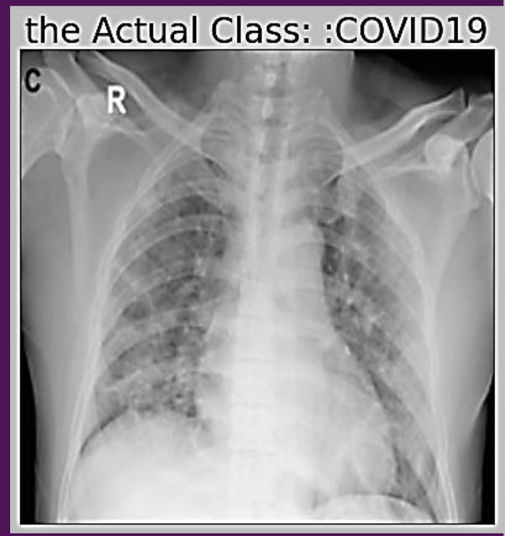
very good Prediction of results

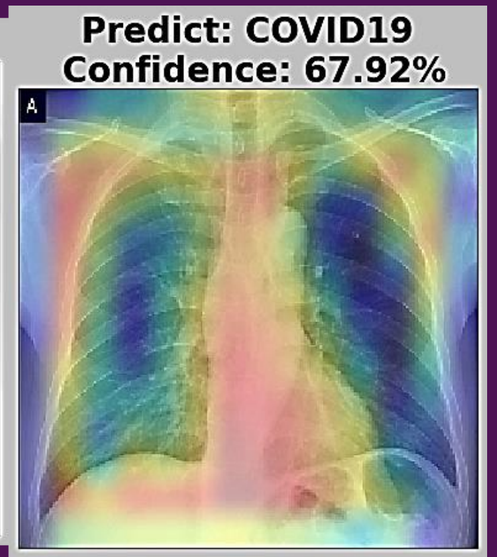


Bad Prediction of results



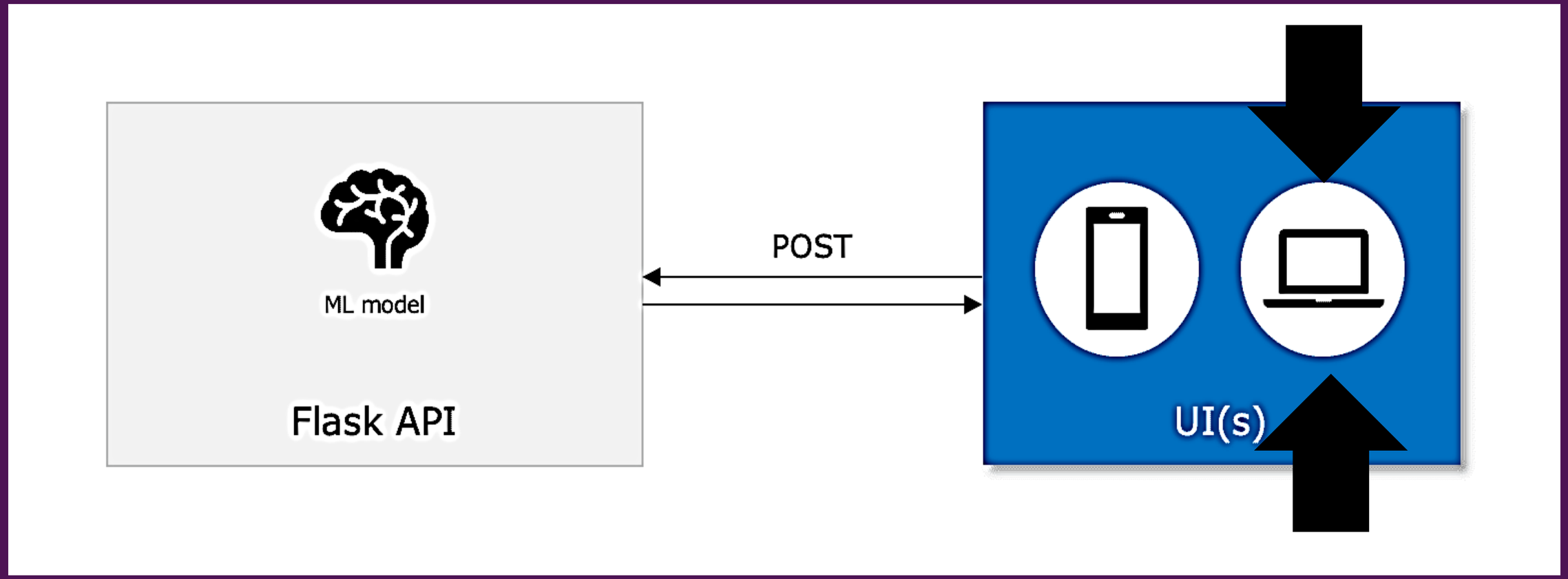






NOT BAD

4) API using flask



5) website design

The title of our site is
(Pneumonia System)
the site is divided into **eight pages**

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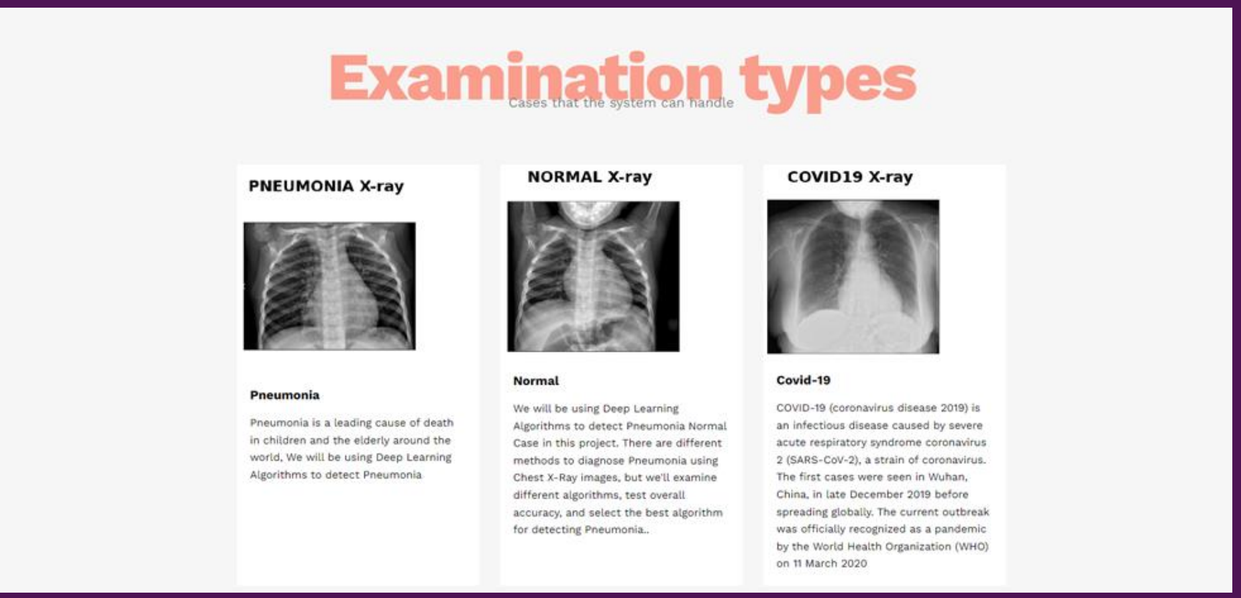
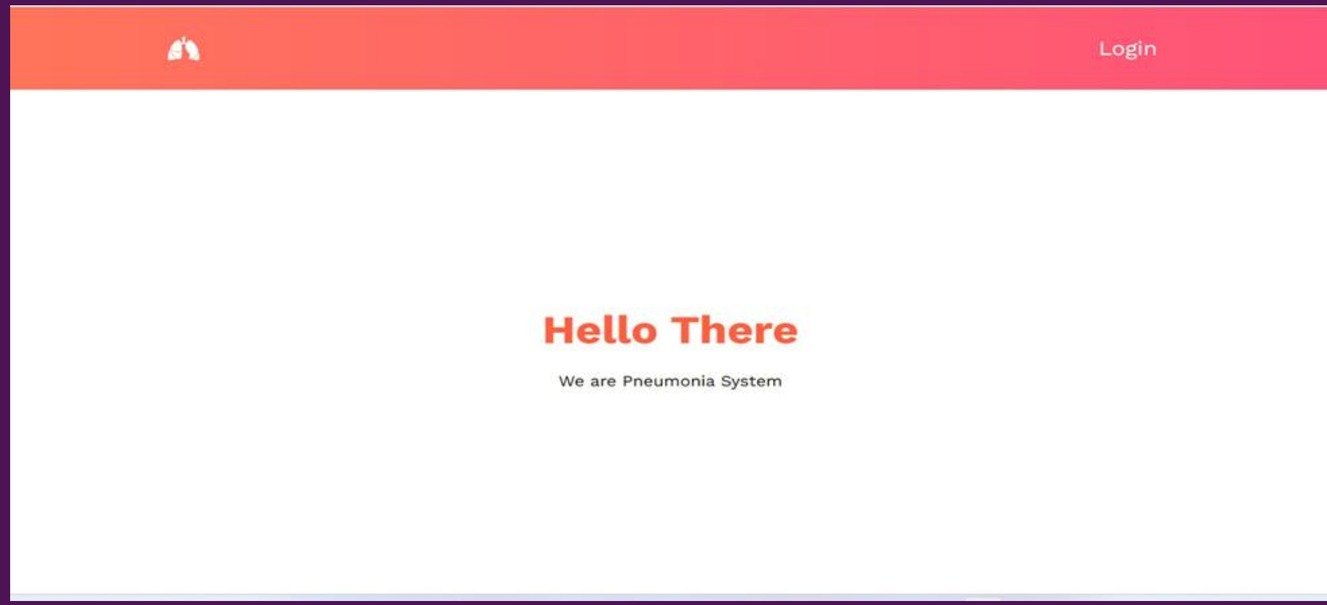
each page has a specific function or purpose, and each page will be presenting and how to deal with it without errors.

1- The Home page

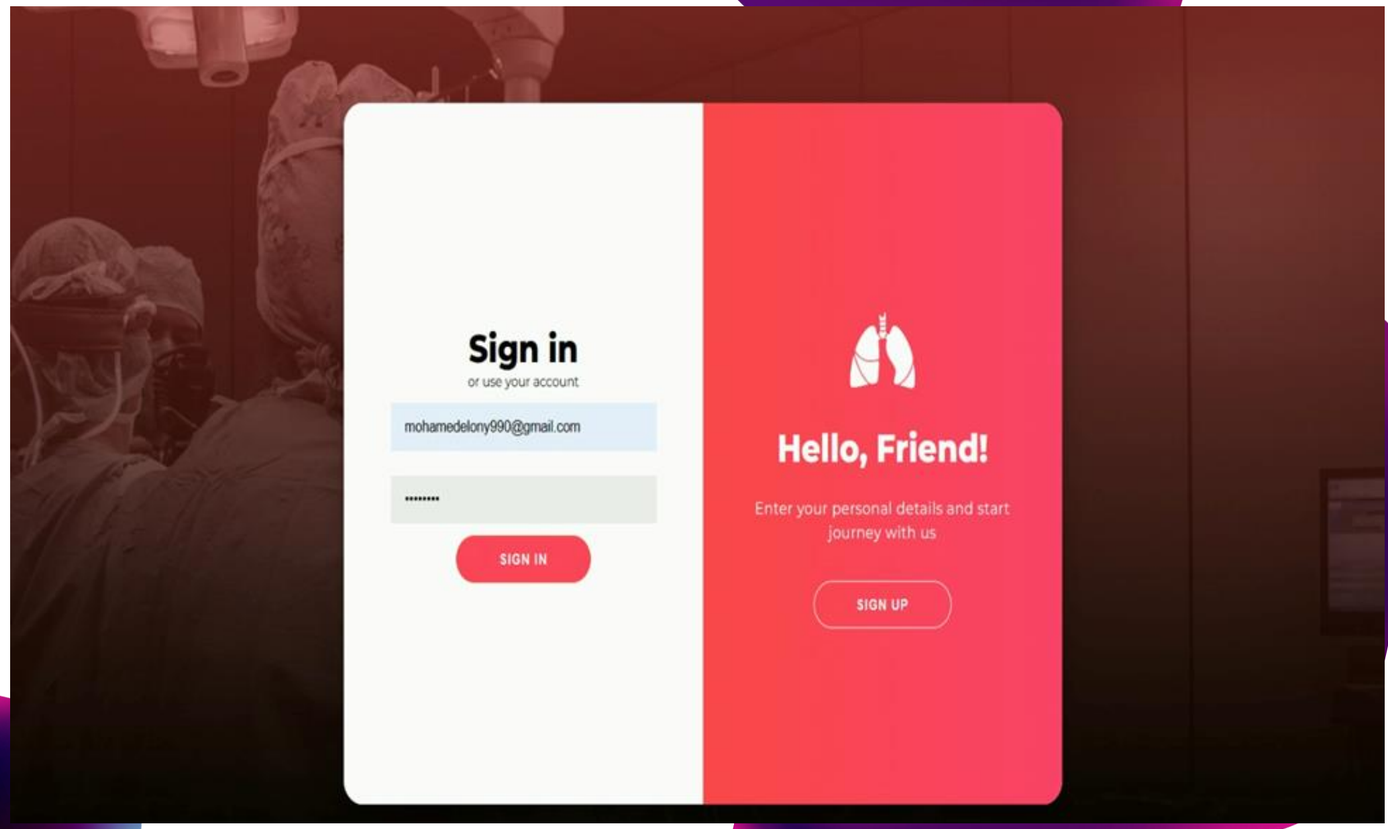
The Home page in our system consists of a header that contains a button to access the registration and login page in the system and also many small articles that talk in detail about the entire project and the general idea that the project deals with and also contains a part containing contact information with the administrators of the system.





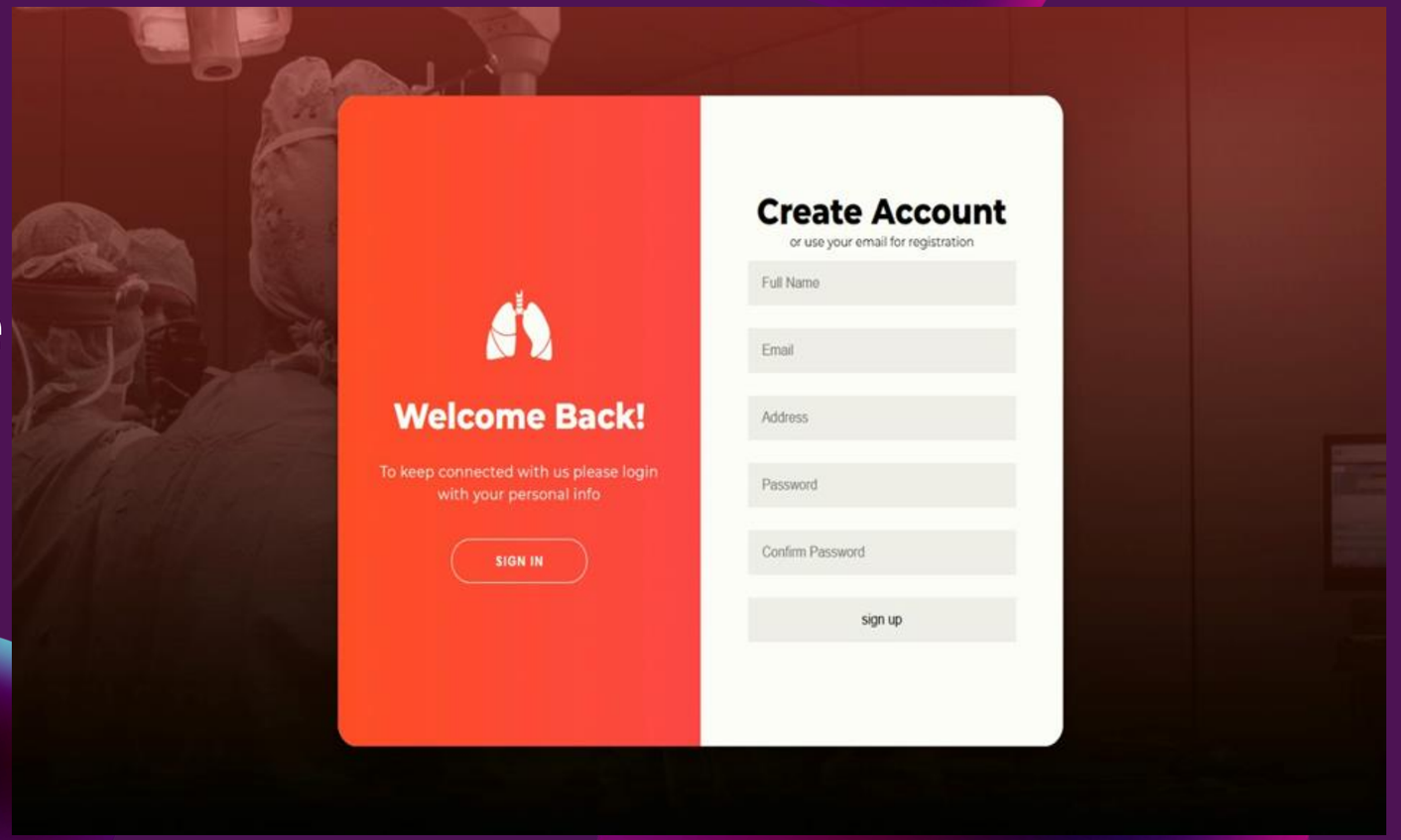
2- sign in

The page consists of two parts, the part on the left contains two fields, one for writing the email and the second for writing the password, and then you press the Sign In button. As for the part on the right, it contains the Sign Up button, to be directed to the Sign Up page.



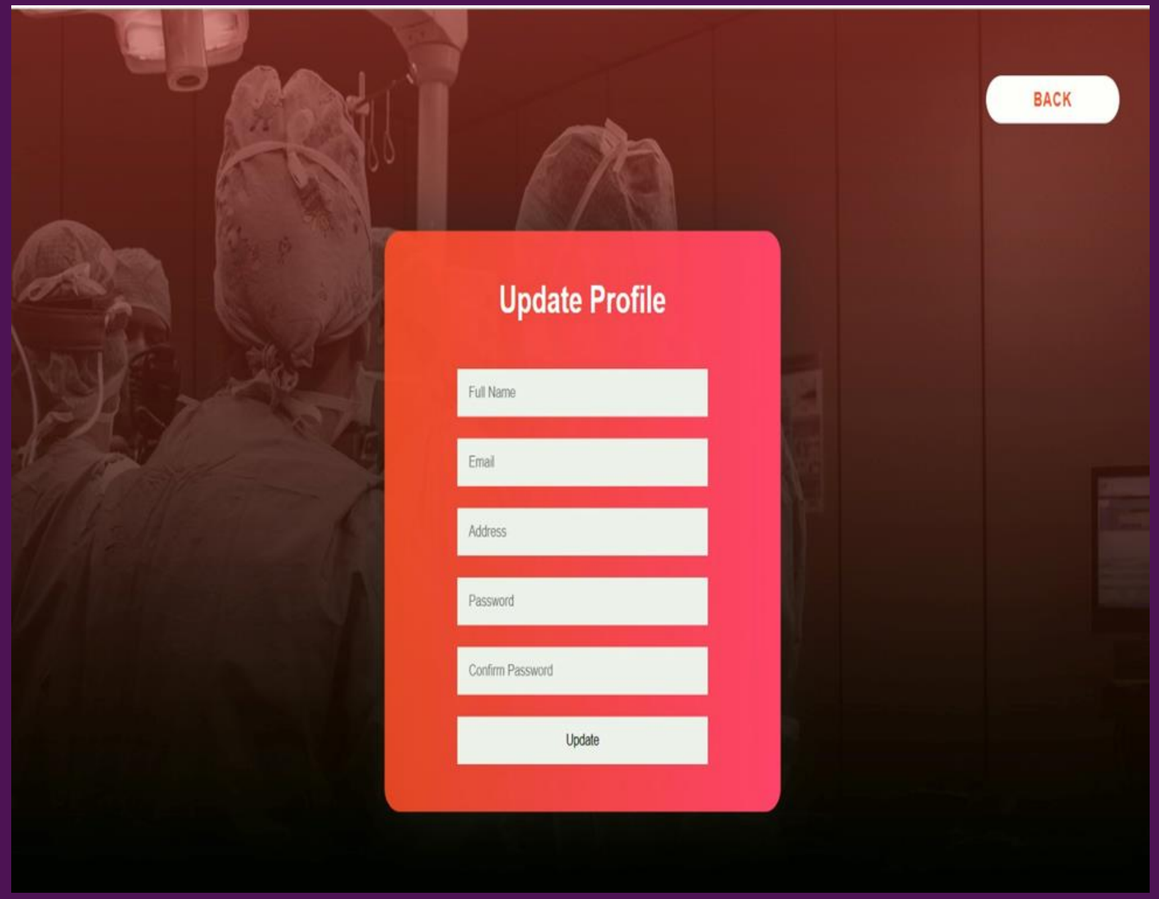
3- Sign Up Page

On this page, you can create a new email to start accessing the special services



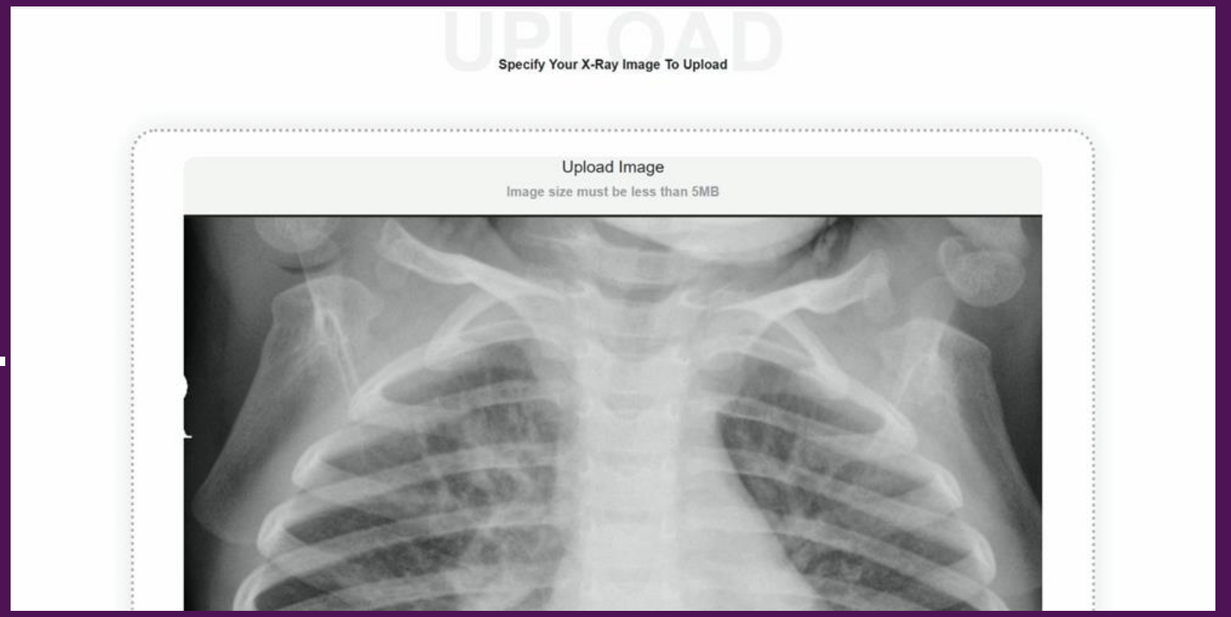
4- Update Profile Page

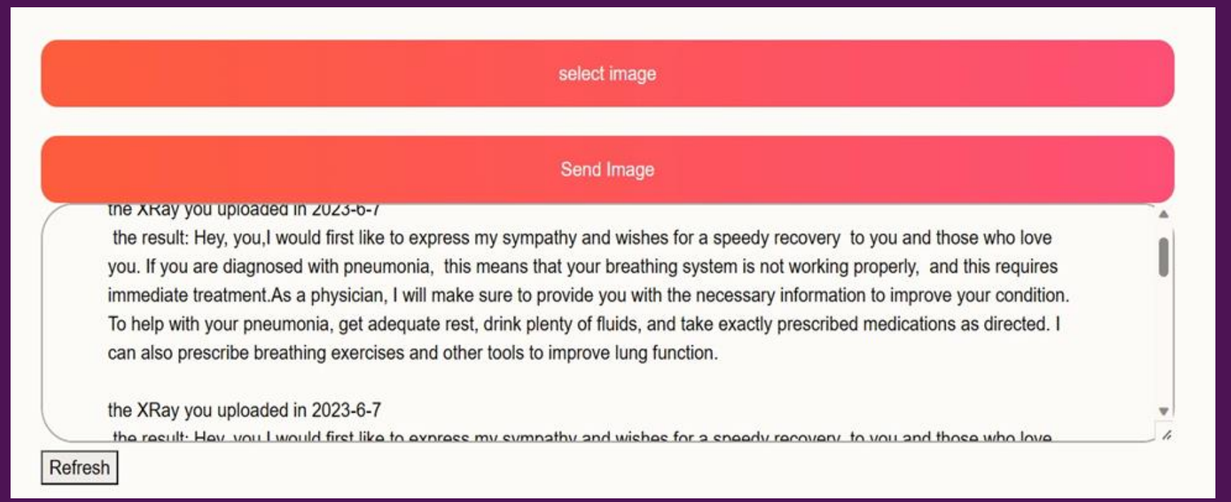
On this page, you can edit your email information.



Upload Photo Page

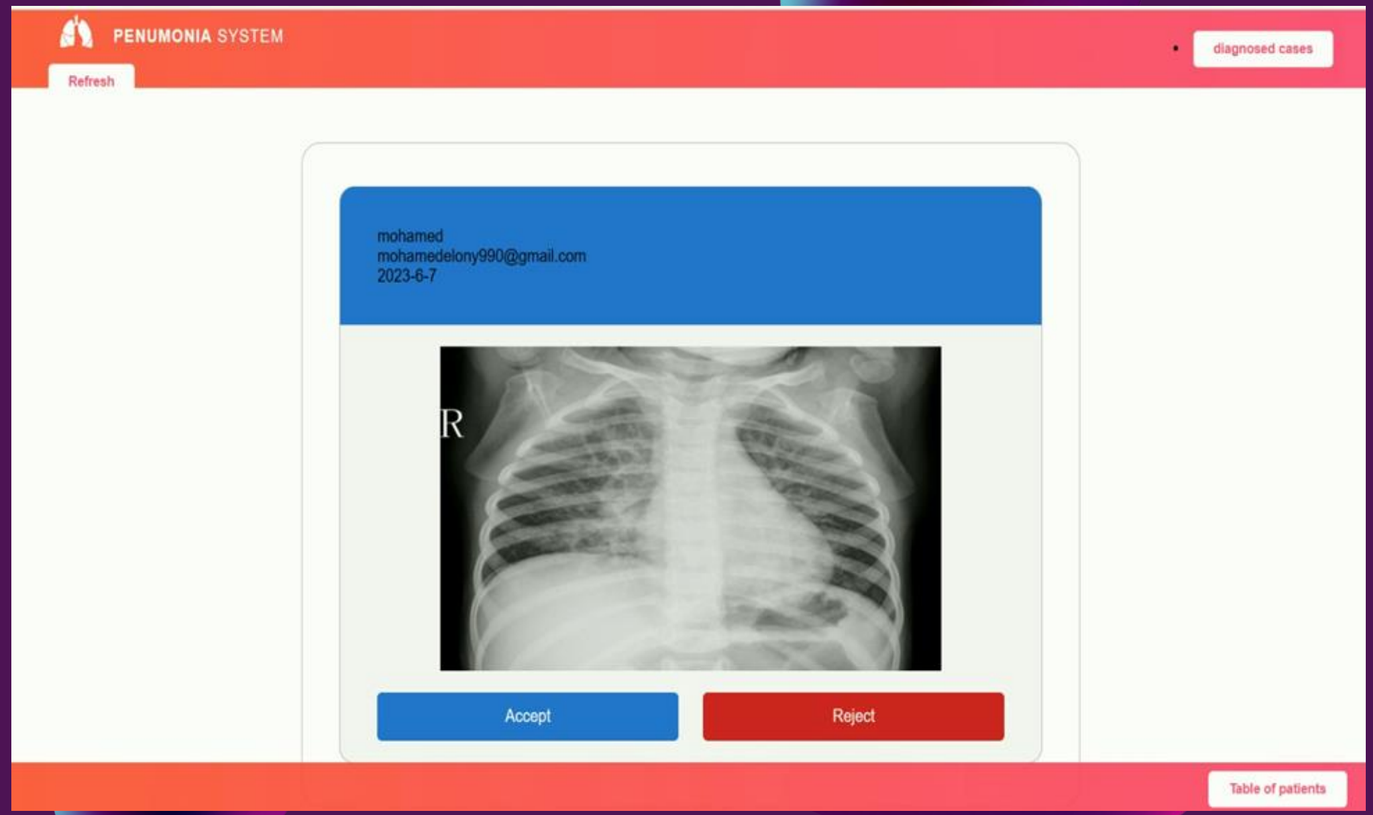
On this page, you can upload your x-ray image to the system to be examined





5- Admin Page

On this page, the controller is the admin, and this page can be called the undiagnosed cases page



Diagnosed Cases Page

On this page, the x-rays that have been examined are saved to be sent to the patient's e-mail

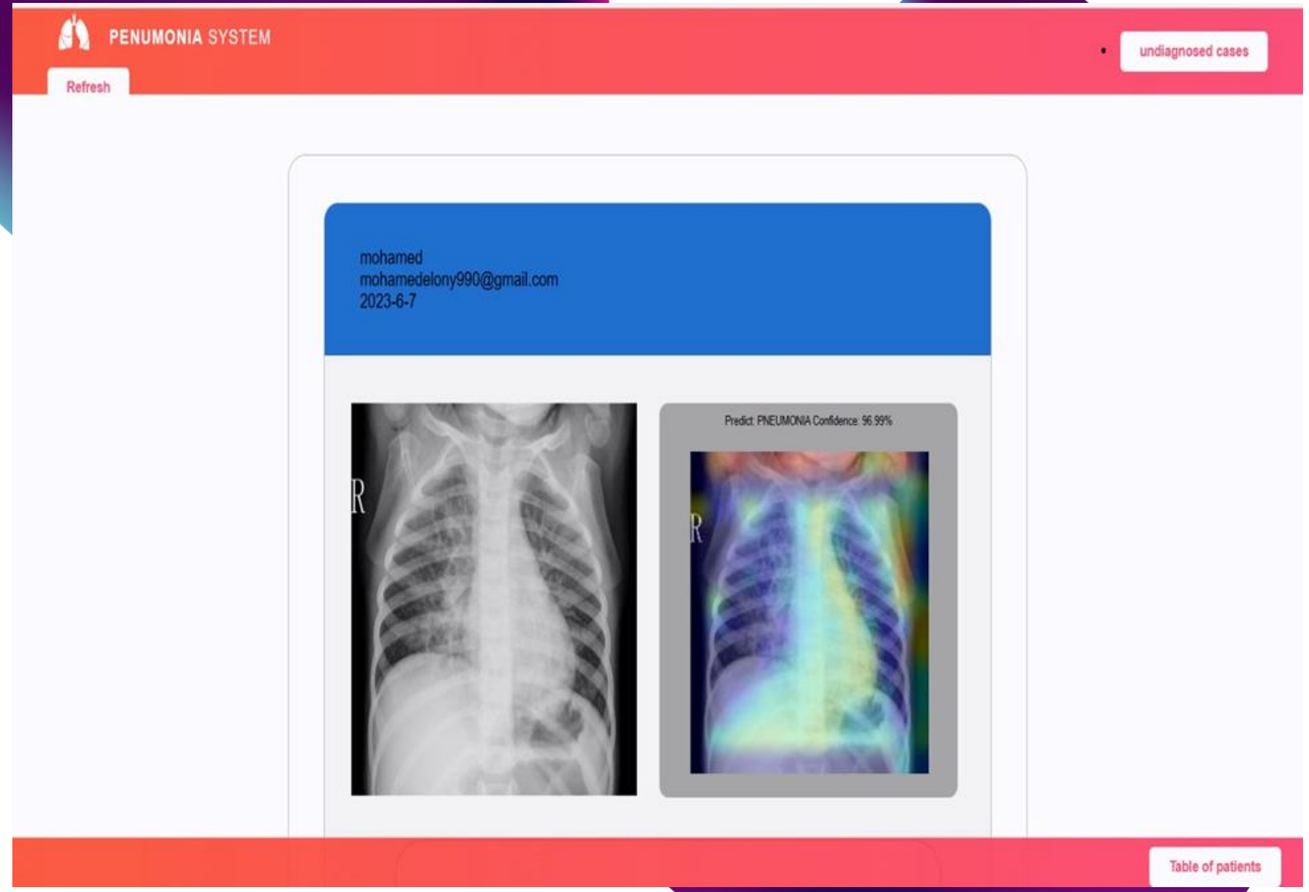
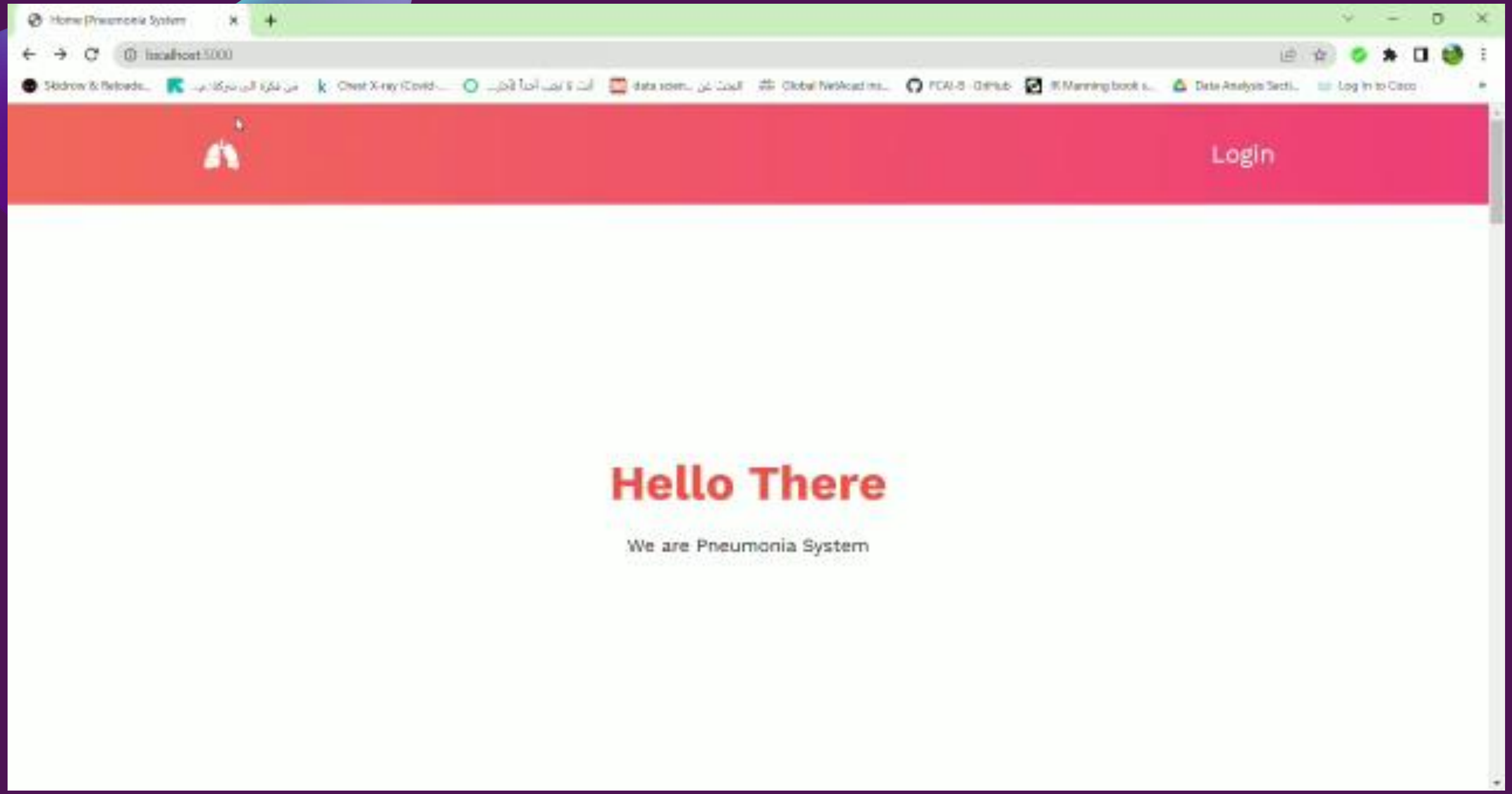


Table Of Patients

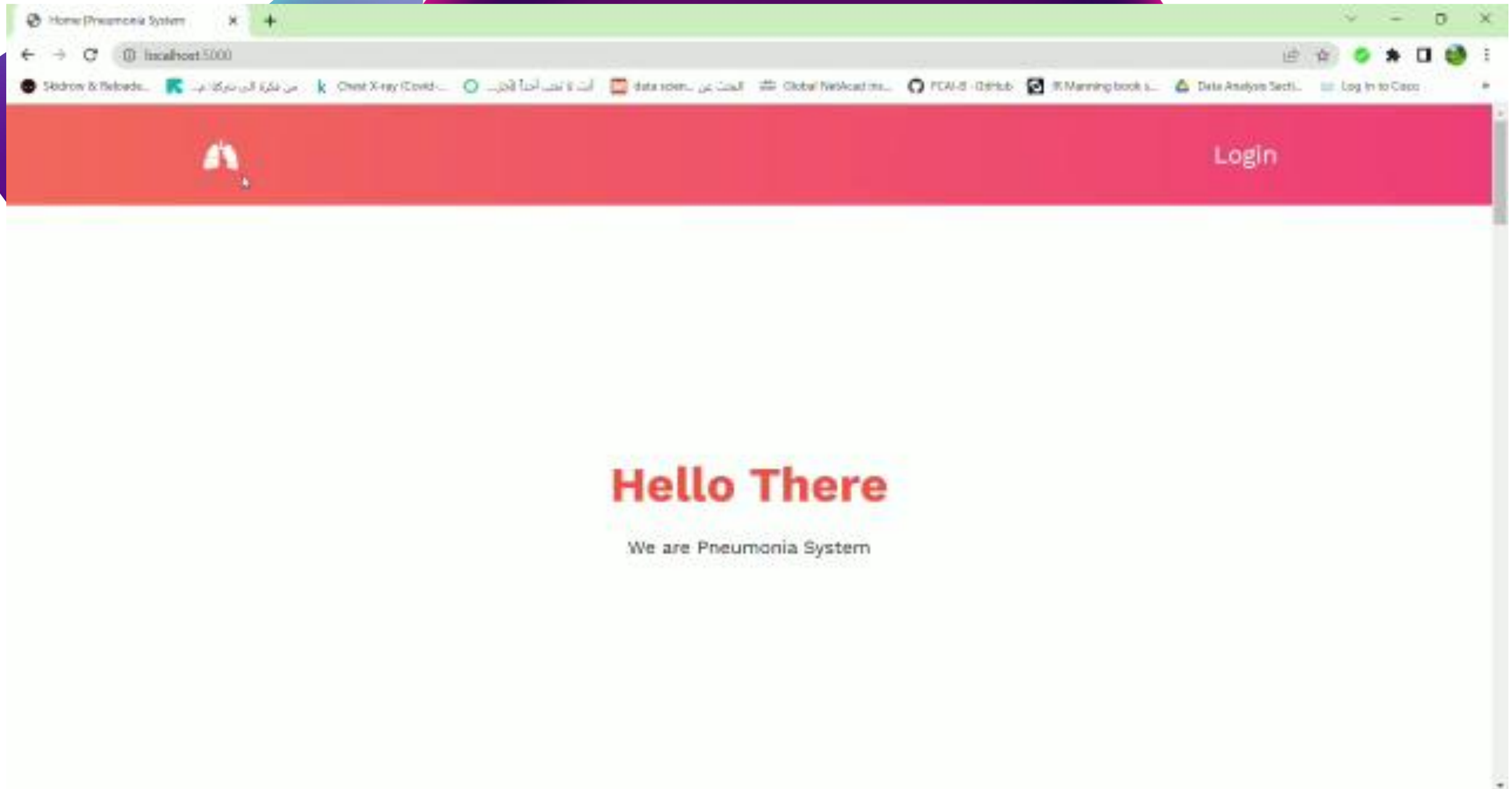
On this page, the data of all the cases on the system are displayed

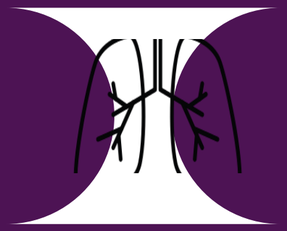
FullName	Email	XRay	Date	Diagnosis	Result
mohamed	mohamedelony990@gmail.com	10/images/WhatsApp Image 2023-04-29 at 5.52.40 PM.jpeg	2023-6-7	Predict: PNEUMONIA Confidence: 99.54%	10/results/WhatsApp Image 2023-04-29 at 5.52.40 PM.jpeg
mohamed	mohamedelony990@gmail.com	10/images/WhatsApp Image 2023-04-29 at 5.52.40 PM.jpeg	2023-6-7	Predict: PNEUMONIA Confidence: 99.54%	10/results/WhatsApp Image 2023-04-29 at 5.52.40 PM.jpeg
mohamed	mohamedelony990@gmail.com	10/images/WhatsApp Image 2023-04-29 at 5.52.36 PM.jpeg	2023-6-7	Predict: PNEUMONIA Confidence: 96.99%	10/results/WhatsApp Image 2023-04-29 at 5.52.36 PM.jpeg
mohamed	mohamedelony990@gmail.com	10/images/WhatsApp Image 2023-04-29 at 1.33.32 PM.jpeg	2023-6-7	Predict: PNEUMONIA Confidence: 96.99%	10/results/WhatsApp Image 2023-04-29 at 1.33.32 PM.jpeg
mohamed	mohamedelony990@gmail.com	10/images/WhatsApp Image 2023-04-29 at 5.52.36 PM.jpeg	2023-6-7	Predict: PNEUMONIA Confidence: 96.99%	10/results/WhatsApp Image 2023-04-29 at 5.52.36 PM.jpeg

video as “user” of system



video as "Admin" of system





♥♥ Thank you ♥♥