



# X-RAY Detection



To make xray readable

## Team members

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# Overview

- COVID-19 continues to have catastrophic effects on the lives of human beings throughout the world. To combat this disease it is necessary to screen the affected patients in a fast and inexpensive way.
- One of the most viable steps towards achieving this goal is through radiological examination, Chest X-Ray being the most easily available and least expensive option.
- Perceiving these limitations, a stand-in approach to detect the disease can be radiography scanning, where chest radiography images can be analyzed to detect the presence of, or the symptoms of the novel coronavirus .
- The application provides an easy way to predict if the person exhibits covid-19 symptoms or not

Project Scope and objective

- The purpose of this document is to build an online x-ray detection application to provide useful information from the x-ray to ease the work of radiologists and help people with a better understanding of the same.
- At times like this when it is not easy to go out and get the report of the x-ray this application can help people or doctors to directly get access of the report from the security of their homes.
- Sometime Doctors are not available when we get report, we have to wait for another day, until then we can know about our illness and take precautions

# Feasibility report



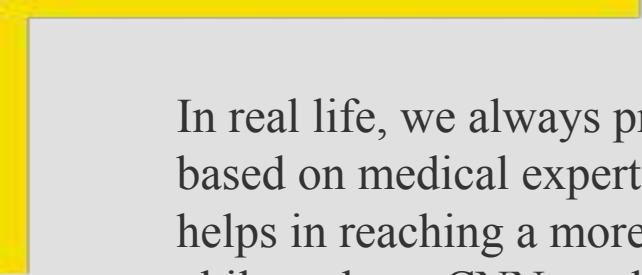
## Innovation and Usefulness

- Studies show that viruses belonging to this family demonstrate significant manifestation in radiographic images . Therefore, it can be said that classification with the help of radiographic images, such as chest X-ray (CXR), can be accurate but at the same time much faster and less expensive than the PCR test.
- The app is developed in such a way that it remains user friendly with simple UI.
- Once signed in you can keep track of all the previous reports and the resources that were provided.

## Market Potential and Competitive advantage

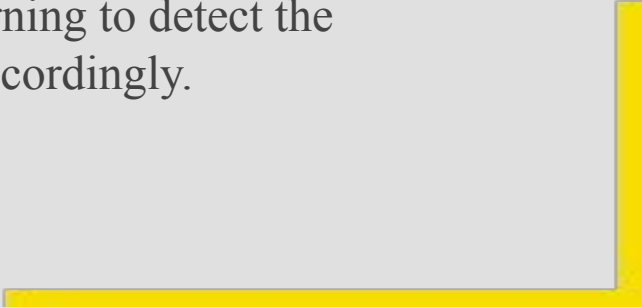
- The x-ray detection app aims to provide a clarity on covid-19 and prevent people from distinguishing normal cold or pneumonia symptoms to covid-19.
- The app has a simple UI which ensures easy navigation and ease of use to all users
- With slight modifications the app can easily detect other lungs related diseases too.

# Proposed Project Model



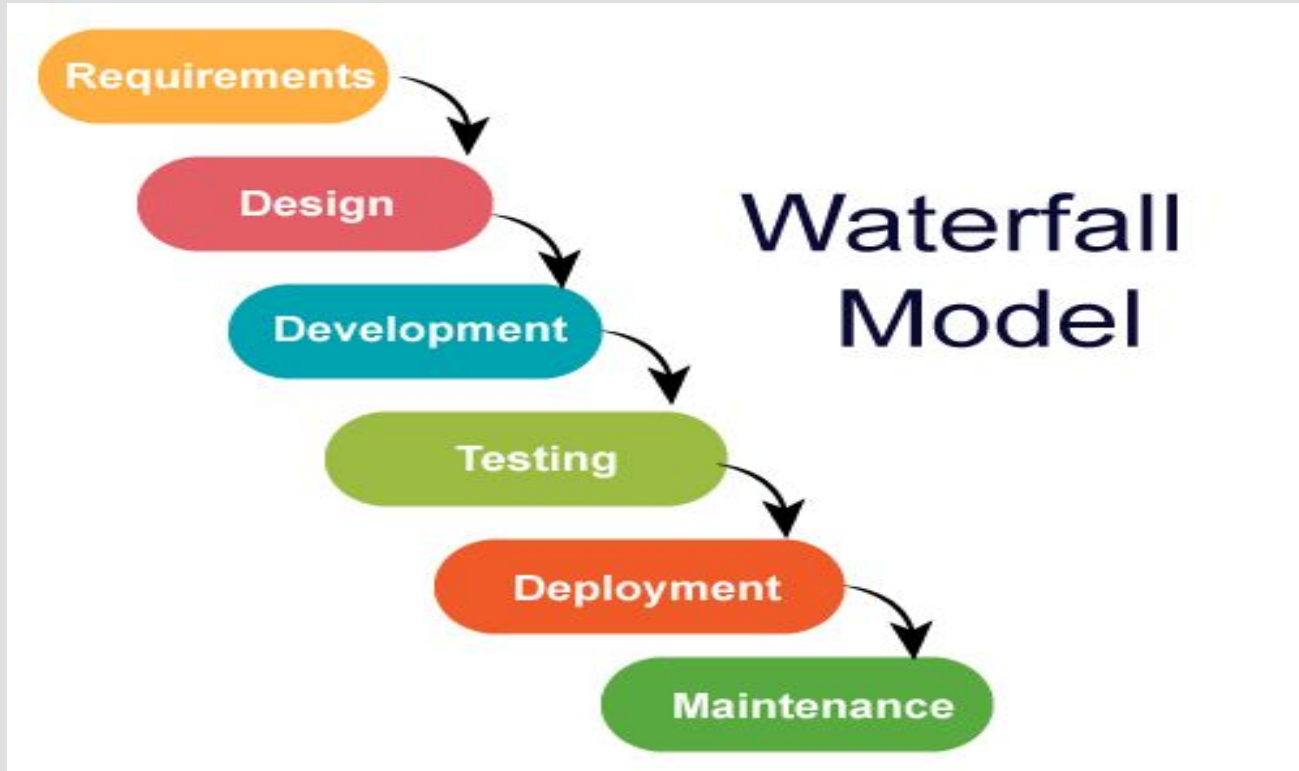
In real life, we always prefer to come up with a medical diagnosis based on medical expert views. The opinion of the medical experts helps in reaching a more reliable conclusion. Following the same philosophy, a CNN model has been adopted in our proposed work.

The idea used to accomplish the project requirements involves training of a cnn(Convolutional Neural Network) model on more than 5000 x-ray images and applying that learning to detect the input x-ray value and generating it's result accordingly.



Proposed process model

# Waterfall Model



# Project Estimation and scheduling





Use case diagram

User

```
graph LR; User((User)) --- Register(Register); User --- Login(Login); User --- Upload(Upload); User --- GenerateReport(Generate report); User --- About(About); User --- Contact(Contact);
```

A UML Use Case Diagram illustrating the interactions between a User and a Website. The User is represented by a stick figure icon. The Website is represented by a large rounded rectangle containing six use cases: Register, Login, Upload, Generate report, About, and Contact. Lines connect the User to each of these use cases, indicating that the User can interact with all of them.

Website

Register

Login

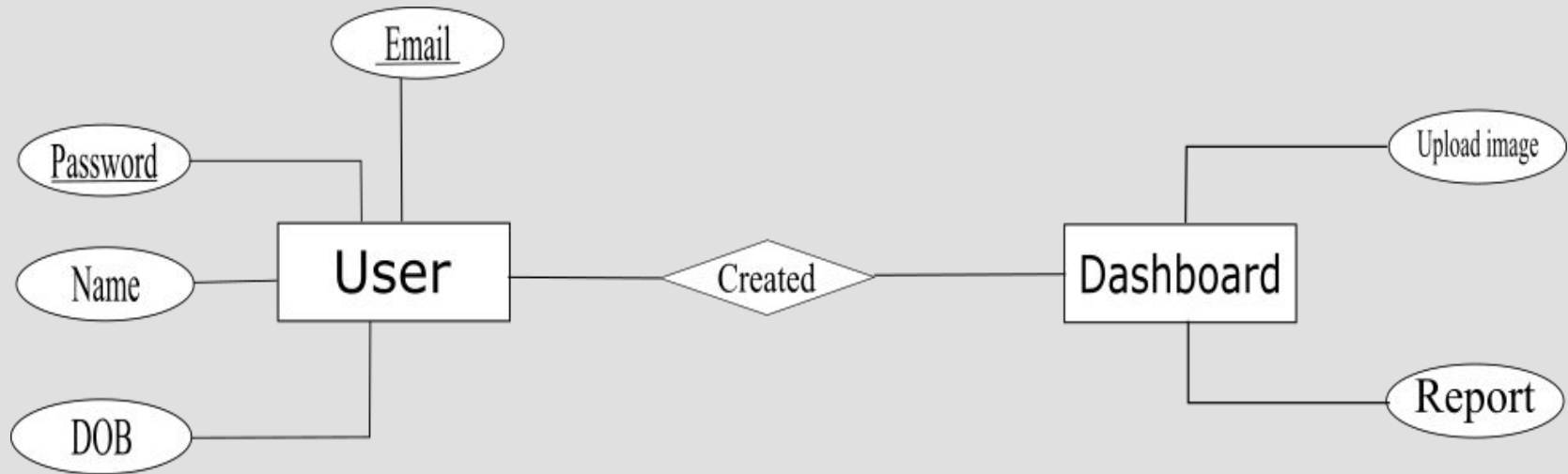
Upload

Generate report

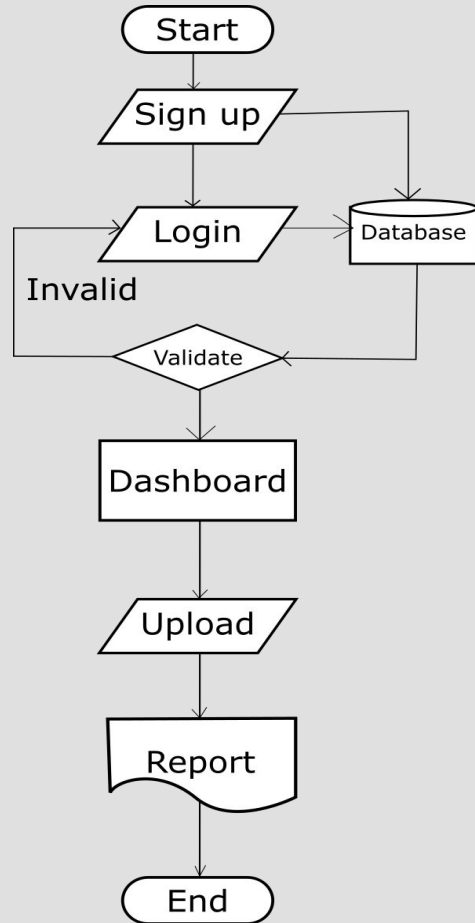
About

Contact

E-R diagram



Data flow diagram



Coding

## Rendering template

```
@app.route('/')  
def signup():  
    return render_template('sample.html')  
  
@app.route('/login.html')  
def login():  
    return render_template('login.html')  
  
@app.route('/upload.html')  
def uploading():  
    return render_template('upload.html')
```



# Upload

```
@app.route("/upload", methods=["POST"])
def upload():
    target = os.path.join(APP_ROOT, 'images/')
    # target = os.path.join(APP_ROOT, 'static/')
    print(target)
    if not os.path.isdir(target):
        os.mkdir(target)
    else:
        print("Couldn't create upload directory: {}".format(target))
    print(request.files.getlist("file"))
    for upload in request.files.getlist("file"):
        print(upload)
        print("{} is the file name".format(upload.filename))
        filename = upload.filename
        destination = "/".join([target, filename])
        print("Accept incoming file:", filename)
        print("Save it to:", destination)
        upload.save(destination)
```

## Prediction

```
import numpy as np
from keras.preprocessing import image
from keras.applications.resnet50 import preprocess_input
from keras.models import load_model
new_model = load_model('model.h5')
new_model.summary()
test_image = image.load_img('images/'+filename,target_size=(224,224))
test_image = image.img_to_array(test_image)
test_image = np.expand_dims(test_image, axis = 0)
test_image = preprocess_input(test_image)
result = new_model.predict(test_image)
result=list(training_set.class_indices)[np.argmax(predictions[0])]
result1 = result[0]
for i in range(6):
    if result1[i] == 1.:
        break;
prediction = classes[i]
```

Testing

# Unit Testing

UNIT TESTING is a type of software testing where individual units or components of a software are tested.

- The purpose is to validate that each unit of the software code performs as expected.
- Unit Testing is done during the development (coding phase) of an application by the developers.

Test case and result

Test Cases	Output	Result
Input covid lungs xray	Covid-19	Pass
Input pneumonia infected lungs X-ray	Pneumonia	Pass
Upload healthy lungs X-ray	Normal	Pass
Upload image not of lungs	Covid-19	Fail

Glimpse of the app



[Home](#) [Contact](#) [About](#)

[Continue](#)



Sign up

Login





## Sign Up



Register



Upload

Choose file

Browse

Show Result



Upload

Report



**COVID19**

Limitation and future work

## Future Enhancements

- We will use multiple state of art models (Inception, DenseNet201, etc)to increase the performance further.
- We will increase the number of classification results i.e., we will train it on a model that will be able to generate more results aside from covid,pneumonia and normal.
- Report will contain personalized suggestions
- The report generated can be shared with just one click

## Limitations

- It only classifies the image as covid-19, pneumonia or normal.

Conclusion

- Fast and timely detection of COVID and pneumonia patients is necessary to avoid spreading the disease and keeping it in control. This project work has been done to detect the COVID +ve and pneumonia patients from Chest X-Ray images in a simple and inexpensive way.
- The proposed model has achieved a classification accuracy of 86.4%. It is believed that this project work along with the GUI interface will help the doctors to detect the affected patients with the help of computer-aided analysis, that too within a few seconds. We believe that this will significantly add value to the medical field.

Thankyou