A MAJOR PROJECT REPORT

ON

# COVID 19 PROBABILITY ESTIMATOR

SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF DEGREE OF

## BACHELOR OF TECHNOLOGY

## IN

## ELECTRONICS AND COMMUNICATION ENGINEERING

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MAY, 2021**

# CERTIFICATE

This is to certify that the major project report entitled, "**COVID 19 PROBABILITY ESTIMATOR"** submitted by "**ANUBHAV BISHT**" in partial fulfillment of the requirements for the award of Bachelor of Technology Degree in **Electronics and Communication Engineering** of the Jaypee Institute of Information Technology, Noida is an authentic work carried out by them under my supervision and guidance. The matter embodied in this report is original and has not been submitted for the award of any other degree.

**Signature of Supervisor(s)**

**Name(s)**

**Department(s)**

**JIIT NOIDA**

Month, Year

# DECLARATION

We hereby declare that this written submission represents our own ideas in our own words and where others ideas or words have been included, have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission.

**Place: JIIT NOIDA**

**Date:11 MAY 2021**

**Name: ANUBHAV BISHT**

**Enrolment: 17102258**

# ABSTRACT

As of late Corona Virus arose as Global Pandemic and took up numerous lives and halted the speed of the world for quite a long time. Particularly it is hard to control in the nations with thick populace like Brazil, India and so on The Cases in India presently have arrived at another high and are more than 3 lakh and as per examines the multiplying pace of this infection is 14 days. This infection is profoundly infectious and lethal. Toward the beginning of the year, late January first case was accounted for in Quite a while from that point the positive cases are expanding on a high speed. Even after lockdown the speed as opposed to easing back is expanding even at a higher speed. There is an analysis that there isn't adequate number of testing in the country, this is basically a direct result of the explanation that there are covered no of testing units accessible in the country and some of the time this is the justification late spotting of contaminated individual and meanwhile this infection can spread to numerous others. An examination uncovers out of complete quantities of test directed a little bit comes out to be positive this ought to be expanded so the test becomes proficient so that tainted individuals are confined quickly supressing the infection spread.

So I have made this COVID 19 Probability Estimator, so individual would self be able to test himself and know the likelihood of that person being tainted by Covid. To test this a MACHINE LEARNING model is made with test boundaries. At whatever point an individual tests himself, his test outcomes message would be shipped off concerned specialists like emergency clinics or area organization. In view of the outcome, authority can make suitable moves.

# ACKNOWLEDGEMENT

It gives me immense pleasure in presenting report on **COVID 19 PROBABILITY ESTIMATOR.** I would like to acknowledge the contribution of my mentor; without their support and guidance this project would not have been concluded. First of all, I thank God, the almighty for blessing me in making my seminar a successful one. I express my sincere gratitude to Dr Akansha Bansal for her guidance and support to shape this project in a systematic way. Her valuable suggestions really helped me in the preparation of the project

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# CHAPTER-1 INTRODUCTION

The epic Covid infection 2019 (COVID-19) pandemic brought about by the SARS-CoV-2 keeps on representing a basic and pressing danger to worldwide wellbeing. The flare-up toward the beginning of December 2019 in the Hubei territory of the People's Republic of China has spread around the world. As of APRIL 2021, the general number of patients affirmed to have the illness has surpassed 149,500,000, in >180 nations, however the quantity of individuals tainted is most likely a lot higher. In excess of 3,110,000 individuals have passed on from COVID-191.
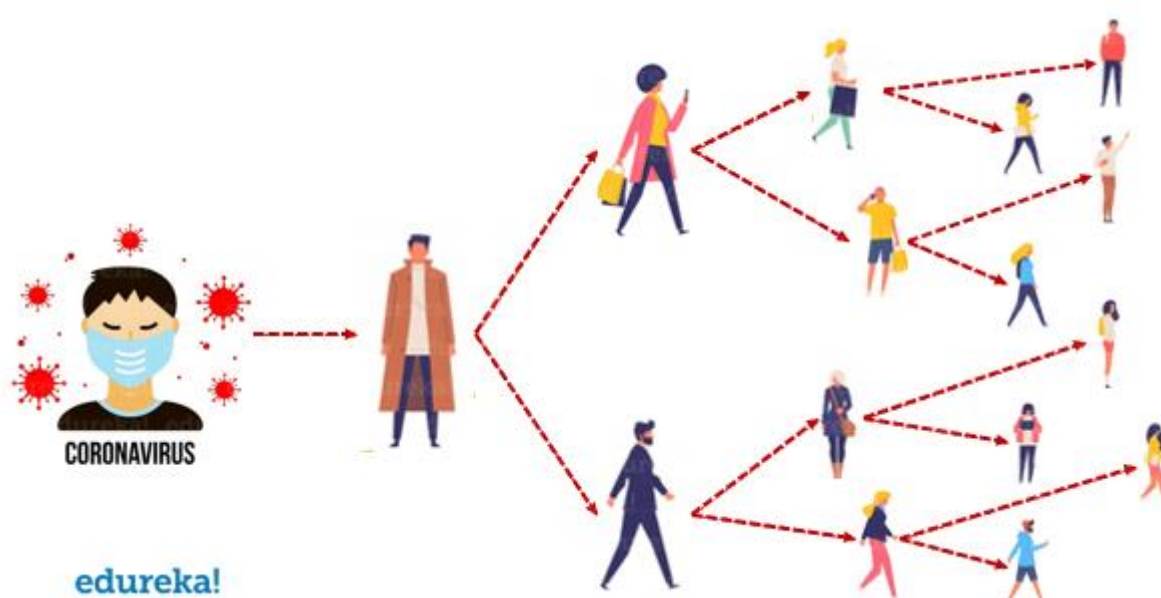


This pandemic keeps on testing clinical frameworks worldwide in numerous angles, remembering sharp increments for requests for emergency clinic beds and basic deficiencies in clinical hardware, while numerous medical care laborers have themselves been contaminated. Along these lines, the limit with regards to prompt clinical choices and successful use of medical services assets is essential. The most approved finding test for COVID-19, utilizing reverse transcriptase polymerase chain response (RT-PCR), has for quite some time been in deficiency in agricultural nations. This adds to expanded disease rates and defers basic preventive measures.Powerful screening empowers speedy and proficient determination of COVID-19 and can moderate the weight on medical care frameworks. Expectation models that join a few highlights to appraise the danger of contamination have been created, in the desire for helping clinical staff worldwide in triaging patients, particularly with regards to restricted medical care assets. These models use highlights like PC tomography (CT) scans, clinical symptoms, lab tests, and an incorporation of these features. Be that as it may, most past models depended on information from hospitalized patients, subsequently are not viable in evaluating for SARS-CoV-2 in everyone.

## Section 1.1: IDEA

- Idea is to stop the transmission by prioritizing tests and hence detecting the cases quickly.
- Data can be collected on symptoms of COVID 19.
- A Machine Learning model is then trained on the data to find out the probability of a person having the infection.
- Model is then used to find out whom to test for infection first.
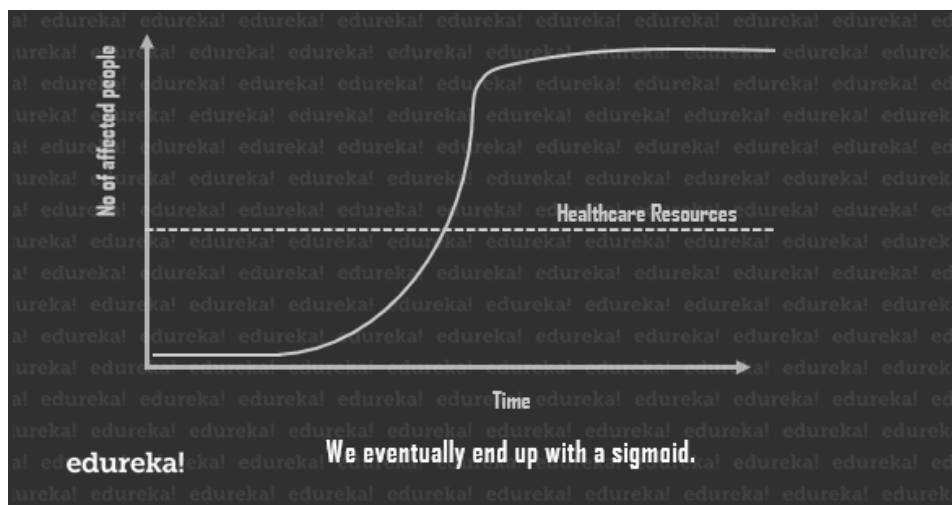- Same model can be used to find potential candidates for conducting random tests.



Fig 1:Exponential Growth due to coronavirus

## Section 1.2:NEED FOR PROJECT

- Number of possible patients outweighs the number of testing kits present in the country.

- The positive to test ratio is not that significant.

- As the cases to be done per day are limited.

- Health Infrastructure of Country is not good.

- Limited number of Ventilators in the country.

- So,This tool is need of the hour.

It Will create a platform for mass accessible to everyone where people can record their responses and the government can prioritize the population for testing. It will record the answers of simple Questionnaire and produce the result using a prediction model.
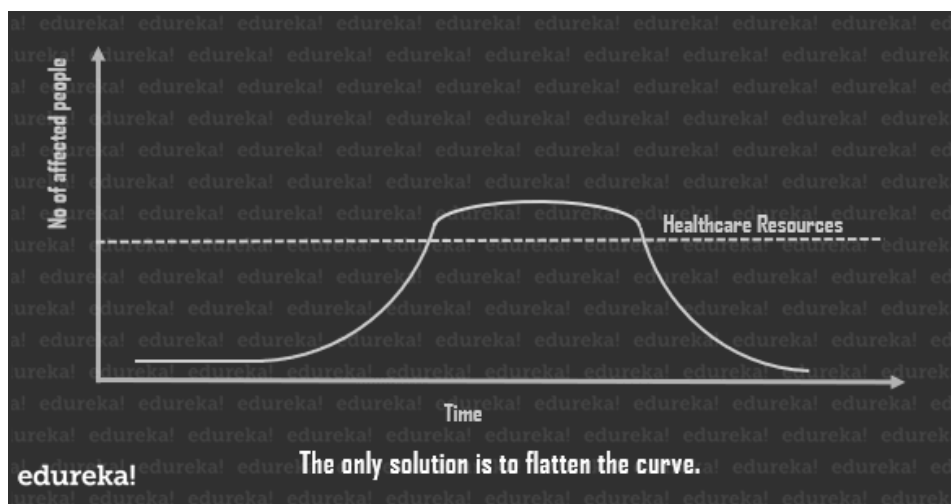


Fig 2:Best case scenario to control the coronavirus

# CHAPTER-2 LITERATURE SURVEY

**ARTICLE NAME**-> Machine learning-based prediction of COVID-19 diagnosis based on symptoms

**AUTHOR**-> Yazeed Zoabi, Shira Deri-Rozov and Noam Shomron

**SUMMARY**-> Powerful screening empowers speedy and proficient determination of COVID-19 and can moderate the weight on medical care frameworks. Expectation models that join a few highlights to appraise the danger of contamination have been created, in the desire for helping clinical staff worldwide in triaging patients, particularly with regards to restricted medical care assets. These models use highlights like PC tomography (CT) scans, clinical symptoms, lab tests, and an incorporation of these features. Be that as it may, most past models depended on information from hospitalized patients, subsequently are not viable in evaluating for SARS-CoV-2 in everyone.

**ARTICLE NAME**-> ML report for regarding COVID-19 using collected text data
**AUTHOR**-> Akib Mohi Khanday and Syed Rabani
**SUMMARY->** Innovation headways rapidly affect each field of life, be it clinical field or some other field. Computerized reasoning has shown the promising outcomes in medical care through its dynamic by examining the information. Coronavirus has influenced in excess of 100 nations in a matter of no time. Individuals everywhere on the world are helpless against its results in future. It is basic to build up a control framework that will identify the Covid. One of the answer for control the ebb and flow devastation can be the finding of sickness with the assistance of different AI instruments. In this paper, we grouped printed clinical reports into four classes by utilizing old style and gathering AI calculations. Highlight designing was performed utilizing methods like Term recurrence/backwards archive recurrence (TF/IDF), Bag of words (BOW) and report length. These highlights were provided to customary and group AI classifiers..

# CHAPTER-3 SOFTWARE AND TECHNOLOGY BEING USED

- Dataset of people is mentioned in Excel sheet(CSV File).We have to arrange the data and preprocess the data first

- Python is the main programming language used for this project and its fundamentals are being used as the main building block

- Machine Learning Algorithm (Random Forest classifier) is used to predict the infection probability.

- To create the website following language will be used HTML,CSS, Javascript, Bootstrap.

- For hosting the website flask server (Python) is used.

- For messaging of test results to govt. authorities, Twilio API (Python)will be used.

# CHAPTER-4 BACKGROUND KNOWLEDGE

## Section 4.1:What is Python?

**Python** is a level universally useful programming language. Python's plan theory underlines code clarity with its eminent utilization of huge space. Its language develops just as its item situated methodology mean to assist software engineers with composing, intelligent code for little and enormous scope projects.

Python is progressively composed and trash gathered. It upholds different programming ideal models, including organized (especially, procedural), object-situated and useful programming.
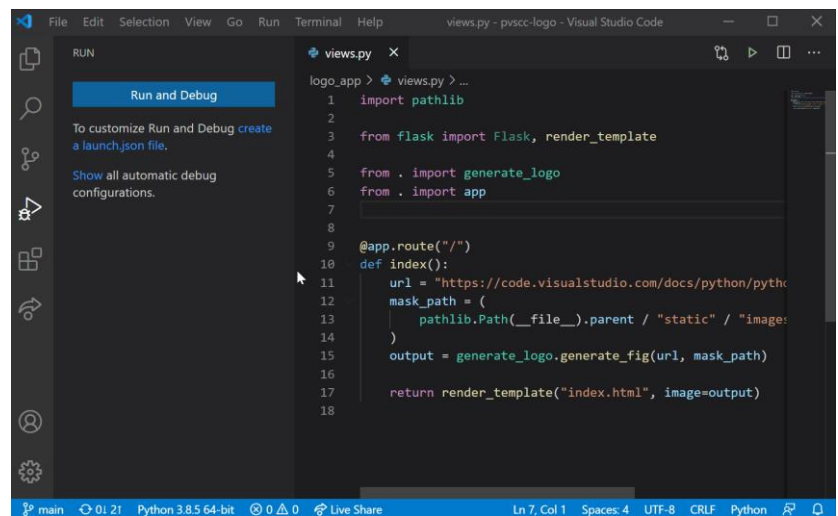
Fig 3:Python Logo                                    Fig 4:Python Code Snippet

Python is usually portrayed as a "batteries included" language due to its complete standard library.

## Section 4.2:What is VS Code?

**Visual Studio Code** is a freeware source-code proofreader made by Microsoft for Windows, Linux and macOS. Highlights incorporate help for troubleshooting, sentence structure featuring, insightful code consummation, bits, code refactoring, and installed Git. Clients can change the subject, console alternate routes, inclinations, and introduce expansions that add extra usefulness.

Microsoft has delivered Visual Studio Code's source code on the microsoft/vscode (Code - OSS) vault of GitHub, under the lenient MIT License, while the deliveries by Microsoft are freeware however not delivered under an open-source permit. Therefore, MIT-authorized doubles have been delivered by different ventures (for example vscodium) that impair Microsoft's inherent telemetry and pack just open-source modules (a portion of Microsoft's are most certainly not). A few creators have condemned this act of adequately quietly delivering two unpretentiously unmistakable items under particular permitting game plans.

In the Stack Overflow 2019 Developer Survey, Visual Studio Code was positioned the most well known engineer climate device, with 50.7% of 87,317 respondents announcing that they use it.



Fig 5 Vs Code Logo
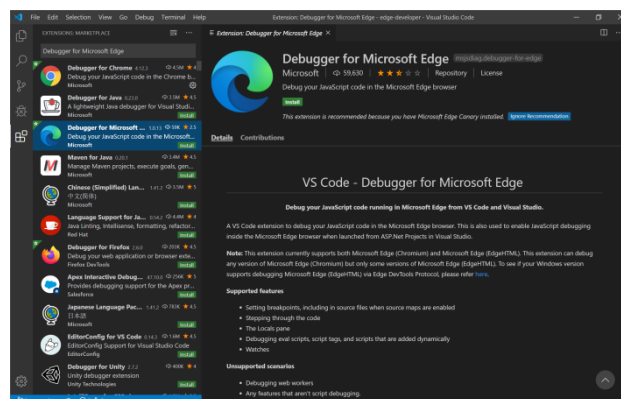


Fig 6 Snippet of Vs Code Workplace

## Section 4.3:What is CsV File?

 A CSV document is a plain book record that contains a rundown of information. These records are regularly utilized for trading information between various applications. For instance, information bases and contact administrators frequently support CSV documents.

These documents may in some cases be called Character Separated Values or Comma Delimited records. They generally utilize the comma character to isolate (or delimit) information, however now and then utilize different characters, similar to semicolons. The thought is that you can trade complex information from one application to a CSV document, and afterward import the information in that CSV record into another application.



Fig 7: Snippet of Csv file

## Section 4.4:What is web development?

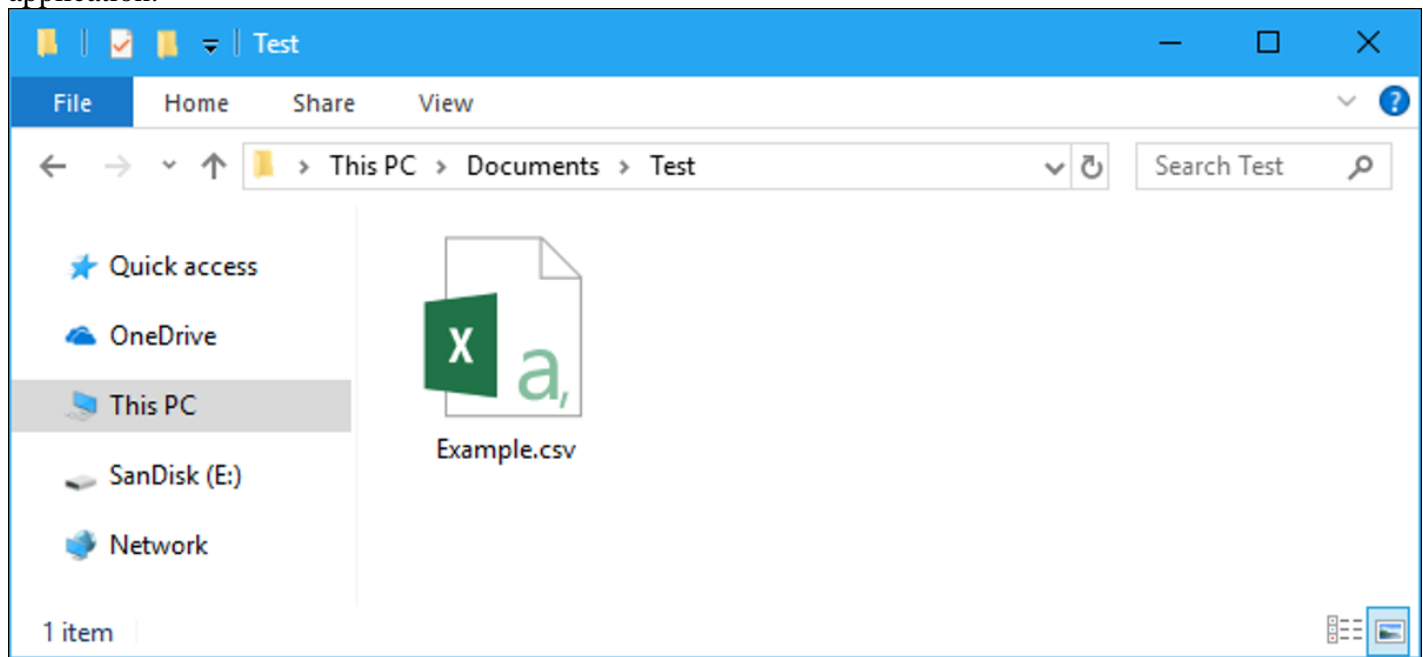Web advancement is that the work related to build up a web site for the net (World Wide net) or AN computer network (a non-public network). electronic organizations, also, social organization administrations. A additional thorough summation of errands to that net advancement usually alludes, could incorporate net planning, web site composition, online page flip of events, client contact, client facet/worker side prearranging, net employee and organization security setup, and on-line business improvement.

An overview:

• HTML provides the essential construction of locales, that is upgraded and altered by totally different advances like CSS and JavaScript.

• CSS is employed to regulate show, arranging, and design.

• JavaScript is employed to regulate the conduct of assorted elements.

Presently, we should always re-examine each one on an individual basis to help you with understanding the roles every plays on a web site and subsequently we'll cowl however they match along. we should always begin with hypertext mark-up language.

### <u>HTML</u>

HTML is at the middle of every web site page, withal the complexity of a webpage or variety of advances enclosed. it is a elementary ability for any net skilful. for anybody deciding the way to create content for the online it's shockingly easy to be told.

### <u>CSS</u>

CSS represents Cascading vogue Sheets. This artificial language directs however the hypertext mark-up language elements of a web site have to be compelled to extremely show au courant the frontend of the page.

## JavaScript

JavaScript may be a additional muzzy language than hypertext mark-up language or CSS, and it wasn't delivered in beta structure till 1995. These days, JavaScript is upheld by all advanced web browsers and is employed on just about each web site on the online for all the additional exceptional and sophisticated quality.

JavaScript may be a principle based mostly artificial language that may be used to change web site substance and cause it to hold on in numerous manners in light-weight of a client's activities. Basic uses for JavaScript incorporate affirmation boxes, suggestions to require action, and adding new personalities to existing knowledge..



Fig8: Web Dev

## Section 4.5: What is Flask?

Flask is a lightweight WSGI web application system. It is intended to make beginning fast and simple, with the capacity to increase to complex applications. It started as a basic covering around Werkzeug and Jinja and has gotten one among the foremost documented Python web application systems.

Flask presents thoughts, however doesn't implement any conditions or venture design. It is dependent upon the engineer to select the apparatuses and libraries they have to utilize. There are a huge number given by the local area that make adding new usefulness simple.



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Fig 9: Flask logo

## Section 4.6: WHAT IS TWILIO API?

The Twilio library  cooperate with the Twilio API from your Python application. after you make an account on its website. The latest form of the library can be found on PyPi. The Twilio Python Helper Library upholds Python applications written in Python 2.7 or more.

Twilio's APIs (Application Programming Interfaces) power its foundation for correspondences. Behind these APIs is a product layer interfacing and upgrading correspondences networks all throughout the planet to permit your clients to call and message anybody, internationally.
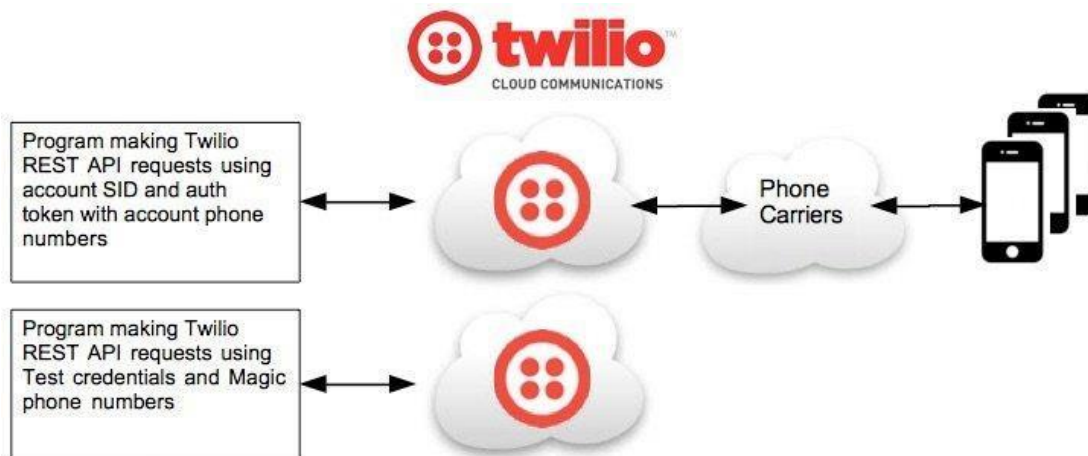


Fig 10: Snippet of Twilio Working

# CHAPTER-5 WORKFLOW OF PROJECT

***Step 1***: Collected and preprocessed the Dataset of 2000 people based on age, fever, body pain, breathing difficulty.

***Step 2***:Trying all the ML models and finding the best ML model among all

***Step 3***: Applying ML Model to earlier collected data to predict probability of COVID 19 and save it for later use

***Step 4***: Deploying a website where you are required to fill your name, address, fever, body

pain in a form.(Creating a webpage)

***Step 5***: Hosting the Website using flask

***Step 6***: Integrating the Inputs that you gave in form and my earlier saved ML model so as to predict the probability of COVID 19.

***Step 7***: Website show result.

***Step 8***: Your test result and information is sent to concerned authority whether you require test or not.

# CHAPTER-6 WORKING OF THE PROJECT

## Step1:Making a Dataset

*Initially what we did was that we did our research that were the main symptoms which were found in coronavirus patients*

➢ A team of doctors can sit down to find out the best model parameters.

➢ We have a taken a sample set of such parameters

### Features

❖ Average Fever - Body temperature will be mentioned here.

❖ Body Pain – Binary (0/1)

- If a person have body pain then "1".

- If not then "0".

❖ AGE – person's age

❖ Runny Nose – Binary (0/1)

- If a person has runny nose then "1".

- If not then "0".

❖ Breathing difficulty – (-1/0/1)

- If there is no difficulty in breathing then "-1".

- If there is little difficulty in breathing then "0".

- If there is severe difficulty then "1".

Thus we organized our dataset of 2000 people based on above features and also what was the infection probability of all people (1 if a person was found to be patient of disease or 0 if a person was normal)

| fever | bodypain | age | runnynose | diffbreath | infectionprob |
|---|---|---|---|---|---|
| 99 | 0 | 2 | 0 | -1 | 0 |
| 98 | 0 | 16 | 0 | -1 | 0 |
| 99 | 0 | 5 | 0 | -1 | 0 |
| 99 | 0 | 19 | 0 | -1 | 0 |
| 98 | 0 | 17 | 0 | -1 | 0 |
| 99 | 0 | 8 | 0 | -1 | 0 |
| 99 | 0 | 17 | 0 | -1 | 0 |
| 98 | 0 | 11 | 0 | -1 | 0 |
| 98 | 0 | 8 | 0 | -1 | 0 |
| 99 | 0 | 13 | 0 | -1 | 0 |
| 99 | 0 | 15 | 0 | -1 | 0 |
| 98 | 0 | 13 | 0 | -1 | 0 |
| 99 | 0 | 1 | 0 | -1 | 0 |
| 98 | 0 | 15 | 0 | -1 | 0 |
| 98 | 0 | 6 | 0 | -1 | 0 |
| 98 | 0 | 10 | 0 | -1 | 0 |
| 99 | 0 | 4 | 0 | -1 | 0 |
| 99 | 0 | 5 | 0 | -1 | 0 |
| 98 | 0 | 4 | 0 | -1 | 0 |
| 99 | 0 | 1 | 0 | -1 | 0 |
| 99 | 0 | 18 | 0 | -1 | 0 |
| 99 | 0 | 5 | 0 | -1 | 0 |
| 98 | 0 | 17 | 0 | -1 | 0 |
| 98 | 0 | 18 | 0 | -1 | 0 |
| 99 | 0 | 17 | 0 | -1 | 0 |
| 99 | 0 | 18 | 0 | -1 | 0 |

Fig 11: Snippet of our dataset

## Step2:Machine Learning Model

Before learning the working of machine learnings steps I implemented there is a bit of overview

### Machine Learning

AI calculations use insights to discover designs in massive* measures of information. Furthermore, information, here, includes a ton of things—numbers, words, pictures, clicks, what have you. On the off chance that it tends to be carefully put away, it tends to be taken care of into an AI calculation. AI is the cycle that powers a large number of the administrations we use today—suggestion frameworks like those on Netflix, YouTube, and Spotify; web crawlers like Google and Baidu; web-based media channels like Facebook and Twitter; voice aides like Siri and Alexa. The rundown goes on. In these examples, every stage is gathering however much information about you as could reasonably be expected—what classifications you like watching, what joins you are clicking,. Or on the other hand, on account of a voice partner, about which words match best with the amusing sounds emerging from your mouth. Honestly, this cycle is very fundamental: discover the example, apply the example. Be that as it may, it practically runs the world.

### What is supervised learning?

Something final you need to know: machine (and profound) learning comes in three flavors: supervised, unsupervised, and reinforcement. In supervised learning, the most pervasive, the information is marked to tell the machine precisely what designs it should search for. Consider it something like a sniffer canine that will chase down targets once it realizes the fragrance it's after. That is the thing that you're doing when you press play on a Netflix show—you're advising the calculation to discover comparative shows.

### What is Classification?

Classificatiion is characterized as the interaction of acknowledgment, comprehension, and gathering of articles and thoughts into preset classes a.k.a "sub-populaces." With the assistance of these pre-sorted preparing datasets, grouping in AI programs influence a wide scope of calculations to order future datasets into individual and pertinent classifications.

Order calculations utilized in AI use input preparing information to foresee the probability or likelihood that the information that follows will can be categorized as one of the foreordained classifications. Quite possibly the most widely recognized uses of grouping is for sifting

messages into "spam" or "non-spam", as utilized by the present top email specialist co-ops.

To put it plainly, order is a type of "design acknowledgment,". Here, grouping calculations applied to the preparation information track down a similar example (comparative number arrangements, words or opinions, and such) in future informational collections.

We will investigate grouping calculations in detail, and find how a content examination programming can perform activities like estimation investigation - utilized for arranging unstructured content by assessment extremity (positive, negative, nonpartisan, and such).

*Now I will Try all the ML models(Classification based) and finding the best ML model among all*

**1.Logistic Regression**: Logistic is an arrangement calculation, utilized when the worth of the objective variable is clear cut in nature. Calculated relapse is most generally utilized when the information being referred to has parallel yield, so when it has a place with some class, or is either a 0 or 1.

**2.Random Forest Classifier:** Random Forest or irregular choice woodlands are a troupe learning strategy for arrangement, relapse and different assignments that works by developing a huge number of choice trees at preparing time and yielding the class that is the method of the classes (characterization) or mean/normal expectation (relapse) of the individual trees.Random choice timberlands right for choice trees' propensity for overfitting to their preparation set. Random Forest for the most part outflank choice trees, yet their exactness is lower than slope helped trees.

**3.K nearest neighbor:**

K-Nearest Neighbor is an order and forecast calculation that is utilized to split information into classes dependent on the distance between the information focuses. K-Nearest Neighbor expects that information focuses which are near each other should be comparative and thus, the information highlight be characterized will be gathered with the nearest group

**4.Support Vector Machine:**

In AI, support-vector machines (SVMs, additionally support-vector networks) are administered learning models with related learning calculations that break down information for arrangement and relapse investigation. Created at AT&T Bell Laboratories by Vladimir Vapnik with partners (Boser et al., 1992, Guyon et al., 1993, Vapnik et al., 1997), SVMs are

perhaps the most vigorous forecast strategies, being founded on measurable learning systems or VC hypothesis proposed by Vapnik and Chervonenkis (1974) and Vapnik (1982, 1995). a SVM preparing calculation fabricates a model that doles out new guides to one classification or the other, making it a non-probabilistic twofold direct classifier (in spite of the fact that techniques, for example, Platt scaling exist to utilize SVM in a probabilistic arrangement setting). SVM maps preparing guides to focuses in space in order to amplify the width of the hole between the two classifications. New models are then planned into that equivalent space and anticipated to have a place with a classification dependent on which side of the hole they fall.

***Here is a code snippet which I wrote to find the best model among these:***

```
from sklearn import svm
from sklearn.ensemble import RandomForestClassifier as RFC
from sklearn.metrics import accuracy_score
from sklearn.linear_model import LogisticRegression
from sklearn.preprocessing import StandardScaler
from sklearn.ensemble import RandomForestClassifier
import pandas as pd
import numpy as np
import pickle


patientdata = pd.read_csv("data.csv")



def splitpatientdata(data, ratio):
    np.random.seed(42)
    shuffled = np.random.permutation(len(data))
    testsetsize = int(len(data)*ratio)
    testindices = shuffled[:testsetsize]
    trainindices = shuffled[testsetsize:]
    return data.iloc[trainindices], data.iloc[testindices]



train, test = splitpatientdata(patientdata, 0.2)
```

```
X_train = train[['fever', 'bodypain', 'age',
          'runnynose', 'diffbreath']].to_numpy()
X_test = test[['fever', 'bodypain', 'age',
          'runnynose', 'diffbreath']].to_numpy()


Y_train = train[['infectionprob']].to_numpy()
Y_test = test[['infectionprob']].to_numpy()


clf = svm.SVC(kernel='linear', C=0.5, gamma=50, probability=1)
clf.fit(X_train, Y_train)
y_pred = clf.predict(X_train)
```

**These are the results of my findings:**

| ML Model | Training Data Accuracy | Testing Data Accuracy |
|---|---|---|
| 1.Logistic regression | 0.68 | 0.619 |
| 2.Random forest Classifier | 0.959 | 0.66 |
| 3.KNN | 0.77 | 0.61 |
| 4.SVM | 0.69 | 0.64 |

*So from my findings I found out that Random Forest Classifier is the best ML model*

# Step3:Applying the Machine Learning Model to the dataset

Now I will apply Random Forest Classifier to my dataset

Here is the code snippet

```python
from sklearn.preprocessing import StandardScaler

from sklearn.ensemble import RandomForestClassifier

import pandas as pd

import numpy as np

import pickle

# first read data from csv file

patientdata = pd.read_csv("data.csv")


# train test split data for applying machine learning model



def splitpatientdata(data, ratio):

    np.random.seed(42)

    shuffled = np.random.permutation(len(data))

    testsetsize = int(len(data)*ratio)

    testindices = shuffled[:testsetsize]

    trainindices = shuffled[testsetsize:]

    return data.iloc[trainindices], data.iloc[testindices]


# 20% of patientdata will go to test set data(which will be used to test your ML output)

# and 80% of patientdata will go to train set data

# which will be used for making the ML model



train, test = splitpatientdata(patientdata, 0.2)

# Now start making ML Model
```

```python
# Now we will remove infectionprob from train set and test set as
# we want to apply ML model on the data and we dont result(infectionprob)
# already there


X_train = train[['fever', 'bodypain', 'age',
            'runnynose', 'diffbreath']].to_numpy()
X_test = test[['fever', 'bodypain', 'age',
            'runnynose', 'diffbreath']].to_numpy()
# Now we want a seperate data set of result(infectionprob)
Y_train = train[['infectionprob']].to_numpy()
Y_test = test[['infectionprob']].to_numpy()
# Apply ML model in this project we are using RandomForestClassifier to
# estimate output
model = RandomForestClassifier(n_estimators=100,
                    bootstrap=True,
                    max_features='sqrt')
# now we will fit model on the above X_train and Y_train
model.fit(X_train, Y_train)
inputfeatures = [100, 1, 75, 1, 0]
infectionprobabilty = model.predict_proba([inputfeatures])[0][1]
print(infectionprobabilty)
# open a file where you want to store data
file = open('model.pkl', 'wb')
# dump information to that file
pickle.dump(model, file)
file.close()
```

*Now I will save this model for my later use*

## Step4:Making a Website

Now we will make a form type website so that a user can fill out his information Such as name age,age,address,phone number and his fever , runny nose ,body pain And then website will show the result according the machine learning model saved earlier

Here is a snippet of our website



Fig 12: Snippet of our website

*Given below is the code for reference*

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <!-- Required meta tags -->
    <meta charset="utf-8" />
    <meta
      name="viewport"
      content="width=device-width, initial-scale=1, shrink-to-fit=no"
    />

    <!-- Bootstrap CSS -->
    <link
      rel="stylesheet"
      href="https://stackpath.bootstrapcdn.com/bootstrap/4.4.1/css/bootstrap.min.css"
      integrity="sha384-
Vkoo8x4CGsO3+Hhxv8T/Q5PaXtkKtu6ug5TOeNV6gBiFeWPGFN9MuhOf23Q9Ifjh"
```

```html
        crossorigin="anonymous"
    />

    <title>Covid 19 Infection Probability Detector</title>
  </head>
  <body>
    <nav class="navbar navbar-expand-lg navbar-dark bg-dark">
      <a class="navbar-brand" href="#">Probability Estimator</a>
      <button
        class="navbar-toggler"
        type="button"
        data-toggle="collapse"
        data-target="#navbarSupportedContent"
        aria-controls="navbarSupportedContent"
        aria-expanded="false"
        aria-label="Toggle navigation"
      >
        <span class="navbar-toggler-icon"></span>
      </button>

      <div class="collapse navbar-collapse" id="navbarSupportedContent">
        <ul class="navbar-nav mr-auto">
          <li class="nav-item active">
            <a class="nav-link" href="#"
              >About Us <span class="sr-only">(current)</span></a
            >
          </li>
          <li class="nav-item">
            <a class="nav-link" href="#">Contact Us</a>
          </li>
        </ul>
        <form class="form-inline my-2 my-lg-0">
          <input
            class="form-control mr-sm-2"
            type="search"
            placeholder="Search"
            aria-label="Search"
          />
          <button class="btn btn-outline-success my-2 my-sm-0" type="submit">
            Search
          </button>
        </form>
      </div>
    </nav>
    <div class="container">
      <h2 class="text-center mt-3">Covid 19 Probability Detector</h2>
      <form action="/" method="POST">
        <div class="form-group">
          <label for="fever">Enter Patient Name</label>
          <input
            type="text"
            class="form-control"
            id="name"
            name="name"
            placeholder="name"
```

```
          />
        </div>
        <div class="form-group">
          <label for="fever">Enter your full address</label>
          <input
            type="text"
            class="form-control"
            id="address"
            name="address"
            placeholder="address"
          />
        </div>
        <div class="form-group">
          <label for="fever">Contact Number</label>
          <input
            type="text"
            class="form-control"
            id="no."
            name="no."
            placeholder="no."
          />
        </div>
        <div class="form-group">
          <label for="fever">Enter Fever Value</label>
          <input
            type="text"
            class="form-control"
            id="fever"
            name="fever"
            placeholder="enter fever in fahrenheit"
          />
        </div>
        <div class="form-group">
          <label for="age">Enter your age</label>
          <input
            type="text"
            class="form-control"
            id="age"
            name="age"
            placeholder="enter age"
          />
        </div>
        <div class="form-group">
          <label for="exampleFormControlSelect1">Body Pain</label>
          <select class="form-control" id="pain" name="pain">
            <option value="0">No Pain</option>
            <option value="1">Severe Pain</option>
          </select>
        </div>
        <div class="form-group">
          <label for="exampleFormControlSelect1">Do you have runny nose</label>
          <select class="form-control" id="runny nose" name="runny nose">
            <option value="0">No</option>
            <option value="1">Yes</option>
          </select>
```

```
      </div>
      <div class="form-group">
        <label for="exampleFormControlSelect1"
          >Do you have difficulty in breathing</label
        >
        <select class="form-control" id="difficulty" name="difficulty">
          <option value="-1">No difficulty</option>
          <option value="0">Mild difficulty</option>
          <option value="1">Severe difficulty</option>
        </select>
      </div>
      <button class="btn btn-primary">Submit</button>
    </form>
  </div>
  <div class="container">
    <h2 class="text-center mt-3">Covid 19 Probability Detector</h2>
  </div>
  <!-- Optional JavaScript -->
  <!-- jQuery first, then Popper.js, then Bootstrap JS -->
  <script
    src="https://code.jquery.com/jquery-3.4.1.slim.min.js"
    integrity="sha384-
J6qa4849blE2+poT4WnyKhv5vZF5SrPo0iEjwBvKU7imGFAV0wwj1yYfoRSJoZ+n"
    crossorigin="anonymous"
  ></script>
  <script
    src="https://cdn.jsdelivr.net/npm/popper.js@1.16.0/dist/umd/popper.min.js"
    integrity="sha384-
Q6E9RHvbIyZFJoft+2mJbHaEWldlvI9IOYy5n3zV9zzTtmI3UksdQRVvoxMfooAo"
    crossorigin="anonymous"
  ></script>
  <script
    src="https://stackpath.bootstrapcdn.com/bootstrap/4.4.1/js/bootstrap.min.js"
    integrity="sha384-
wfSDF2E50Y2D1uUdj0O3uMBJnjuUD4Ih7YwaYd1iqfktj0Uod8GCExl3Og8ifwB6"
    crossorigin="anonymous"
  ></script>
  </body>
</html>
```

## Step 5:Integrating our machine learning model and website and deployment using Flask

### How is Flask involved?

We will compose code that will deal with the worker side handling. Our code will get demands. It will sort out the thing those solicitations are managing and what they are inquiring. It will likewise sort out what reaction to ship off the client.

To do all this we will use Flask.

### How Does a Flask App Work?

The code lets us run a basic web application that we can serve, as if it were a website.

```python
from flask import Flask
app = Flask(___name___)
@app.route("/")
def home():
    return "Hello, World!"


if __name__ == "___main___":
    app.run(debug=True)
```

These lines of codes are in our main.py.

Line 1: Here we are bringing in the Flask module and making a Flask web worker from the Flask module.

Line 3: name means this current record. For this situation, it will be main.py. This current record will address my web application.

We are making an example of the Flask class and calling it application. Here we are making another web application.

Line 6–7: When the client goes to my site and they go to the default page (nothing after the cut), at that point the capacity beneath will get actuated.

Line 9: When you run your Python script, Python allots the name " main " to the content when executed

On the off chance that we import another content, the if proclamation will keep different contents from running. At the point when we run main.py, it will change its name to principle and really at that time will that if proclamation actuate.

Line 10: This will run the application. Having debug=True permits conceivable Python blunders to show up on the page. This will help us follow the blunders.

## **Step-6:Final Website and messaging of result**

Now what will happen is webpage will get shown to user and he needs to fill all of this necessary details and then all of these details will be collected by Flask and woul serve our backend ML models all its necessary inputs and then ML model would work and would compute the output for the given input and then it would send the results to Flask model and Flask model would then render another webpage and would show the user the result of its test After someone fills his form and he gets his result from site His result is automatically is sent to Govt official with all his details so that government can track down the location of person and can contact him to know his condition if his test result probability is more than 50%

**Let say Anubhav fill his info and is suffering from no symptoms**

Enter Patient Name

Anubhav Bisht

Enter your full address

vaishali

Contact Number

323123

Enter Fever Value

98

Enter your age

22

Body Pain

No Pain
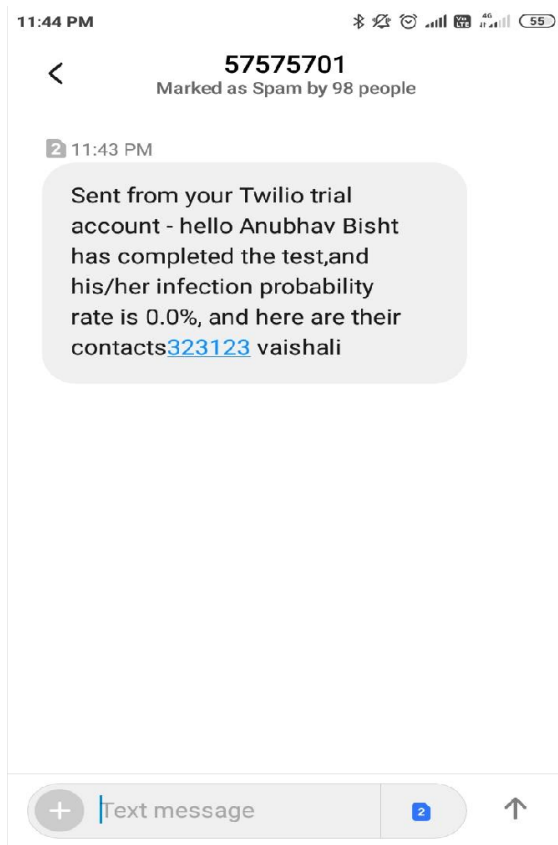
Do you have runny nose

No

**Output of his result**

# Covid 19 Probability Detector

patient probability of infection is 0.0%

Thanks for using our service,covid hospital will contact you if needed

Go Back

**Message Received By government official**

11:44 PM

## 57575701
Marked as Spam by 98 people

11:43 PM

Sent from your Twilio trial account - hello Anubhav Bisht has completed the test,and his/her infection probability rate is 0.0%, and here are their contacts323123 vaishali

Text message

**Now Let say Sachin fill his info and is suffering from symptoms of coronavirus**

Enter Patient Name

Sachin Kumar

Enter your full address

Agra

Contact Number

234324

Enter Fever Value

101

Enter your age

22

Body Pain

Severe Pain

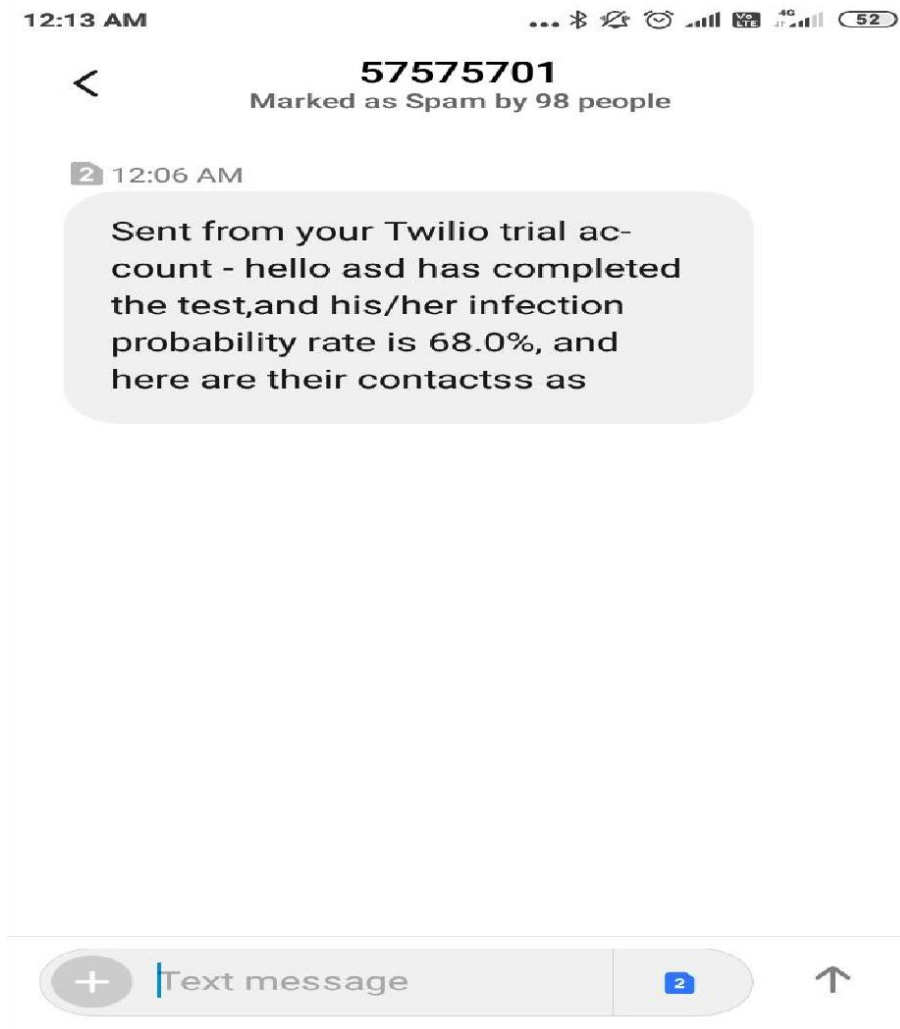Do you have runny nose

Yes

# Covid 19 Probability Detector

patient probability of infection is 68.0%

Thanks for using our service,covid hospital will contact you if needed

Go Back

**Output of his result**

**Message Received By government official**



*Code snippet:*

```
import pickle

from flask import Flask, render_template, request
app = Flask(__name__)

# open a file where you store the pickled data
file = open('model.pkl', 'rb')
clf = pickle.load(file)
```

file.close()

```python
@app.route('/', methods=['GET', 'POST'])
def hello_world():
    if request.method == "POST":
        from twiliocred import my_sid, my_auth_token, my_cell, my_twilio
        from twilio.rest import Client
        mydict = request.form
        name = str(mydict['name'])
        address = str(mydict['address'])
        contact = str(mydict['no.'])
        fever = int(mydict['fever'])
        age = int(mydict['age'])
        bodypain = int(mydict['pain'])
        runnynose = int(mydict['runny nose'])
        diffbreath = int(mydict['difficulty'])
        # code for interfernce
        inputfeatures = [fever, bodypain, age, runnynose, diffbreath]
        infectionprobabilty = clf.predict_proba([inputfeatures])[0][1]
        prob = round(infectionprobabilty*100)
        # print(infectionprobabilty)
        client = Client(my_sid, my_auth_token)
        my_msg = "hello {} has completed the test,and his/her infection probability rate is {}%,
and here are their contacts{} {}".format(
            name, str(prob), contact, address)  # enter your message
        message = client.messages.create(
            to=my_cell, from_=my_twilio, body=my_msg)
        return render_template('show.html', inf=round(infectionprobabilty*100))
    return render_template('index.html')


if __name__ == '__main__':
    app.run
```

```
# in this file you enter your credentials which can be used for sending
# messages


# here enter your unique sid number from twilio site
my_sid = 'AC8ecbb94fe1174665a7cb82a67fd5105d'
# here enter your unique authorised token from twilio site
my_auth_token = 'dd10c4aa36620ede9242d288f82f418f'
# here enter the reciever mobile number which has to be verified by your twilio account
beforehand
    my_cell = '+918368328899'
    # here enter your unique twilio number which acts as sender
my_twilio = '+13613360886'
```

# CHAPTER-7 CONCLUSION

The objective of the project has been achieved which was to develop "COVID-19 Probability Estimator". From observations that have been made, it clearly shows that it's working is accurate. The project has been developed successfully.

# CHAPTER-8 KNOWLEDGE GAINED

• Organizing Data in csv file and using excel function for basic mathematical computation

• Machine Learning and Machine Learning Algorithms such as Random Classifier and how to handle rigorous libraries such as scikit Learn

• Python language and how to use its libraries

• Web Development - HTML, CSS, JavaScript

• Web Hosting Using Flask

• Management and Technical Skills

• And most important knowledge was how to deal with a real world problem like Coronavirus Pandemic and design a solution for the world using our basic knowledge of computer science so that coronavirus testing can be prioritized in countries such as India who have a large population

# CHAPTER-9 FUTURE SCOPE

Currently this project is in a webpage form so I want to increase its functionality by implementing in the form of web app and native app . Also the dataset for which it has been implemented is for 2000 people and  it was made for personal use So it would be interesting to see how it works in real life scenario.Also it would be good to add more features to this project like as vaccination is starting soon so I would like to incorporate this too so that vaccination process gets easier for government and the people

# CHAPTER-10 REFERENCES

[1]  T. O'Shea and J. Hoydis, "An introduction to deep learning for the physical layer," IEEE Trans. on Cogn. Commun. Netw., vol. 3, no. 4, pp. 563–575, Dec. 2017.

[2]  Zoabi, Yazeed, Shira Deri-Rozov, and Noam Shomron. "Machine learning-based prediction of COVID-19 diagnosis based on symptoms." npj Digital Medicine 4.1 (2021): 1-5.

[3]  Khanday, Akib Mohi Ud Din, et al. "Machine learning based approaches for detecting COVID-19 using clinical text data." *International Journal of Information Technology* 12.3 (2020): 731-739

[4]  I. Goodfellow, Y. Bengio, and A. Courville, Deep Learning. MIT Press, 2016. [Online]. Available: http://www.deeplearningbook.org

[5]  S. Dörner, S. Cammerer, J. Hoydis, and S. ten Brink, "Deep learning based communication over the air," IEEE J. Sel. Topics Signal Process., vol. 12, no. 1, pp. 132– 143, Feb. 2018.

[6]  R. S. Sutton and A. G. Barto, Reinforcement learning: An introduction. Cambridge: MIT Press, 1998, vol. 1, no. 1.

[7]  Random Forest Machine Learning Algorithm"https://scikitlearn.org/stable/modules/generated/sklearn.ensemble.RandoForestClassifier.html