Peripheral Facial Paralysis Detection

A Project report submitted in partial fulfilment of the requirements for the award of the degree of

Bachelor of technology

in

Computer Science and Engineering

By

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Group No.-152

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Institute of Engineering & Technology

Declaration

We hereby declare that the work which is being submitted here **Peripheral Facial Paralysis Detection** under the Major Project (2022-23) conducted in GLA University, Mathura. The contents of this project report, in full or in parts, have not been submitted to any other organization or company for any award or title.

Team Members:

1. Astha Verma
2. Deeksha

Acknowledgement

First and foremost, we would like to take this opportunity to thank our faculty for giving as this opportunity . No work can be carried out without the help and guidance of various people. We are extremely delighted to take this golden chance to express our sincere gratitude to those who have been helpful to us in making this project successful. We would like to say special thanks to Mr. Neeraj Varshney sir. His valuable suggestions and remarks made our project a more meaningful one. Last but not least, we would like to thank our parents for their immense support during the project.

Abstract

In this project we are working on developing a WebApp for Peripheral Facial paralysis detection using CNN. We are training a dataset of 1000 + images for detecting the disease.

We are developing a WebApp using HTML, CSS, Bootstrap, JS. This application will be user friendly. User can detect the disease using the pre-trained model. We are creating server using Flask Framework.

In the home page we are providing the facility of analysing the image of the palsy suffered patient. This page will let the user click a photo or upload an image from a given option from the system. After uploading the image the user will be getting the results if the patient is suffered from Peripheral Facial Palsy or not.

Content

Introduction

1.1 Overview

Peripheral facial paralysis is one of the commonest mononeuropathies. The frequency of idiopathic peripheral paralysis or Bell's palsy varies between 62% and 93% of all cases, with an incidence of between 14 and 25 cases per 100,000 inhabitants per year. Facial Paralysis does not affect only movement of facial activities but also affects the mental health which includes Social Alienation, Depression, Emotional vulnerability due to loss of beauty. It’s very important to detect facial paralysis on its early stage so that it can be recovered before the fall of its physical as well as mental damage.

1.2 Problem Statement

Developing a user friendly Application which can detect the peripheral facial paralysis using CNN. This application will be using a pre-trained model in the backend. It will result the accuracy of recovery rate by detecting the facial keypoints .

1.3 Motivation

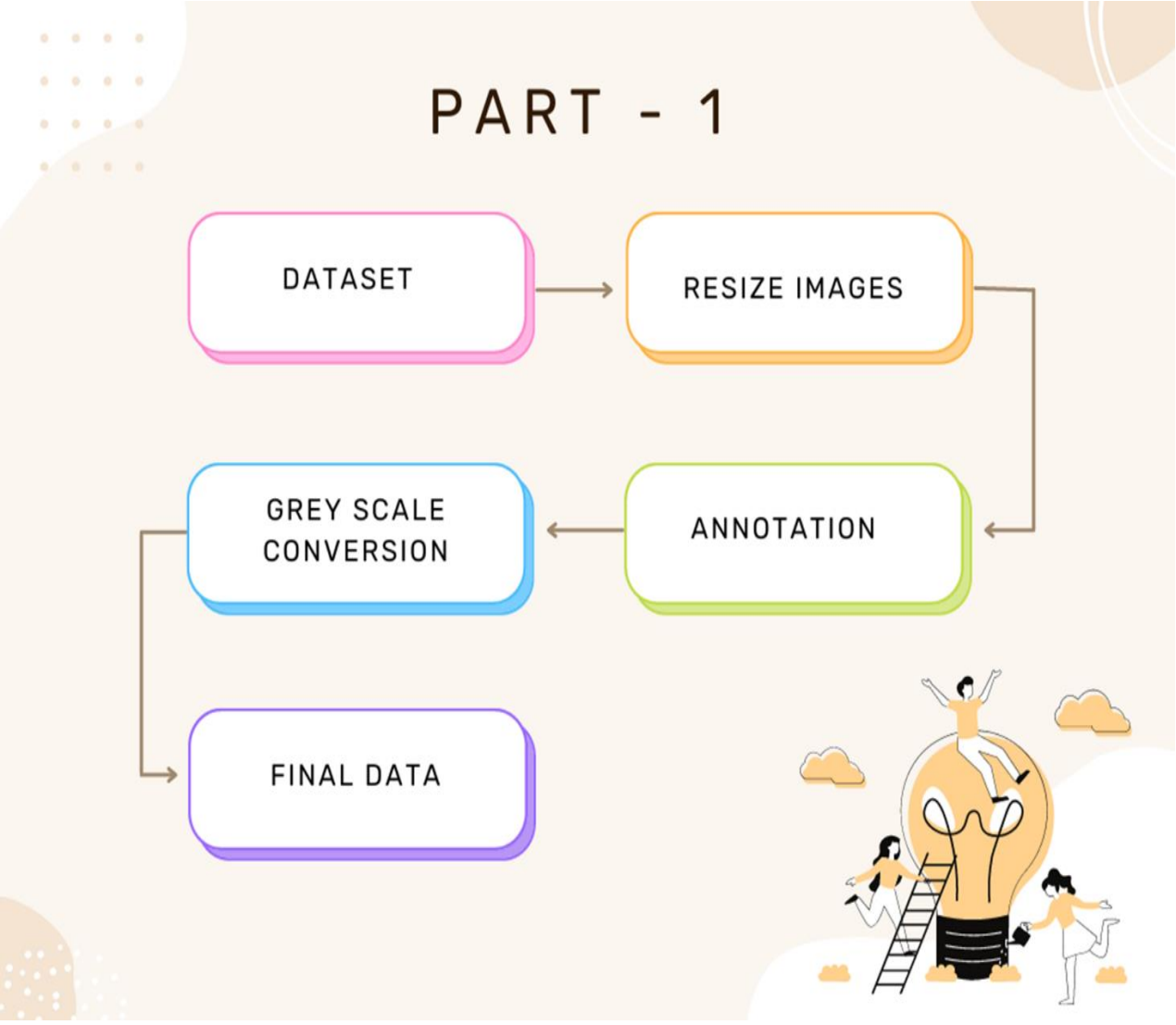
We got the motivation for this project from various reasons. Many people around the globe from this disease. This disease can give birth to several mental diseases as well as reduces self-confidence. Thus early stage detections of the diseases can create a positive impact on the patients.

1.4 Objectives

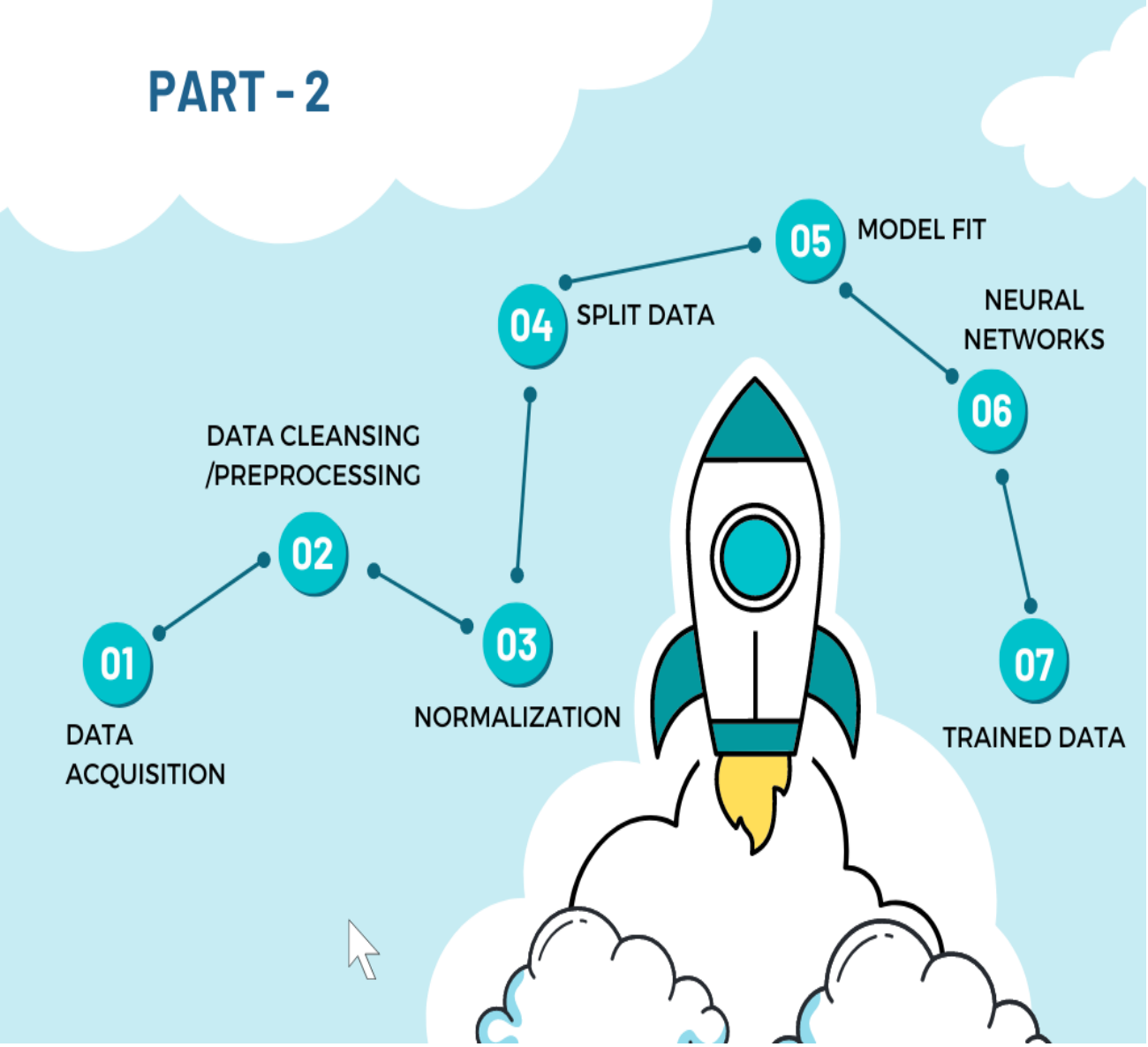
- Regular monitoring will help in early recovery
- Tracking the recovery rate
- Tracking will help in creating a positive affirmation of recovery
- To save the patient from living a diminished quality of life

Working Methodology

I have divided this working methodology in 3 parts. First one deals with collecting the dataset and performing initial operations and normalization over the image data. Here we are collecting a dataset of 1000 + images.



Second part consists of the main process we have to perform in order to get the trained model which we will be using further in our application. Following steps will be performed after part 1 as mentioned above.



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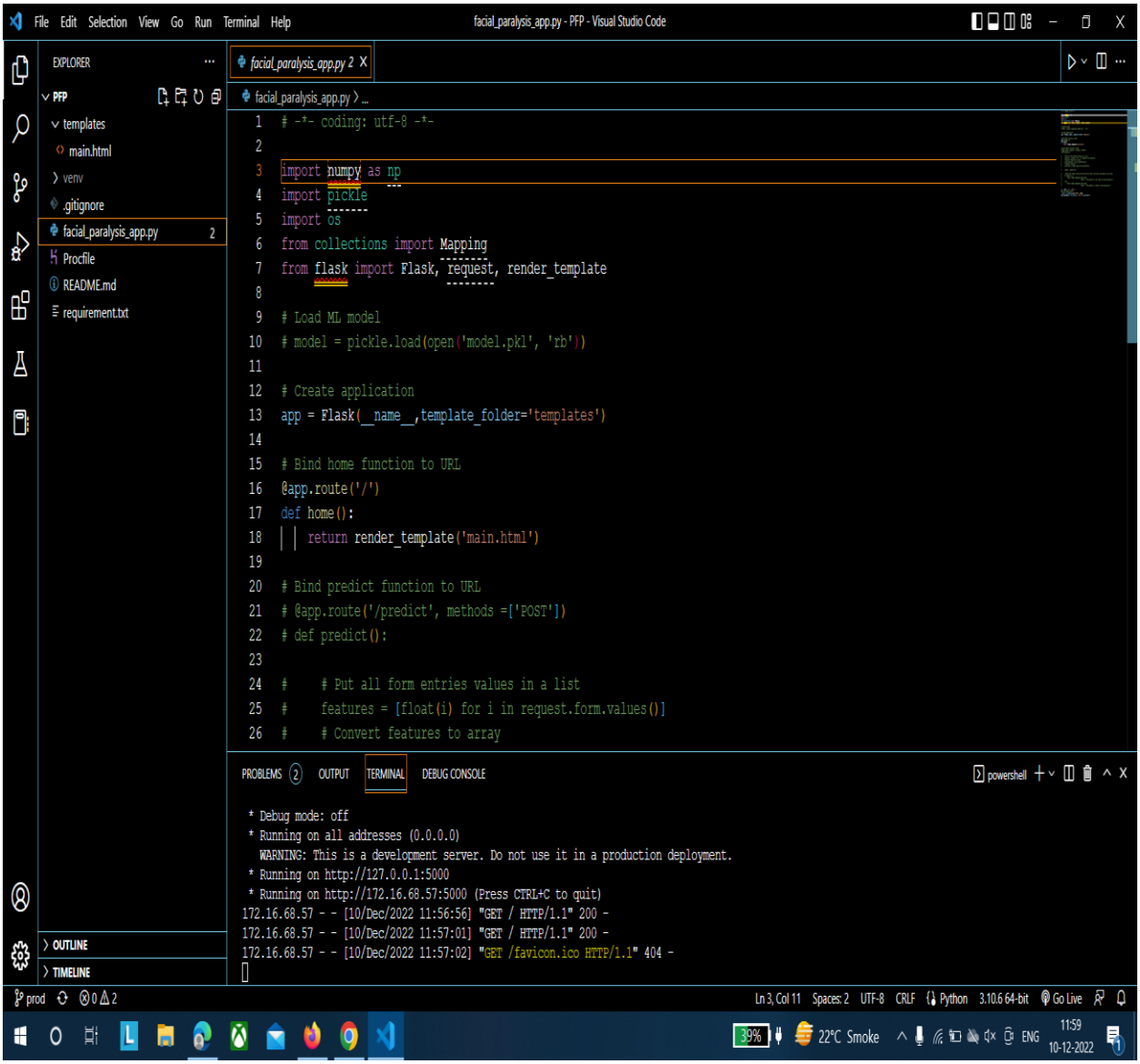

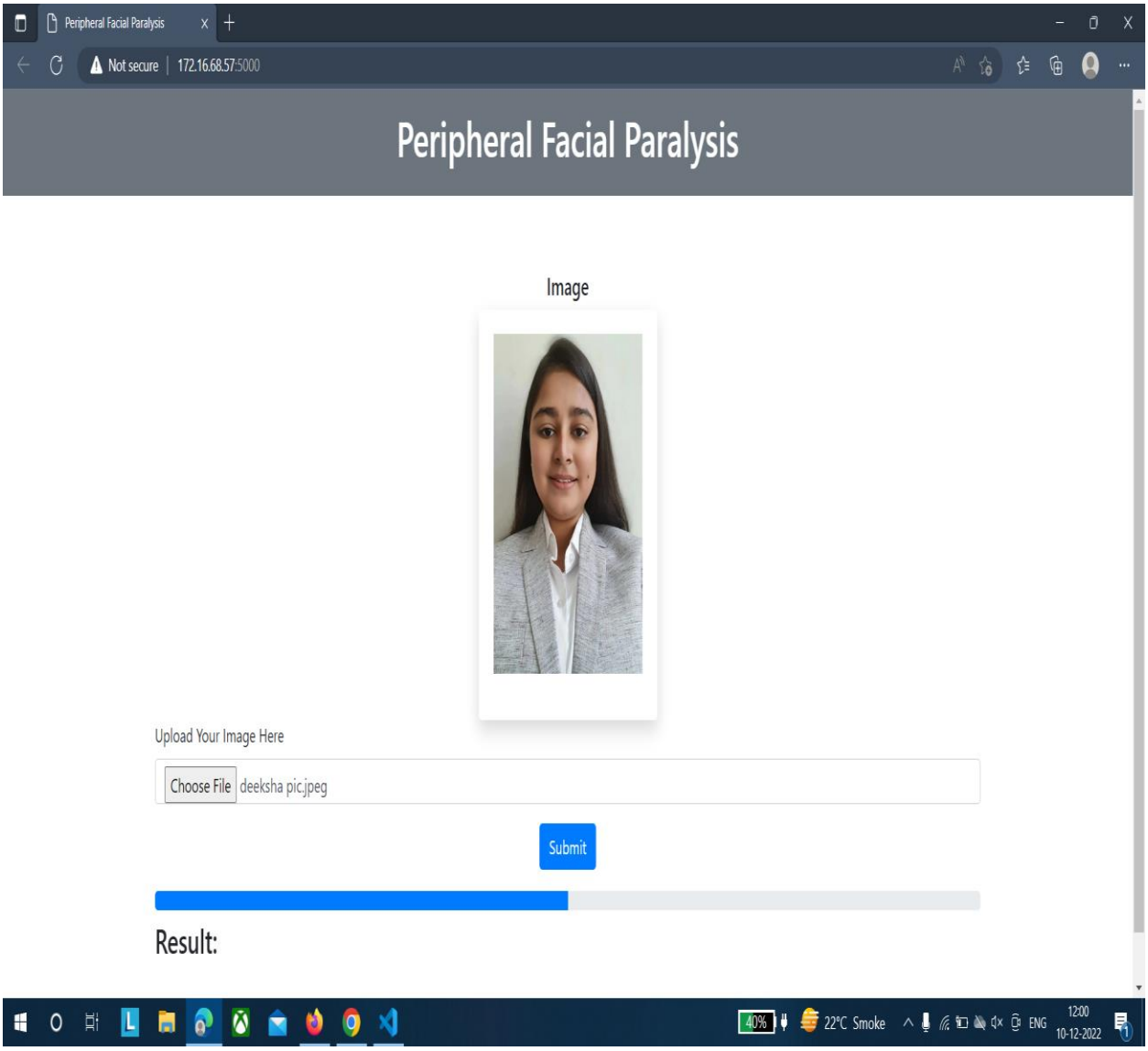
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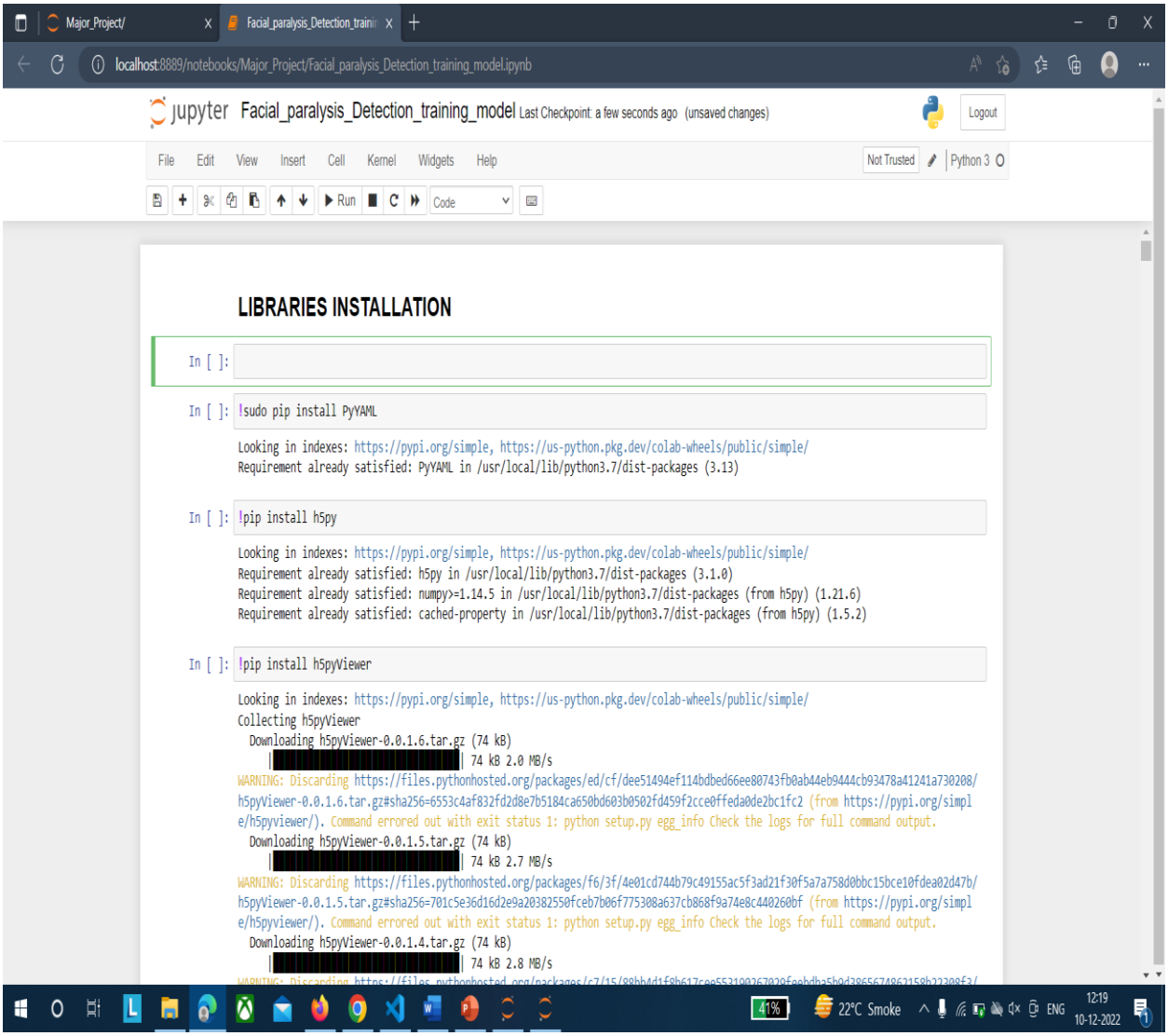
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LIBRARIES INSTALLATION
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Requirement already satisfied: cached-property in /usr/local/lib/python3.7/dist-packages (from h5py) (1.5.2)
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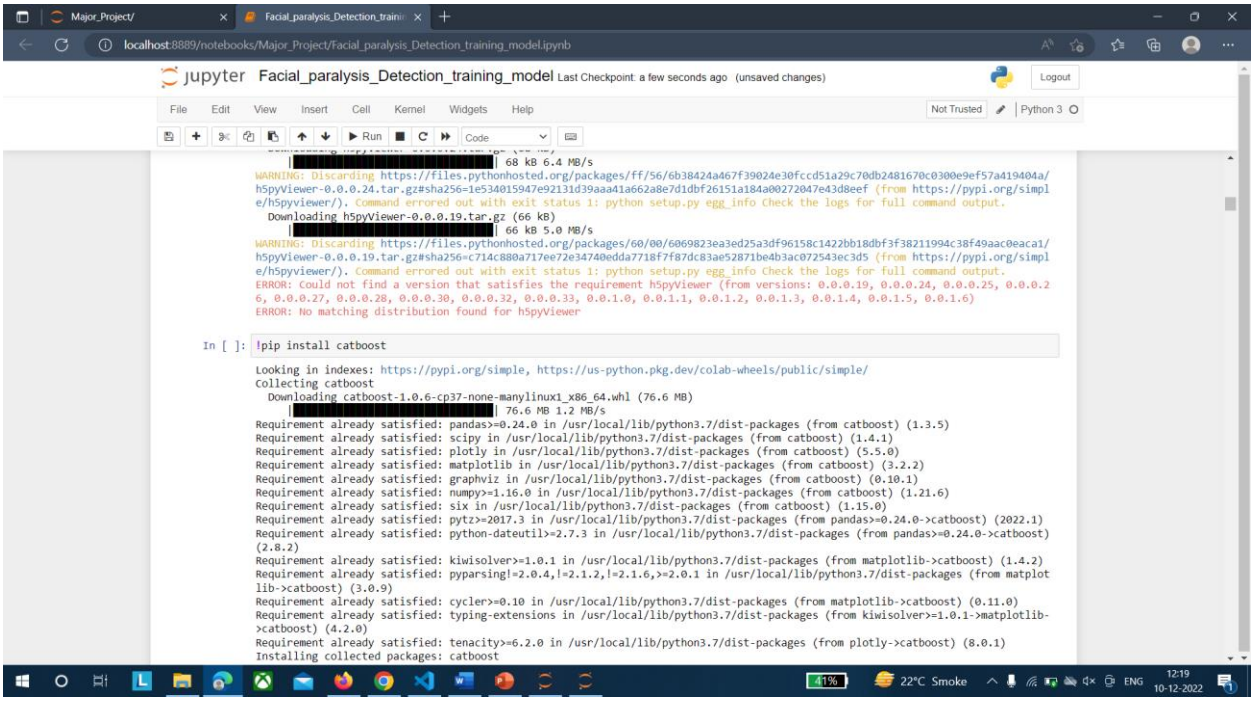
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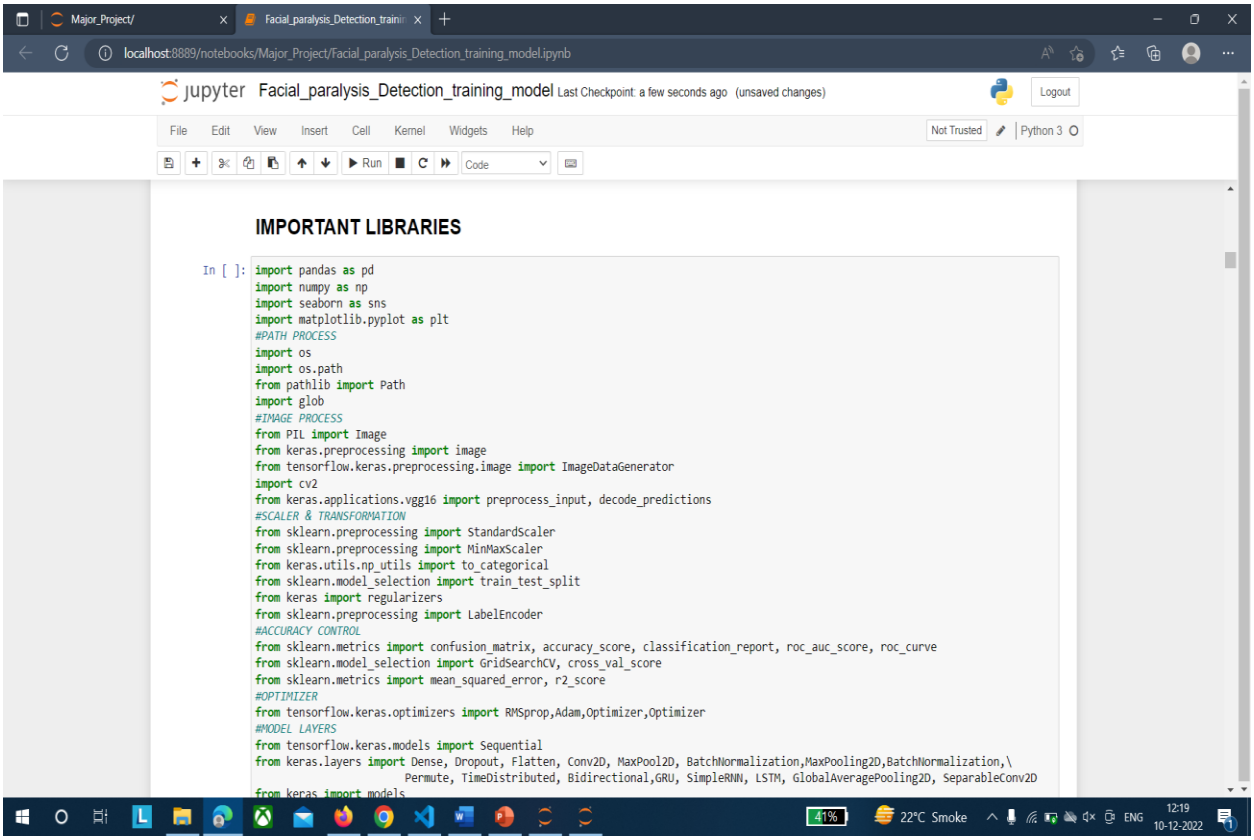
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Not Trusted
Python 3
Run
Code
IMPORTANT LIBRARIES
In [ ]:
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
#PATH PROCESS
import os
import os.path
from pathlib import Path
import glob
#IMAGE PROCESS
from PIL import Image
from keras.preprocessing import image
from tensorflow.keras.preprocessing.image import ImageDataGenerator
import cv2
from keras.applications.vgg16 import preprocess_input, decode_predictions
#SCALER & TRANSFORMATION
from sklearn.preprocessing import StandardScaler
from sklearn.preprocessing import MinMaxScaler
from keras.utils.np_utils import to_categorical
from sklearn.model_selection import train_test_split
from keras import regularizers
from sklearn.preprocessing import LabelEncoder
#ACCURACY CONTROL
from sklearn.metrics import confusion_matrix, accuracy_score, classification_report, roc_auc_score, roc_curve
from sklearn.model_selection import GridSearchCV, cross_val_score
from sklearn.metrics import mean_squared_error, r2_score
#OPTIMIZER
from tensorflow.keras.optimizers import RMSprop,Adam,Optimizer,Optimizer
#MODEL LAYERS
from tensorflow.keras.models import Sequential
from keras.layers import Dense, Dropout, Flatten, Conv2D, MaxPool2D, BatchNormalization,MaxPooling2D,BatchNormalization,\
Permute, TimeDistributed, Bidirectional,GRU, SimpleRNN, LSTM, GlobalAveragePooling2D, SeparableConv2D
from keras import models
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Project Requirements

Software Specification

Technology Implemented	CNN, Flask
Language Used	HTML,CSS,JavaScript, Bootstrap, Python
Development Environment	Visual Studio code
Web Browser	Chrome / Firefox

Hardware Requirements

Processor	intel core i5s/RYZEN 3
Operating System	Windows 10
RAM	4+ GB
Hard disk	64 GB

Hardware Devices	Computer System

Limitations of The Project Proposed

- Internet connection is required while accessing the website.
- Easy searching algorithm is used in searching the category in which user requires help.
- As we are working in front end technologies, we do provide functionality of comment and queries on all categories.
- Sometimes due to some technical issues there may be some delay in providing the solution to the user.

Conclusion

In the modern era of evidence-based medicine, the field of facial nerve management has expanded exponentially with critical questions that will help future facial reanimation surgeons refine the approach for patients with acute and long-standing facial paralysis. This project will result with respect to recovery rate of the facial nerve patient, as well as future surgical outcomes. For patients who have had a stroke, getting medical attention quickly can greatly improve the possibility of a full recovery with limited damage to the brain and body. Rehabilitation and preventative measures will vary depending on the type and severity of the stroke. Unfortunately, even with all current procedures for therapy, some cases of facial paralysis may never completely go away. For this patient, physical therapy, and eye care can help prevent any further damage and improve quality of life.

Online GIT repository

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https://github.com/deeksha9450/Peripheral_Facial_Palsy

References

- https://www.researchgate.net/publication/334763794_Peripheral_facial_paralysis
- https://samarpanphysioclinic.com/facial-palsy-treatment-exercise/
- https://www.healthline.com/health/paralysis#treatment
- https://pubmed.ncbi.nlm.nih.gov/10904952/