Mini Project Report on

SIGN LANGUAGE RECOGINITION

Submitted by

NAME	CLASS	ROLL NO.
Jay Karolia	TE-9	22
Kashyap Kurani	TE-9	25
Chintan Rajgor	TE-9	34
Ananya Tripathi	TE-9	56

Under the guidance of

Prof. Karuna Borhade,

Co-guide: Prof. Vanadana Soni

DEPARTMENT OF COMPUTER ENGINEERING

SHAH AND ANCHOR KUTCHHI ENGINEERING COLLEGE

CHEMBUR, MUMBAI – 400088.

2021 - 2022

Mahavir Education Trust's

SHAH AND ANCHOR KUTCHHI ENGINEERING COLLEGE

Mahavir Education Trust Chowk, W.T Patil Marg, D P Rd, next to Duke's Company, Chembur, Mumbai, Maharashtra 400088

Affiliated to University of Mumbai, Approved by D.T.E. & A.I.C.T.E.

Awarded accreditation of Computer & Information Technology Engineering by NBA

(for 3 years w.e.f. 1st July, 2019)

Certificate

This is to certify that the report of the mini project entitled

SIGN LANGUAGE RECOGINITION

is a bonafide work of

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submitted to the

UNIVERSITY OF MUMBAI

During semester VI

in

COMPUTER ENGINEERING DEPARTMENT

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(Prof. Uday Bhave)

Guide I/c Head of Department

Approval for Mini Project Report for T. E. Semester VI

This mini project report entitled "SIGN LANGUAGE RECOGINITION" by Chintan Rajgor, Annanya Tripathi, Kashyap Kurani and Jay Karolia is approved for the partial fulfillment of the requirement for the completion of Semester V.

Name and Sign of Internal Examiner _____

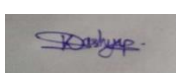
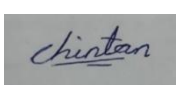
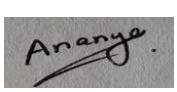
Name and Sign of ExternalExaminer _____

Date:

Place: SAKEC

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we 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. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

	Name of Student	Class	Roll No.	Signature
1.	Jay Karolia	TE9	22	
2.	Kashyap Kurani	TE9	25	
3.	Chintan Rajgor	TE9	34	
4.	Ananya Tripathi	TE9	56	

Date:

Attendance Certificate

To,
The Principal
Shah and Anchor Kutchhi Engineering College,
Chembur, Mumbai-88

Date:

Subject: Confirmation of Attendance

Respected Sir,
This is to certify that Third year (TE) students
Chintan Rajgor, Annanya Tripathi, Kashyap Kurani and Jay Karolia

have duly attended the sessions on the day allotted to them during the period from 16/06/2021 to 06/10/2021 for performing the Mini Project titled "Sign Language Recognition".

They were punctual and regular in their attendance. Following is the detailed record of the student's attendance.

Attendance Record:

Date	Chintan Rajgor	Annanya Tripathi	Kashyap Kurani	Jay Karolia
	Present/Absent	Present/Absent	Present/Absent	Present/Absent
16/06/2021	Present	Present	Present	Present
23/06/2021	Present	Present	Present	Present
07/07/2021	Present	Present	Present	Present
14/07/2021	Present	Present	Present	Present
28/07/2021	Present	Present	Present	Present
04/08/2021	Present	Present	Present	Present
11/08/2021	Present	Present	Present	Present
18/08/2021	Present	Present	Present	Present
08/09/2021	Present	Present	Present	Present

Signature and Name of Internal Guide

_____

Abstract

Those who suffer from being deaf and have impaired hearing should not be sheltered from communicating with the rest of their peers. Just because a portion of the population cannot hear or speak, does not mean that their form of communication should not advance along with the rest of the world. Sign language is how the hearing impaired express their feelings, contribute to a conversation, learn, and overall live their lives as normal as possible. Many high schools, colleges, and universities are introducing sign language classes into their course catalogues, and rightfully so. Being that it is 2021 and there are widespread pushes toward equality and inclusion, sign language should be included in this worldly push. Sign language should be offered as either an elective, or language course. Although when learning and conducting sign language there is no speech involved, it is still a language of its own, and should be viewed as so. It is a form of communication, and is just as important as learning Spanish or French or any other language. Having sign language courses readily available to students will further enhance this push toward achieving complete inclusiveness.

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Chembur, Mumbai 400 088
UG Program in Computer Engineering

Organization of SEM.V T.E. MiniProject Report

1.	Front Page
2.	Certificate (from college)
3.	Project Report Approval
4.	Declaration
5.	Attendance Record (from college)
6.	Abstract
7.	Table of Contents
8.	List of Figures
9.	List of Tables
Chapter 1	Introduction
Chapter 2	Literature Survey: (Historical survey indicating the chronological developments in the relevant field**.)**
Chapter 3	Problem Statement:
Chapter 4	Project Design: ● System Block Diagram ● Flow Chart ● Algorithm
Chapter 5	Implementation Details (Module wise system implementation) a. Module & Description b. Snapshot
Chapter6	Results & Analysis
Chapter7	Conclusion and Future Scope
	Appendix (optional)
	References
	Acknowledgements

LIST OF FIGURES:

LIST OF TABLES:

Chapter 1 : Introduction

The desire of students to learn sign language increases every year. It can be assumed that this is because more students are expressing interest in being able to communicate with others who are disabled. Not only is sign language a lifelong skill that students should not take for granted, it is also, its own dialect. The importance of sign language is gaining momentum, finally, and it is evident more people are seeing the need for it in today's society. No one should be left in the dark, no matter what disabilities they may have. Also, it is an everlasting skill that can without a doubt make people more well-rounded. Learning the skill of sign language can also show the deaf community that they are not being forgotten, and they have the same access to communication with the rest of the world as anyone else, and that their voices should never be muted or disregarded. Sign languages are a visual representation of thoughts through hand gestures, facial expressions, and body movements. Sign Languages also have several variants, such as American Sign Language (ASL), Argentinean Sign Language (LSA), British Sign Language (BSL) and ISL.

Recognition of sign language can be done in two ways, either glove based recognition or vision based recognition. In glove based technique a network of sensors is used to capture the movements of the fingers. Facial expressions cannot be recognized in this method and also, wearing a glove is always uncomfortable for the users. This method cannot be implemented massively since data gloves are very much expensive. So, the proposed system uses the non- invasive vision based recognition method. The vision-based recognition can be achieved in two ways. They are Static recognition or Dynamic recognition. In static recognition system, the input may be an image of hand pose. It provides an only 2D representation of the gesture, and this can be used to recognize only alphabets and numbers. For recognition of continuous sign language, the dynamic gesture recognition system is used. Here the real-time videos are given as inputs to the system, a sequence of hand movements form the gesture of the word/sentence. Information Technology with its modern methodologies such as artificial intelligence and cloud computing has an impressive role in enhancing intercommunication among people with vocal disabilities and normal people.

Chapter 2 : Literature Survey

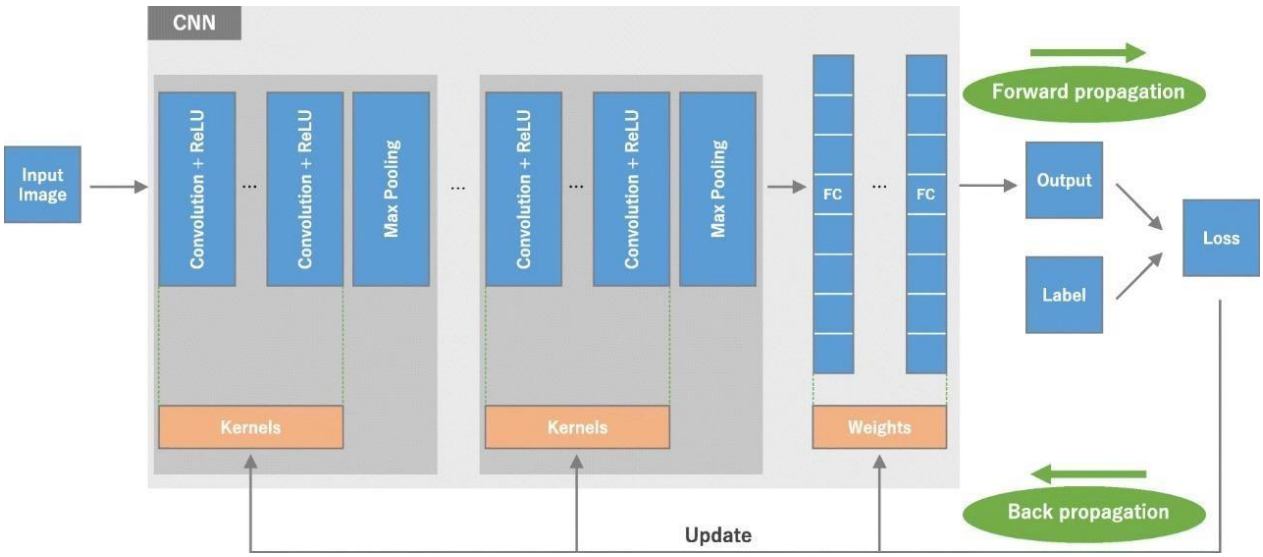
SR.NO	TITLE	Publication	YEAR	DESCRIPTION	Drawbacks
1	Real Time Recognition of Indian Sign Language	IEEE	2019	It uses dyanamic noninvasion vision method to get realtime video as input and then use contours to extract face and both hands and given gesture id and it is compared with previously recorded gestures.	They have use Fuzzy c-means algorithm instead of commonly used CNN algorithm which is easy to implement.
2	Hand Gesture Recognition for Indian Sign Language using Skin Color Detection and Correlation- Coefficient algorithm with Neuro-Fuzzy Approach	IEEE	2019	In this paper authors have to choose to use correlation-coefficient algorithm with neuro-fuzzy approach rather than CNN model.	This system do not take real time video as an input it take images as an input so the words that can be predicted are also limited.
3	SIGN LANGUAGE INTERPRETER HAND USING OPTICAL-FLOW	IEEE	2016	This method uses optical flow technique formed by Lucas-Kanade Algorithm. This algorithm is basically used to find derivation of light intensity.	It has Low accuracy compared to most of the other existing systems.
4	Sign Language Detection from Hand Gesture Images using Deep Multi- layered Convolution Neural Network	IEEE	2019	This method uses multilayered CNN to recognize both static as well as dynamic gestures.	Their is pre-processing of image which takes the hand-signs from a constant image and places it in a noisy background for the input, which improves the accuracy of detection but is slow compared to the other existing systems.

Chapter 3 : Problem Statement

Its already hard to communicate with Specially Abled (deaf and mute) people and its gotten more difficult after lockdown due to covid-19 . So we decided to design a real time software system that will be able to recognize hand-gestures using deep learning techniques. This project aims to predict the 'alphanumeric' gesture of the system as well as custom hand signs for users.

Chapter 4 : PROJECT DESIGN

1. SYSTEM BLOCK DIAGRAM:



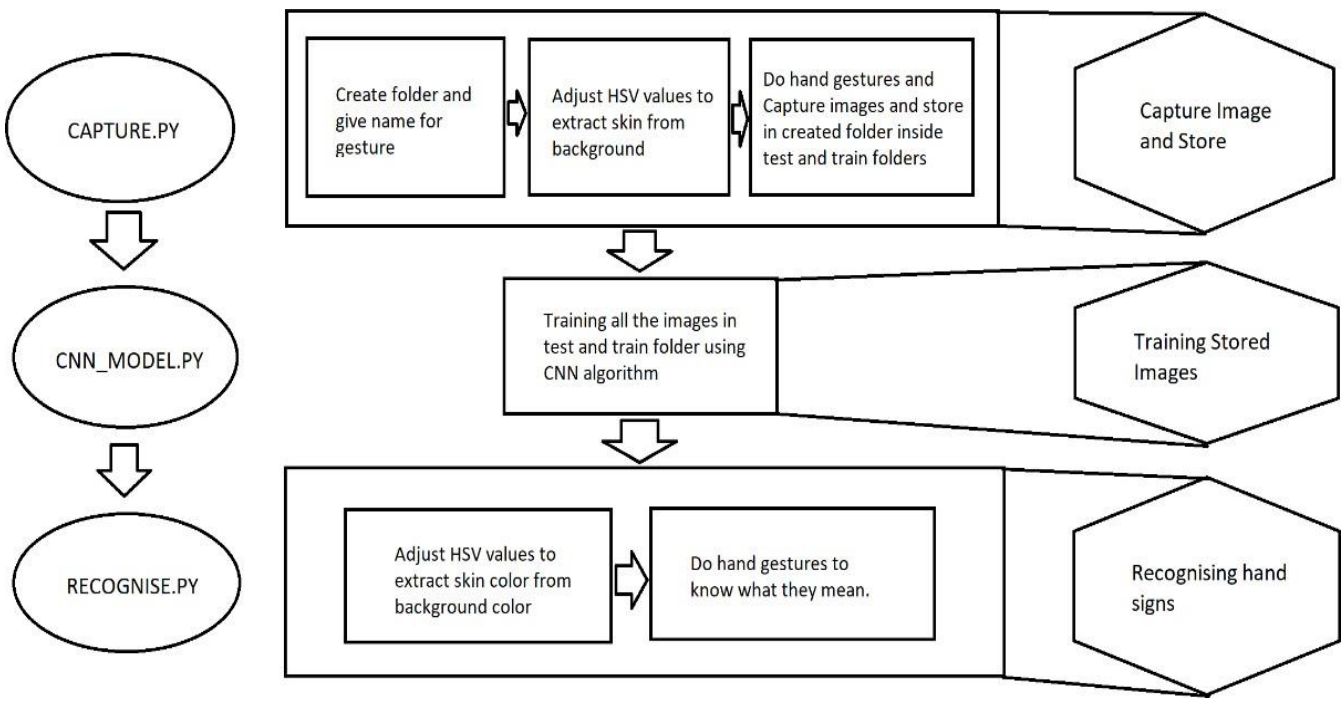
2. ALGORITHM:

I. Storing hand-signs:
   a. Switch on the camera
   b. Set the HSV values to detect hand skin from background.
   c. Capture the image which gets stored in 2 folders namely test and train.

II. Training CNN (Convolution Neural Network) model:
   a. CNN is a type of deep learning model for processing data that has a grid pattern, such as images, and designed to automatically and adaptively learn spatial hierarchies of features, from low- to high- level patterns.
   b. Using this cnn model we train the software to recognize all the images from test and train folder.

III. Recognition of hand-signs:
   a. Switch on the camera
   b. Set the HSV values to detect hand skin from background.
   c. Recognize the hand-signs and display the output by comparing with the images stored in database.

3. FLOWCHART:


CAPTURE.PY
CNN_MODEL.PY
RECOGNISE.PY
Create folder and give name for gesture
Adjust HSV values to extract skin from background
Do hand gestures and Capture images and store in created folder inside test and train folders
Capture Image and Store
Training all the images in test and train folder using CNN algorithm
Training Stored Images
Adjust HSV values to extract skin color from background color
Do hand gestures to know what they mean.
Recognising hand signs

Chapter 6: SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

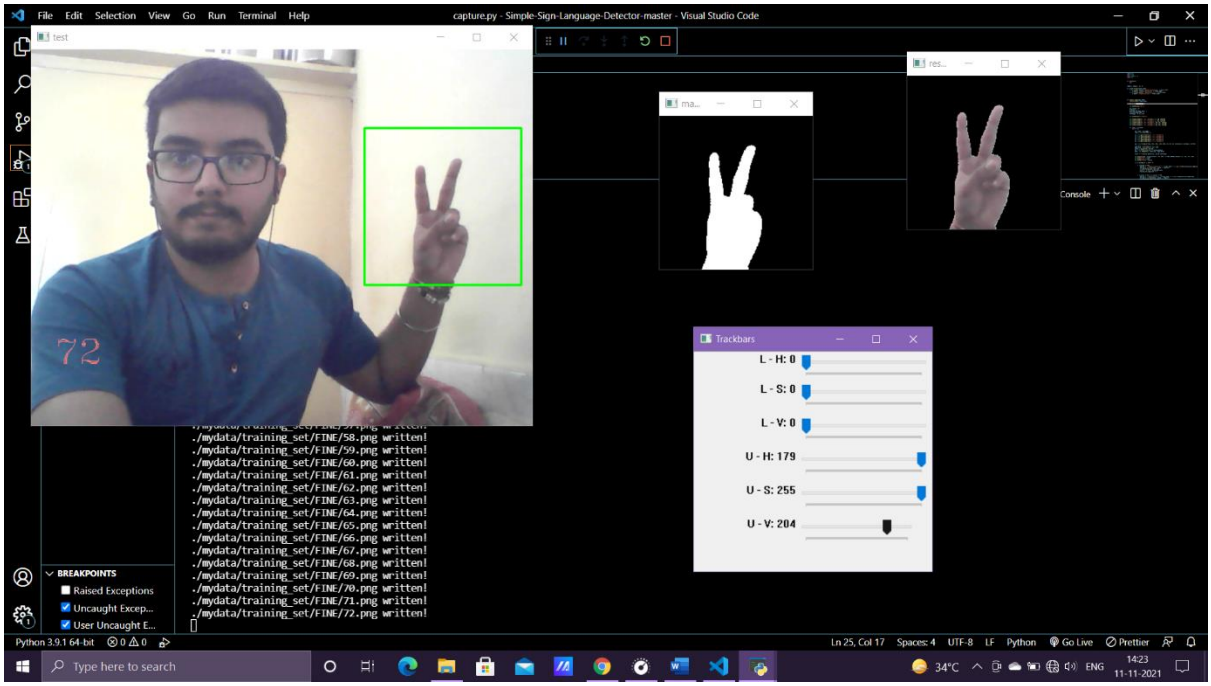
a. Hard Disk minimum of 40 GB.
b. RAM minimum of 2 GB.
c. Dual Core and up ,15" Monitor.
d. Integrated webcam or external webcam (15 -20fps)

SOFTWARE REQUIREMENTS:

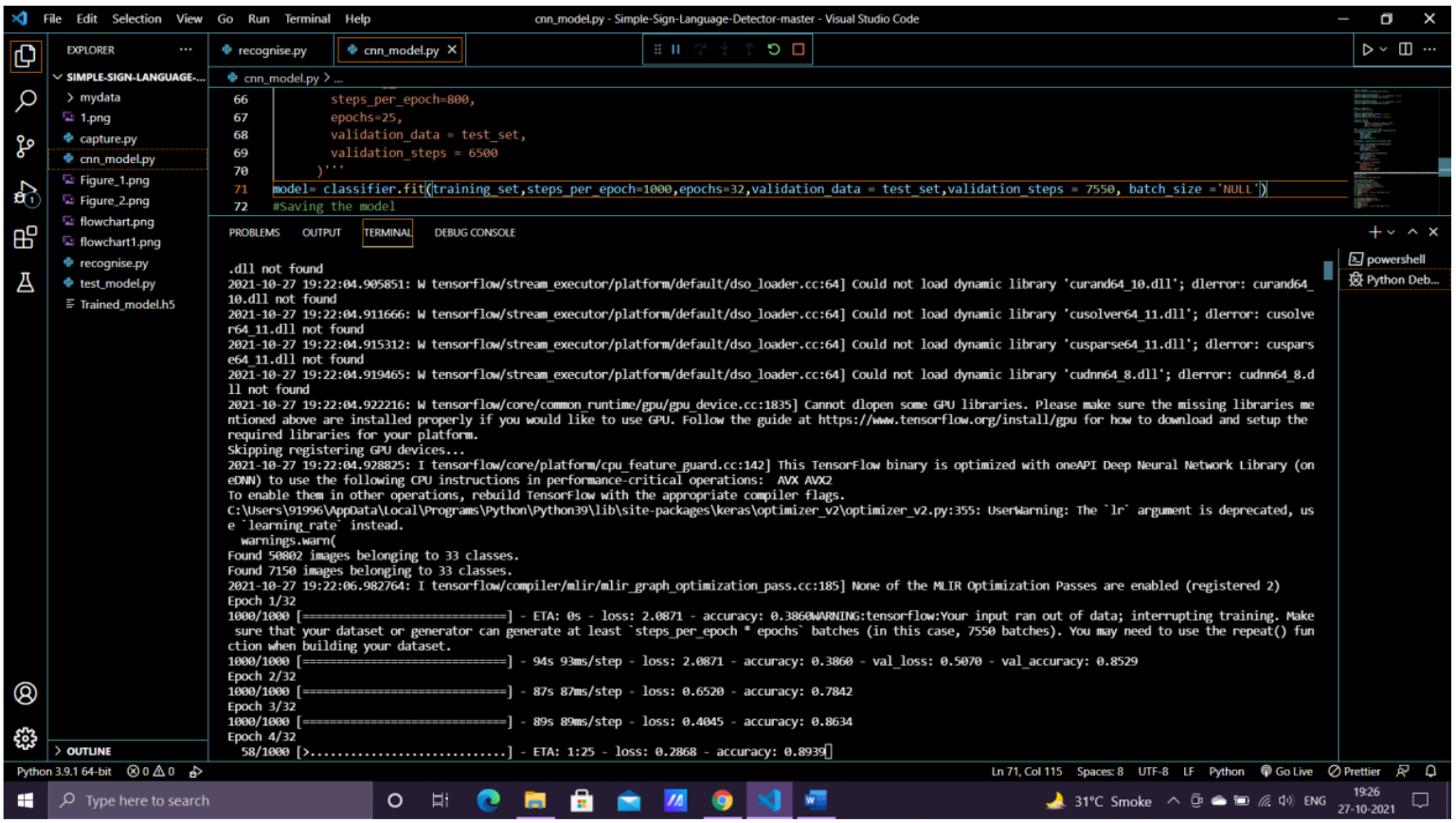
a. Microsoft Visual Studio 2010
b. Python 3
c. Tensorflow
d. Keras
e. OpenCV 3

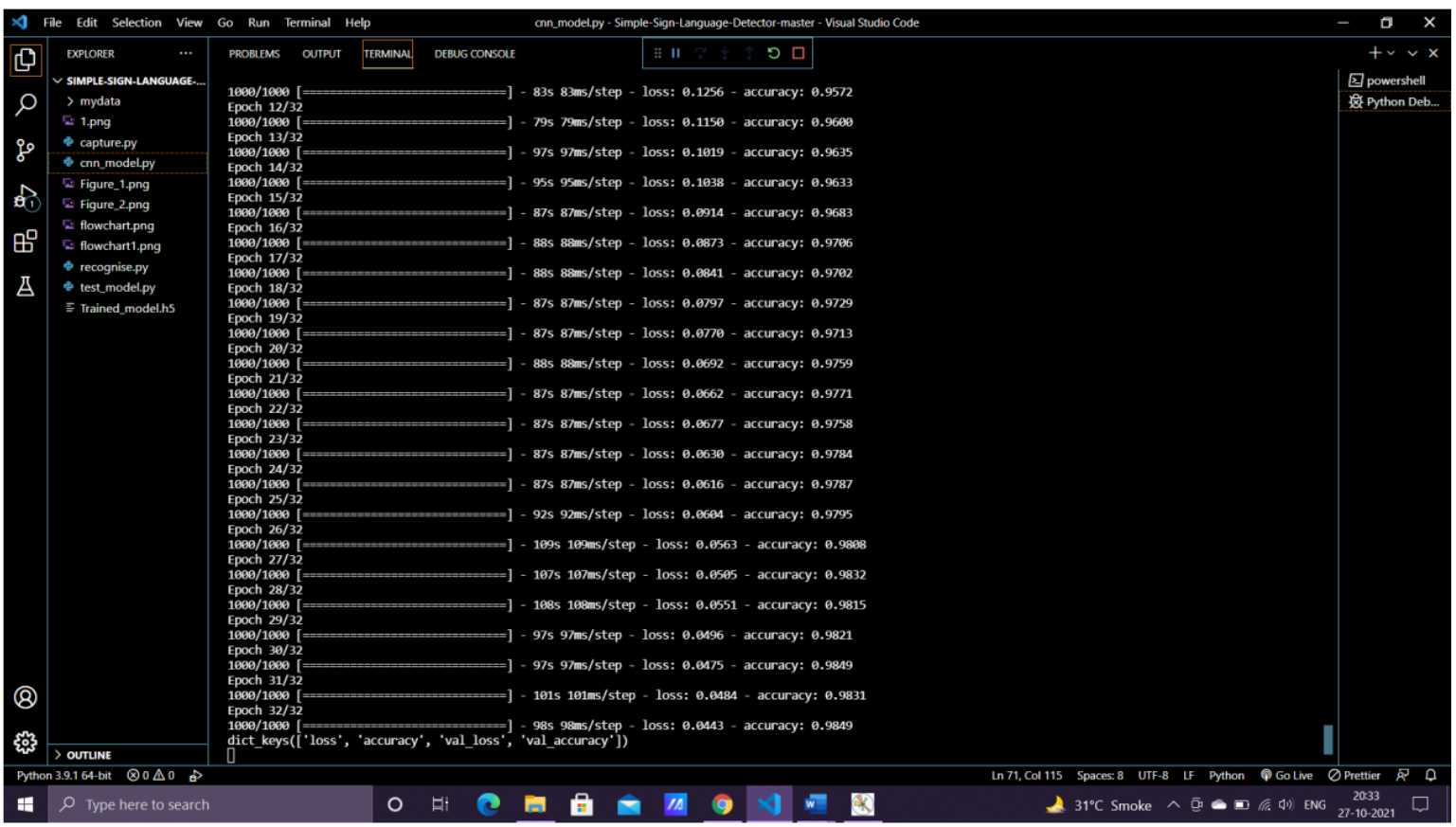
Chapter 5 : IMPLEMENTATION DETAILS

1, We have Successfully captured and stored images with capture.py

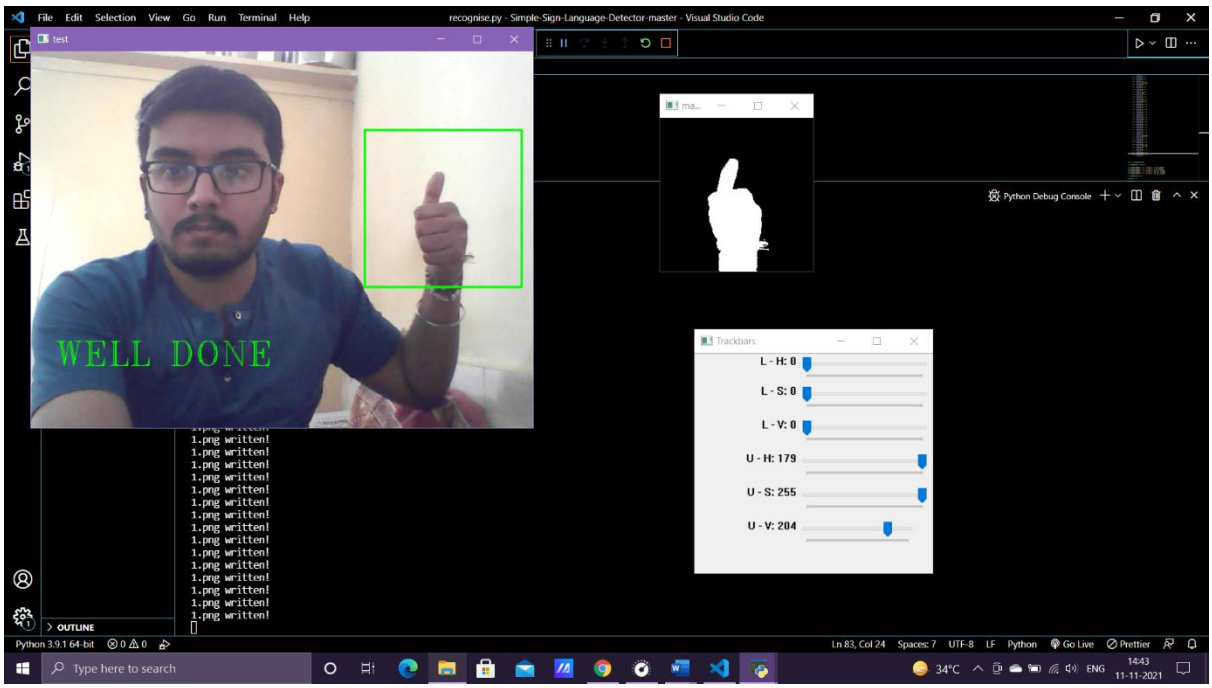


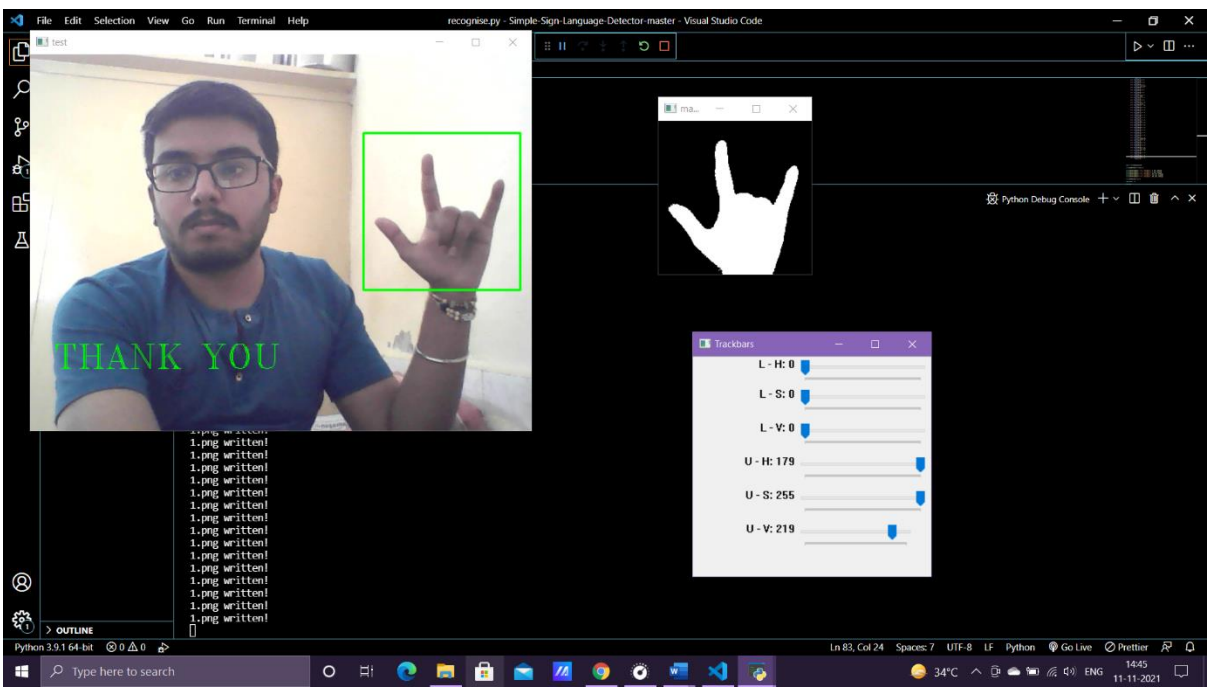
2. We have Successfully Trained Images with CNN model





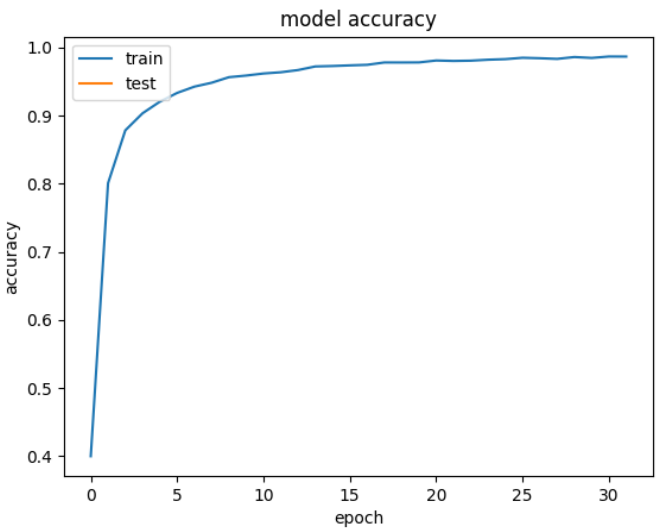
3, Now we have Identified Signs and Predicted the Meaning with Recognise.py successfully



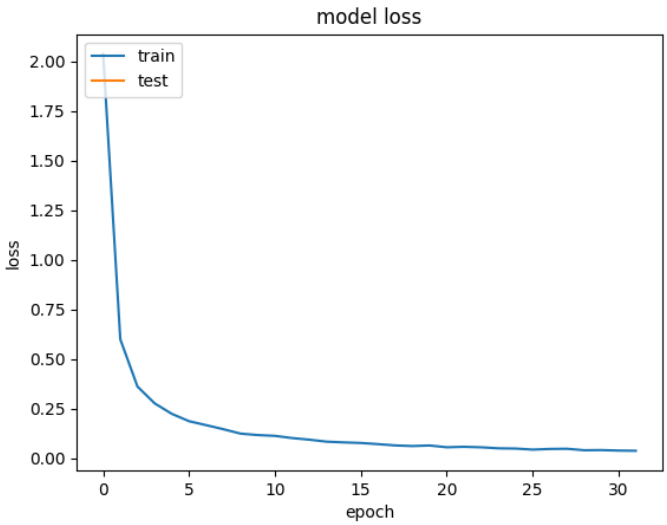


CHAPTER 6: RESULT AND ANALYSIS

MODEL OF ACCURACY:



MODEL OF LOSS:



ANALYSIS:

As we can see from the model of accuracy and loss, our model has an accuracy of 97%.

Chapter 7 : Conclusion and Future Scope

- ## Conclusion:

  The core aim of this project is to establish a model which will help us in communicating with the people who are specially abled without having any difficulties. The model is very helpful in portraying an impressive role in enhancing casual communication among people with hearing disabilities and normal people.

- ## Future Scope:

  In the future, we will be adding more words into the system and also make the system capable of dynamic type recognition.

References

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