REAL TIME COMMUNICATION SYSTEM POWERED BY AI FOR SPECIALLY ABLED

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PROBLEM STATEMENT

Communication plays a significant role in making the world a better place. Communication creates bonding and relations among the people, whether persona, social, or political views. Most people communicate efficiently without any issues, but many cannot due to disability. They cannot hear or speak, which makes Earth a problematic place to live for them. Even simple basic tasks become difficult for them. Disability is an emotive human condition. It limits the individual to a certain level of performance. Being deaf and dumb pushes the subject to oblivion, highly introverted.

PURPOSE

In a world of inequality, this society needs empowerment. Harnessing technology to improve their welfare is necessary. In a tech era, no one should be limited due to his or her inability. The application of technology should create a platform or a world of equality despite the natural state of humans.

PROJECT OBJECTIVES

The project aims to develop a system that converts the sign language into a human hearing voice in the desired language to convey a message to normal people, as well as convert speech into understandable sign language for the deaf and dumb. We are making use of a convolution neural network to create a model that is trained on different hand gestures. An System is built which uses this model. This System enables deaf and dumb people to convey their information using signs which get converted to human-understandable language and speech is given as output.

SCOPE OF THE PROJECT

- The main scope is that it enables the specially abled people to convey their message to normal people.
- And Normal people can also convey their message to specially abled peoples.

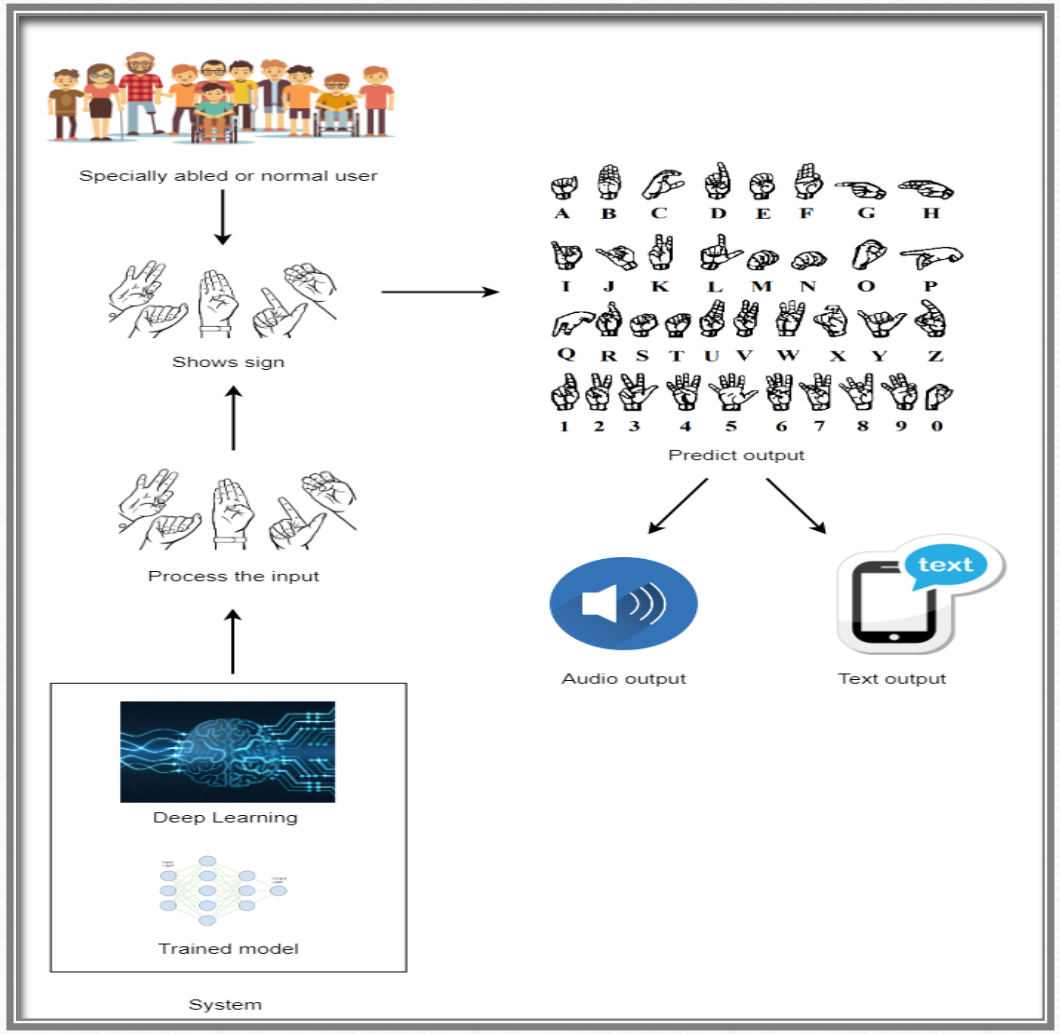
LITERATURE REVIEW

- Previous proposed pictogram based communication system between a patient and physicians aids non native language speakers or people with speech,hearing or cognitive impairments to communicate the relavant medical information or others signs to physicians in a more efficient way.It makes use of intuitive icons and interactive symbols which are easy to access and difficult to misplace.

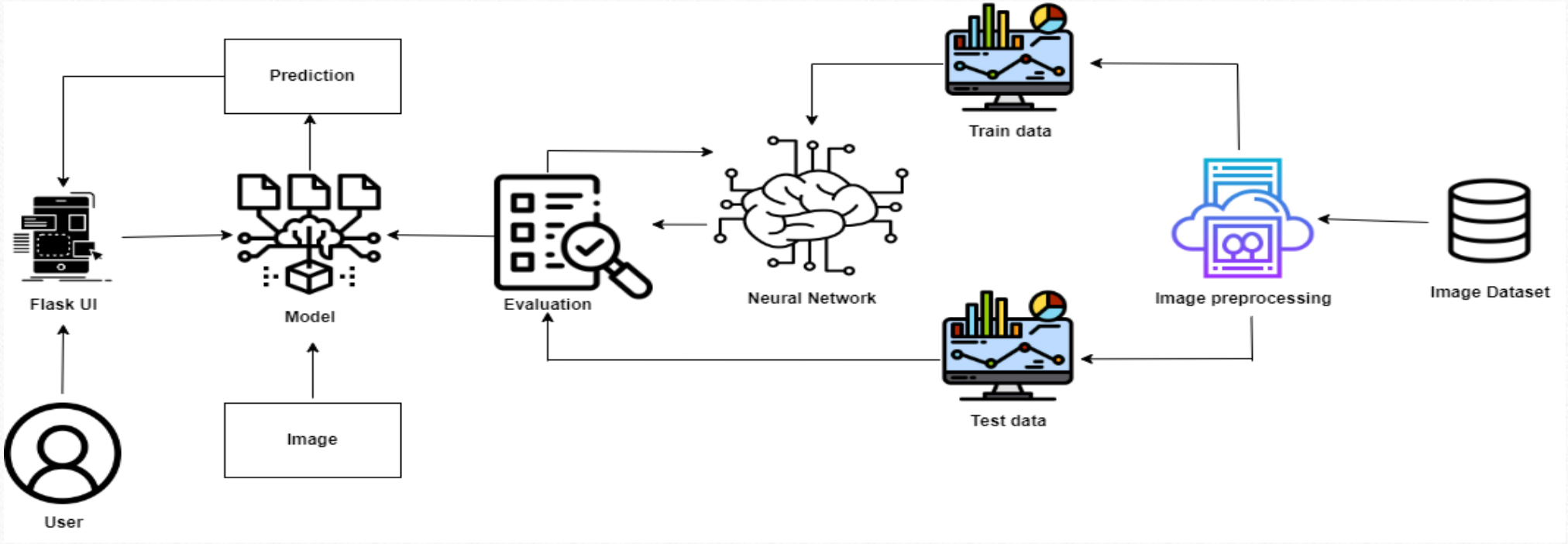
LITERATURE REVIEW

- Previous approach provides a way to communicate via text messages over a regular phone line for the users who are normal as well who are deaf using TTY(Text Telephony) technique.TTY requires specialized equipments that usually consists of a type writer like keyboard, a telephony coupler and some form of visual display. The major disadvantage of this system is the equipment isn’t available to everyone during that period of time which makes it complicated for communication to occur between deaf and non deaf individuals.

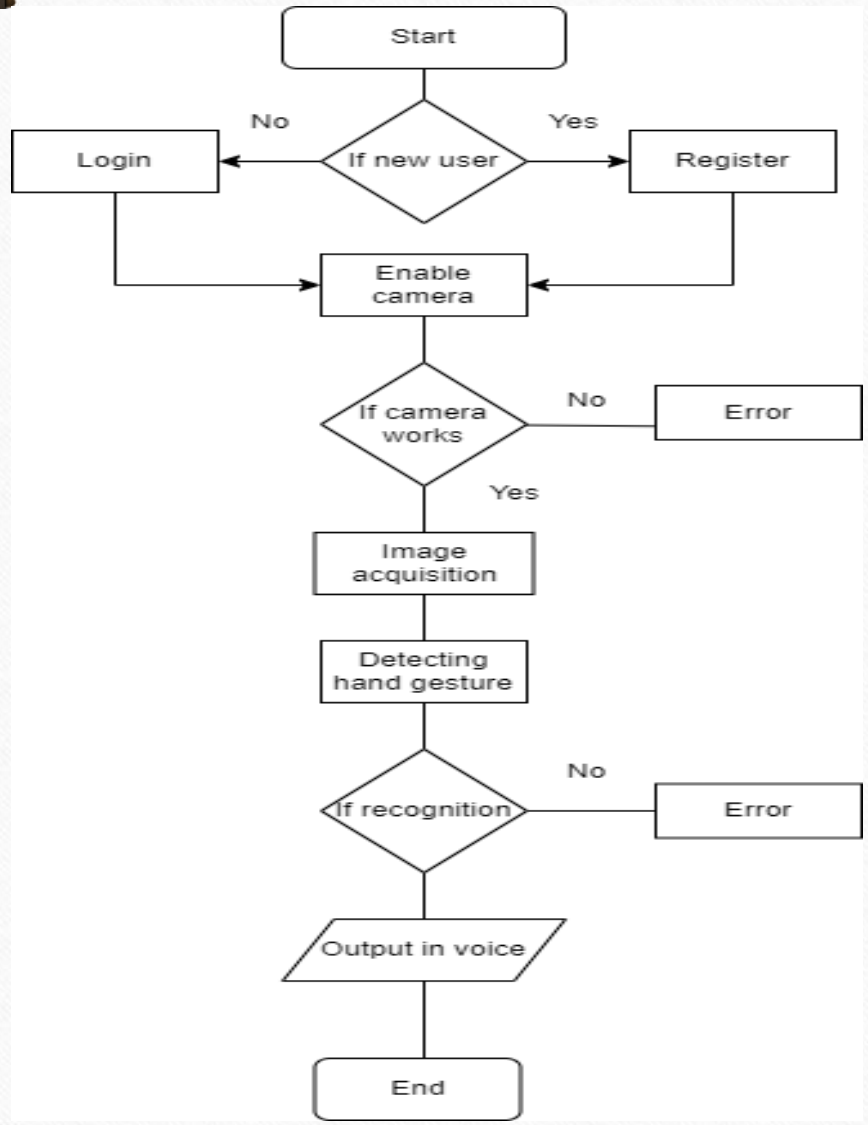
SOLUTION ARCHITECTURE

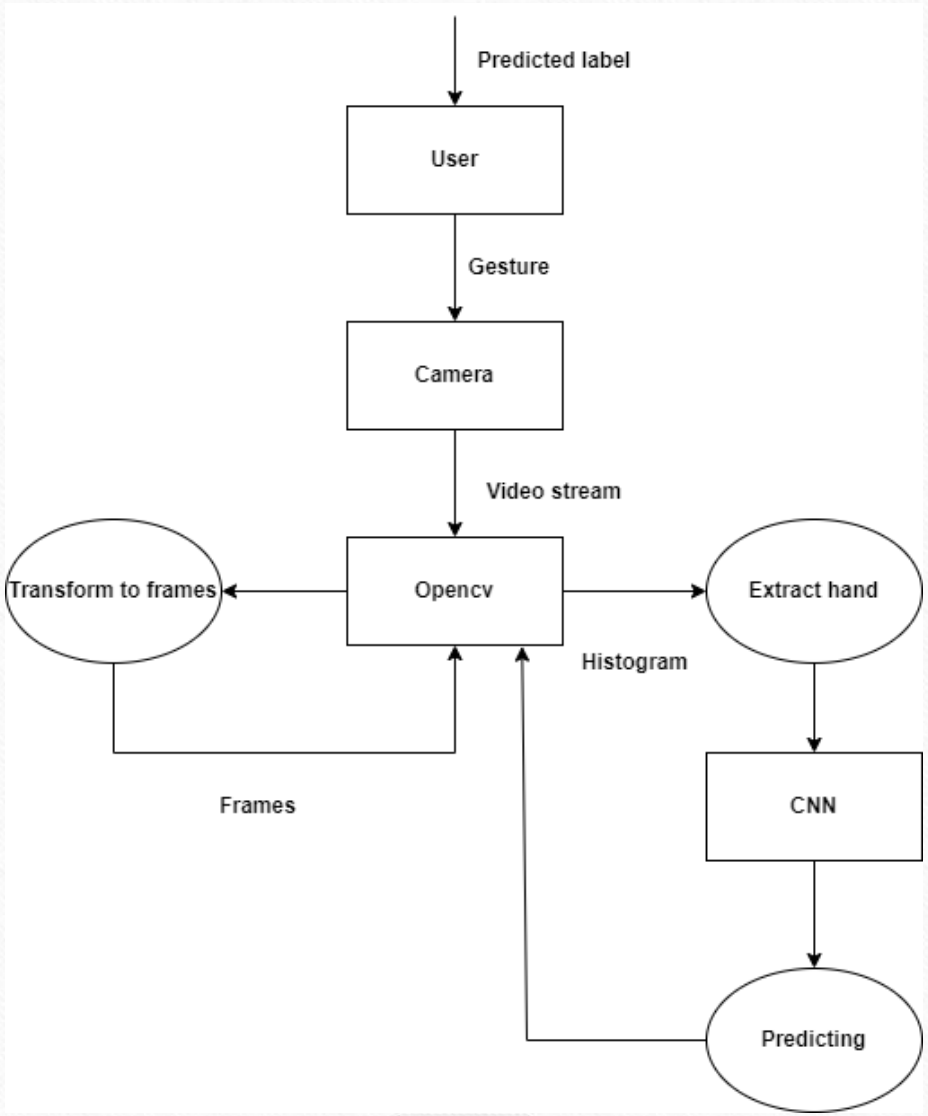


TECHNOLOGY ARCHITECTURE



DATA FLOW DIAGRAM




Predicted label
User
Gesture
Camera
Video stream
Transform to frames
Opencv
Extract hand
Histogram
Frames
CNN
Predicting

CODIND AND SOLUTIONING FEATURE 1

The user is given with a webpage in which after clicking on the “Click Here” button then the camera is opened and here the hand gestures is given.

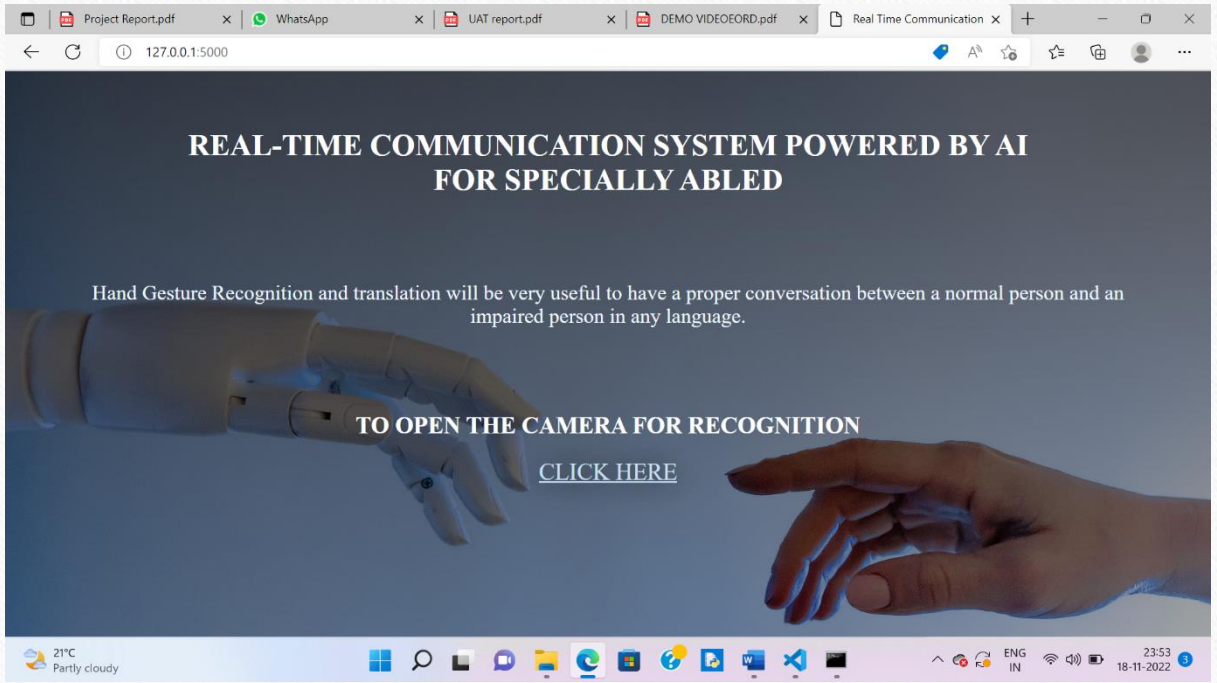
```
def predict():
        print("[INFO] starting video stream...")
        vs = cv2.VideoCapture(0)

        (W, H) = (None, None)

        while True:
            (grabbed, frame) = vs.read()

            if not grabbed:
                break

            if W is None or H is None:
                (H, W) = frame.shape[:2]
            output = frame.copy()
            # r = cv2.selectROI("Slect", output)
            # print(r)
            cv2.rectangle(output, (81, 79), (276,274), (0,255,0), 2)
            frame = frame[81:276, 79:274]
            frame = cv2.cvtColor(frame, cv2.COLOR_RGB2GRAY)
            _, frame = cv2.threshold(frame, 95, 255, cv2.THRESH_BINARY_INV)
            frame = cv2.cvtColor(frame, cv2.COLOR_GRAY2RGB)
```

FEATURE 2

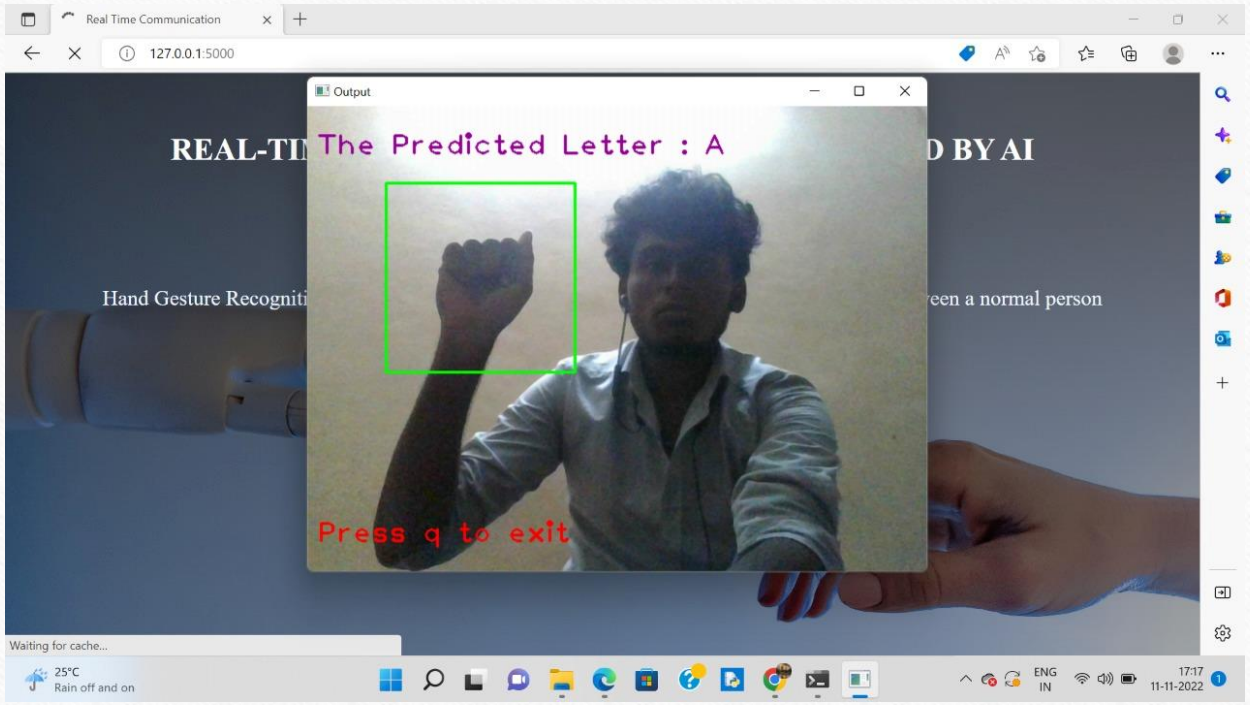
After the camera is opened in the webpage then an certain frame is given with an fixed size in the screen where the hand gestures is given then the character based on the hand gesture shown is represented on the screen.

```
img = resize(frame,(64,64,3))
            img = np.expand_dims(img,axis=0)
            if(np.max(img)>1):
                img = img/255.0


            result = np.argmax(model.predict(img))
            index=['A', 'B','C','D','E','F','G','H','I']
            result=str(index[result])


            cv2.putText(output, "The Predicted Letter : {}".format(result),
(10, 50), cv2.FONT_HERSHEY_PLAIN,
                        2, (150,0,150), 2)
            cv2.putText(output, "Press q to exit", (10,450),
cv2.FONT_HERSHEY_PLAIN, 2, (0,0,255), 2)


            speech = gTTS(text = result, lang = 'en', slow = False)

            cv2.imshow("Output", output)
            key = cv2.waitKey(1) & 0xFF

            if key == ord("q"):
                break


        print("[INFO] cleaning up...")
        vs.release()
        cv2.destroyAllWindows()
        return render_template("index.html")
```

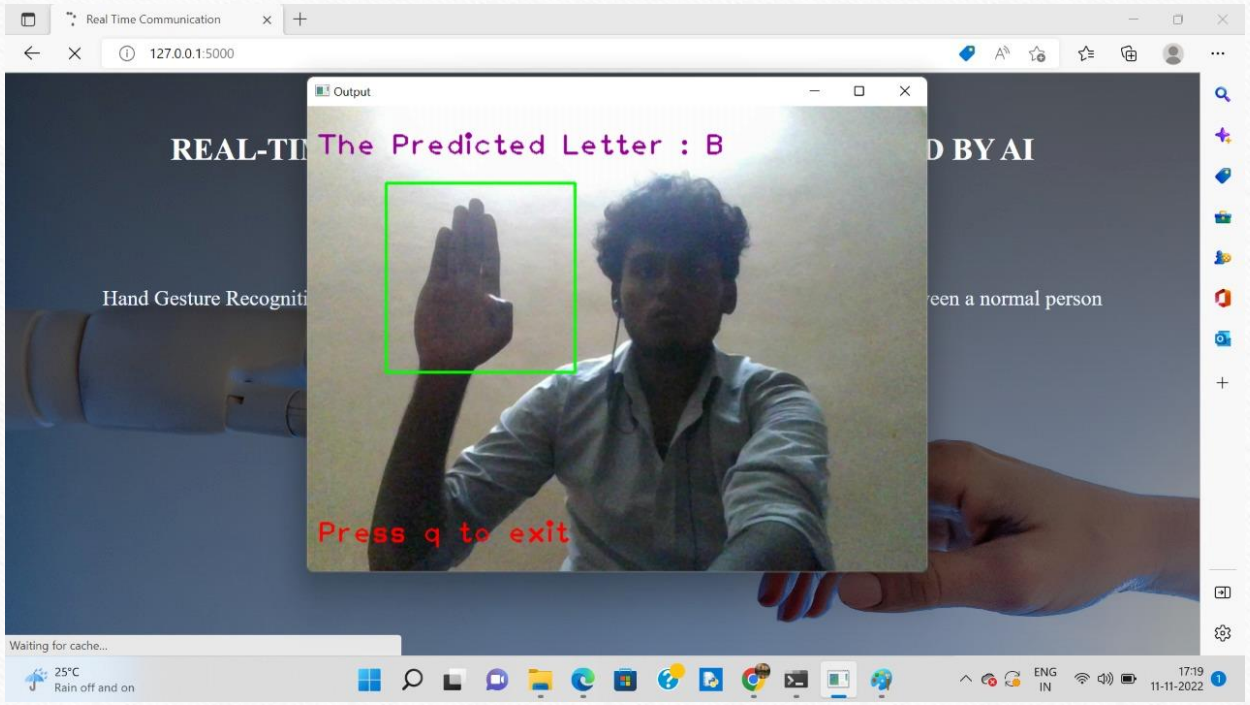
OUTPUTS


Project Report.pdf
WhatsApp
UAT report.pdf
DEMO VIDEOEORD.pdf
Real Time Communication
127.0.0.1:5000
REAL-TIME COMMUNICATION SYSTEM POWERED BY AI
FOR SPECIALLY ABLED
Hand Gesture Recognition and translation will be very useful to have a proper conversation between a normal person and an impaired person in any language.
TO OPEN THE CAMERA FOR RECOGNITION
CLICK HERE
21°C
Partly cloudy
ENG
IN
23:53
18-11-2022

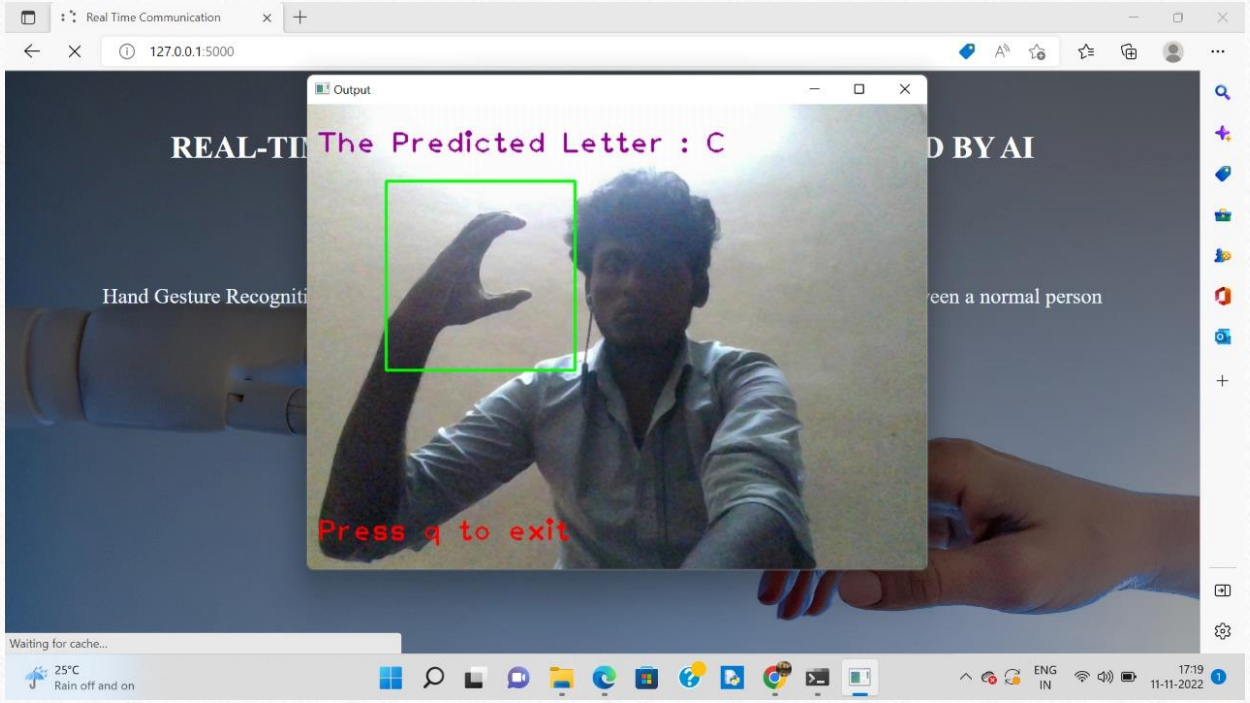
OUTPUTS


Real Time Communication
127.0.0.1:5000
Output
The Predicted Letter : A
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
Waiting for cache...
25°C
Rain off and on
ENG
IN
17:17
11-11-2022

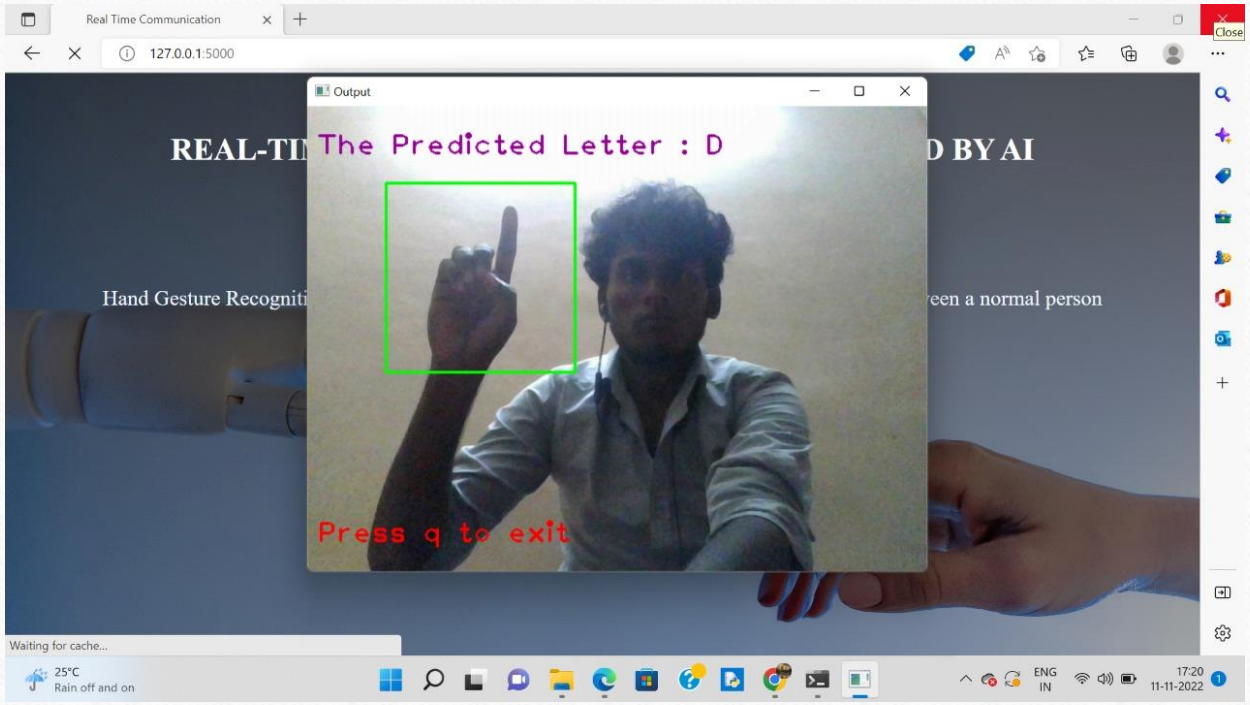
OUTPUTS


Real Time Communication
127.0.0.1:5000
Output
The Predicted Letter : B
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
Waiting for cache...
25°C
Rain off and on
ENG
IN
17:19
11-11-2022

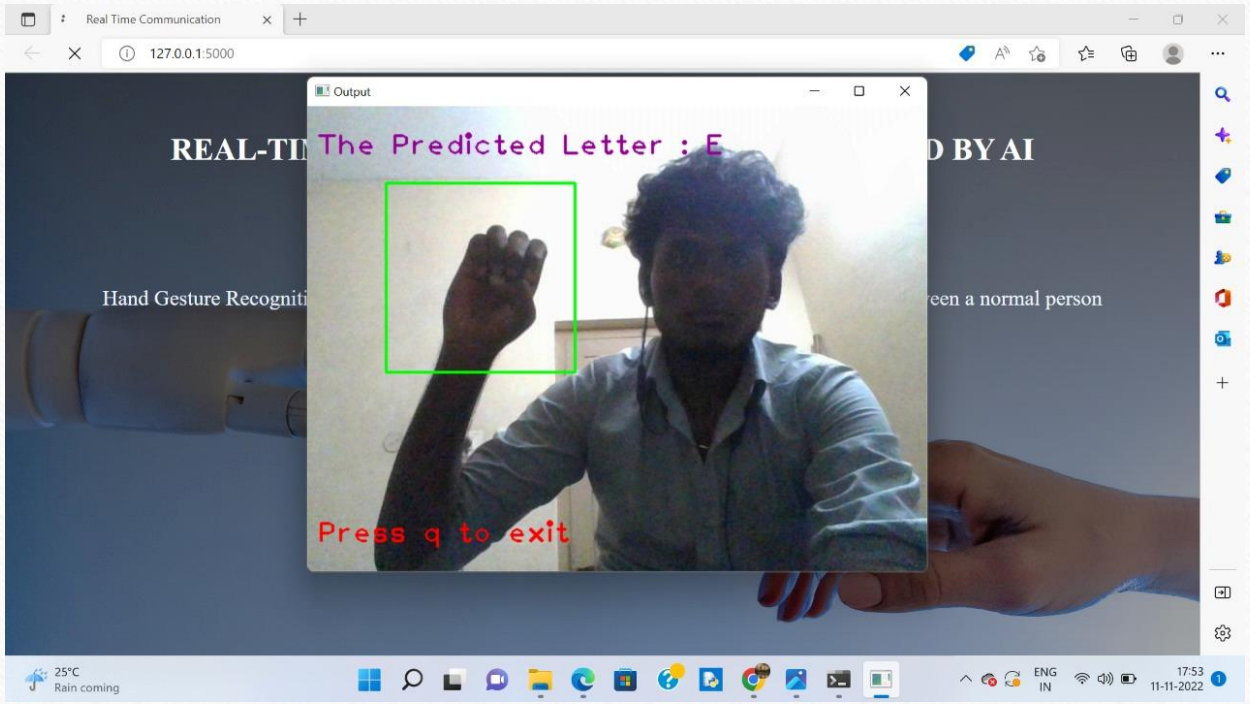
OUTPUTS


Real Time Communication
127.0.0.1:5000
Output
The Predicted Letter : C
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
Waiting for cache...
25°C
Rain off and on
ENG
IN
17:19
11-11-2022

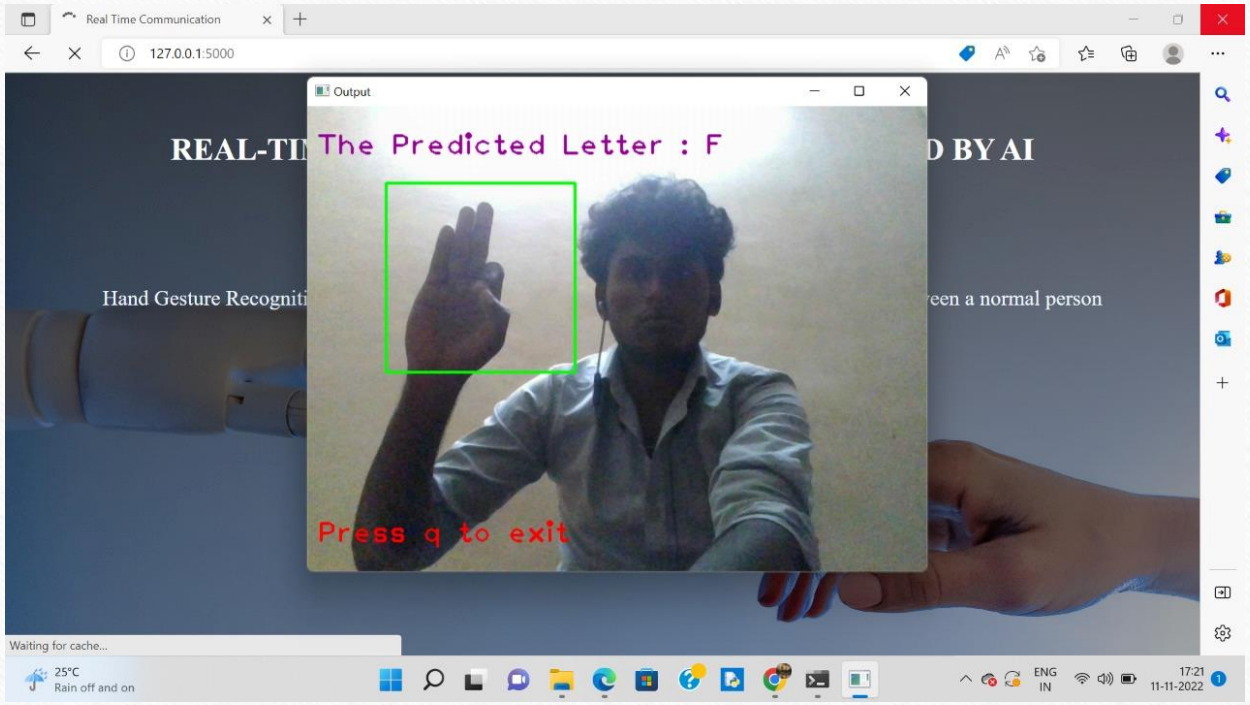
OUTPUTS


Real Time Communication
127.0.0.1:5000
Close
Output
The Predicted Letter : D
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
Waiting for cache...
25°C
Rain off and on
ENG
IN
17:20
11-11-2022

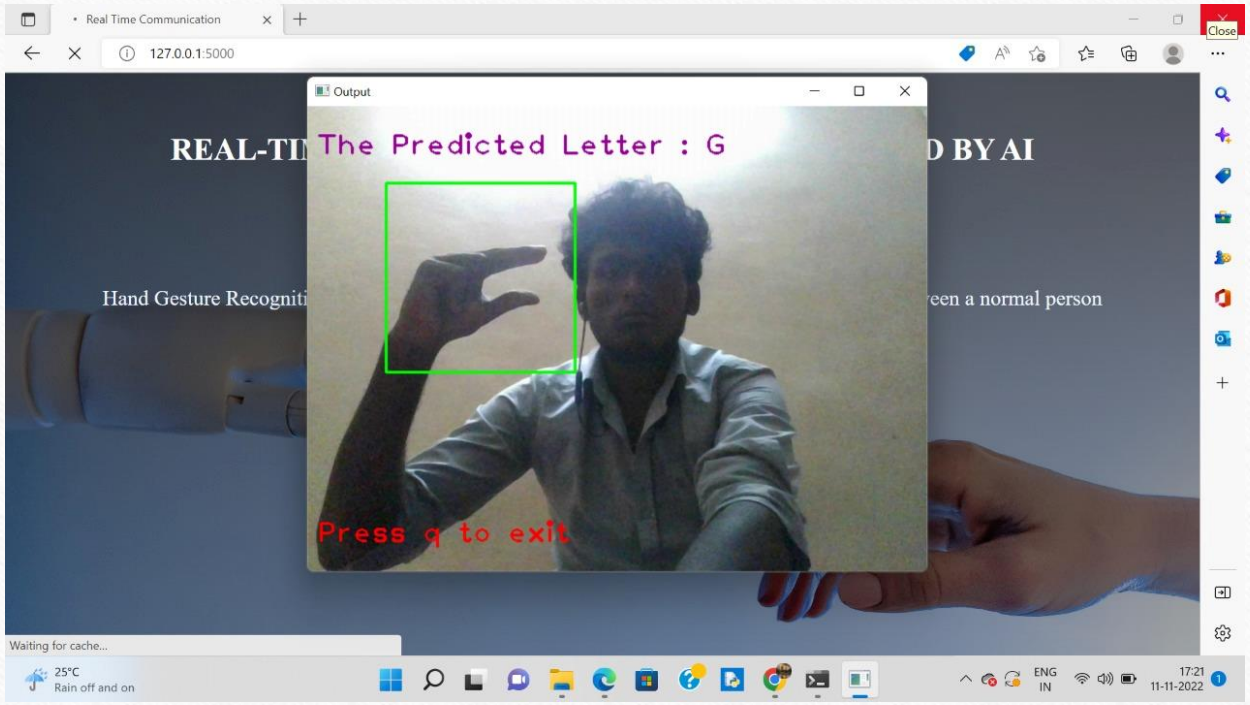
OUTPUTS


Real Time Communication
127.0.0.1:5000
Output
The Predicted Letter : E
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
25°C
Rain coming
ENG
IN
17:53
11-11-2022

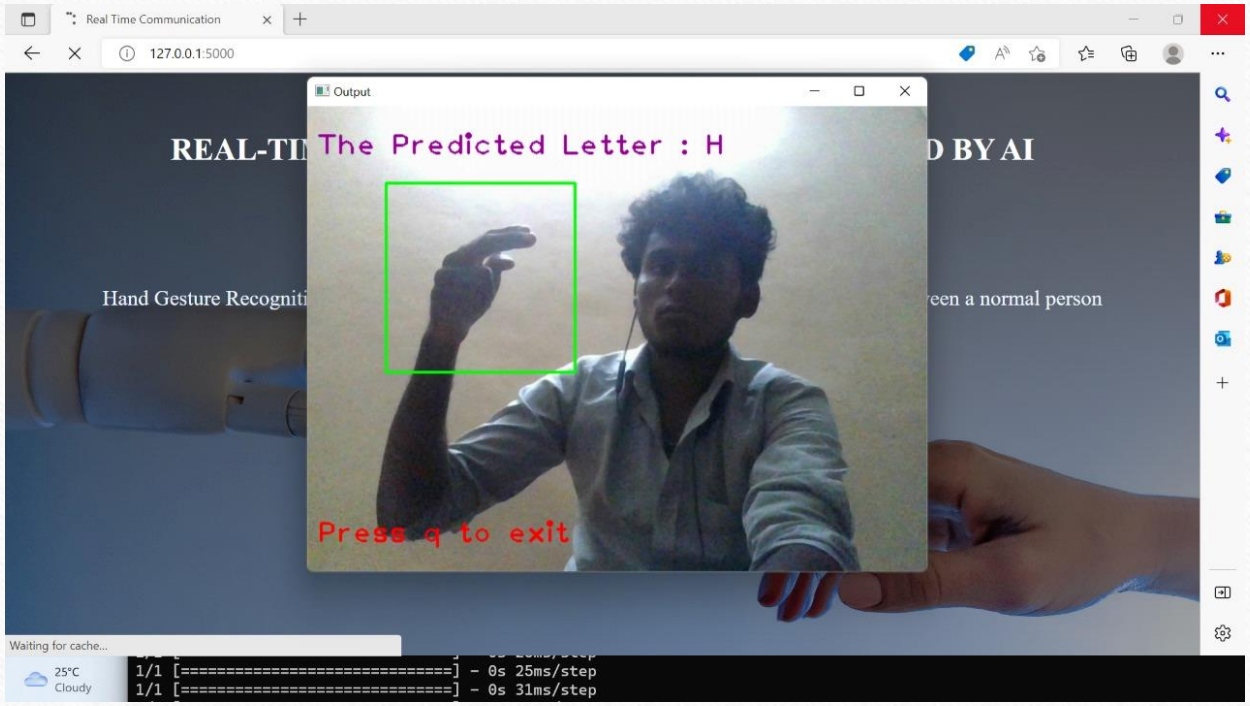
OUTPUTS


Real Time Communication
127.0.0.1:5000
Output
The Predicted Letter : F
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
Waiting for cache...
25°C
Rain off and on
ENG
IN
17:21
11-11-2022

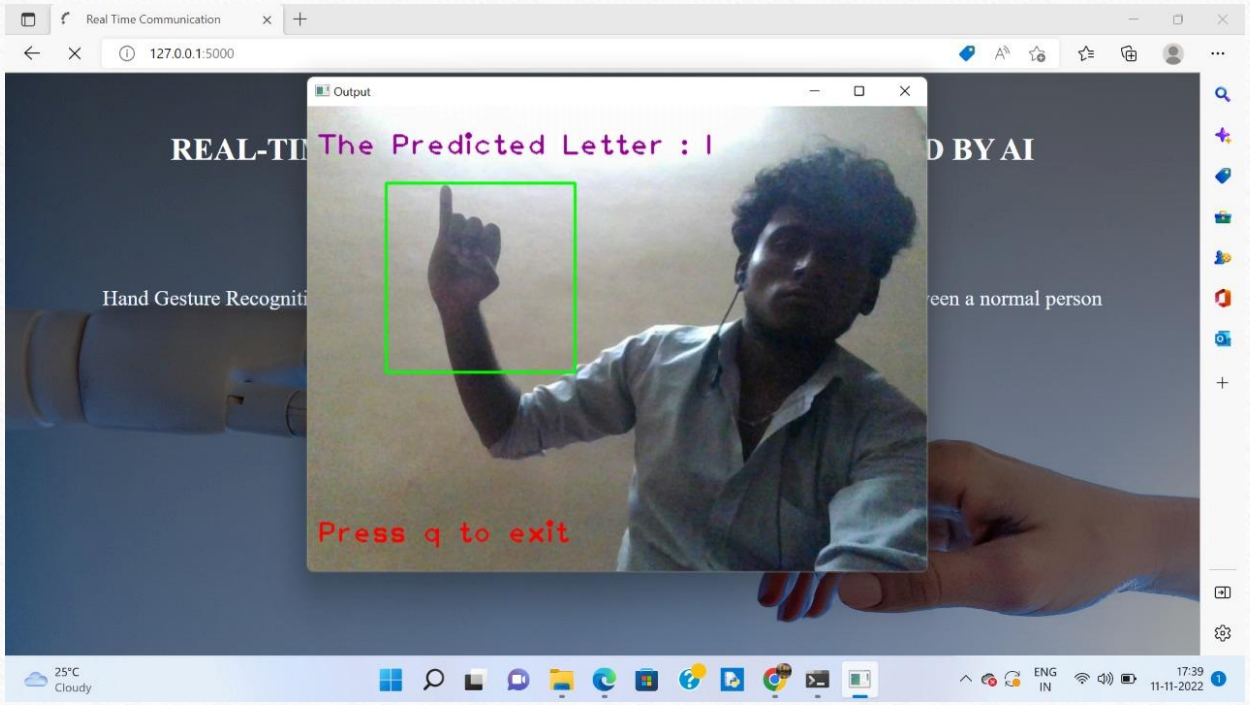
OUTPUTS


Real Time Communication
127.0.0.1:5000
Close
Output
The Predicted Letter : G
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
Waiting for cache...
25°C
Rain off and on
ENG
IN
17:21
11-11-2022

OUTPUTS


Real Time Communication
127.0.0.1:5000
Output
The Predicted Letter : H
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
Waiting for cache...
25°C
Cloudy
1/1 [==============================] - 0s 25ms/step
1/1 [==============================] - 0s 31ms/step

OUTPUTS


Real Time Communication
127.0.0.1:5000
Output
The Predicted Letter : I
Press q to exit
REAL-TI
D BY AI
Hand Gesture Recogniti
een a normal person
25°C
Cloudy
ENG
IN
17:39
11-11-2022

THANK YOU