GESTURE BASED INPUT SYSTEM

A project report submitted in partial fulfilment of the Academic requirements for the award of the Degree of

BACHELOR OF
ENGINEERING IN
INFORMATION TECHNOLOGY

By

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DEPARTMENT OF INFORMATION TECHNOLOGY

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(Affiliated to Osmania University, Hyderabad. Recognized by AICTE)
Nadergul, Saroornagar Mandal, Hyderabad-501510 2020-2021

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ABSTRACT

Gesture based input system is a new way to interact with computer system unlike traditional input devices (Keyboard and mouse). Webcam is used to recognize users hand based his/her gestures necessary system operations are performed like play/pause music, play games, virtual keyboard etc,.

Gesture Based Input System recognizes hand gestures in real-time using the power of Neural Networks**.** Through this System a user can interact with the computer easily without any traditional devices like Keyboard, Mouse and etc. future development can be made to recognize face gestures so even disabled people can easily interact with computers.

In our system we propose some non-complex algorithm and hand gestures to decrease the hand gesture recognition complexity and would be more easy and simple to control real-time computer systems.

INTRODUCTION

With the development in Computer Vision and Human Machine Interaction the Computer holds most important role in our daily life. Human Computer Interaction can provides several advantages with the introducing the different natural forms of device free communication. Gesture Based Input System is one of the several types of them to interact with the humans gestures are the natural form of action which we often used in our day to day life. But in computer application to interact humans with machine the interaction with devices like keyboard, mouse etc. must be requires. As the various hand gestures are frequently used by humans so the aim of this project is to reduce external hardware interaction which is required for computer application, and hence this causes system more reliable for use with ease.

This paper implements gesture based input system recognition technique to handing multimedia application. In this system, a gesture recognition scheme is been proposed as an interface between human and machine. In our system we represent some low-complexity algorithm and some hand gestures to decrease the gesture recognition complexity and which becomes easier to control real-time systems.

SYSTEM ANALYSIS

Objectives:

- Gesture based input system is a new way to interact with computer system unlike traditional input devices (Keyboard and mouse).
- Webcam is used to recognize users hand based his/her gestures necessary system operations are performed like play/pause music, play games, virtual keyboard etc.

Problem Specification:

- Gesture Based Input System implements technique to handing multimedia application, a gesture recognition scheme is been proposed as an interface between human and machine.
- In our system we represent some low-complexity algorithm and some hand gestures to decrease the gesture recognition complexity and which becomes easier to control real-time systems.

Proposed System:

- Using Hand Gesture Recognition Database dataset from Kaggle (7 hand gestures), we follow a series of steps to eliminate noise, unnecessary space and background.

Applications:

- A VLC media player system that has been controlled by various hand gestures consists of play, and pause, Full screen, and stop, increase volume, and decrease volume features.
- Gesture control is the ability to recognize and interpret movements of the human body in order to interact with and control a computer system without direct physical contact.

Modules and their functionalities:

The various modules of the project and their functionalities are described as below:

- **Data Collection Mode:** Allows the user to collect train, test, or validation data on a variety of hand gestures

- **Model Testing Mode:** Test the model's ability to discern between different gestures through real-time visualizations

- **Music-Player/ Gesture Mode:** Use gestures to play music, pause music, and change the volume of music.

  1. `Rad:` Plays the song.
  2. `Fist`: Plays the song.
  3. `Five`: Pauses the song.
  4. `Okay`: Increases the volume. Hold the pose to continue increasing the volume.
  5. `Peace`: Decreases the volume. Hold the pose to continue decreasing the volume.
  6. `Straight`: Stops the song.
  7. `None`: Does nothing.

SOFTWARE AND HARDWARE REQUIREMENTS

Languages used:

- Python.
- Machine Learning.

HARDWARE REQUIREMENTS

Requires at least 8GB of RAM and good processor.

SOFTWARE REQUIREMENTS

Packages used:

- OpenCV.
- Keras.
- PyGame.
- NumPy.
- TensorFlow.

Plugins:

- my_model_weights.h5.

LITERATURE SURVEY

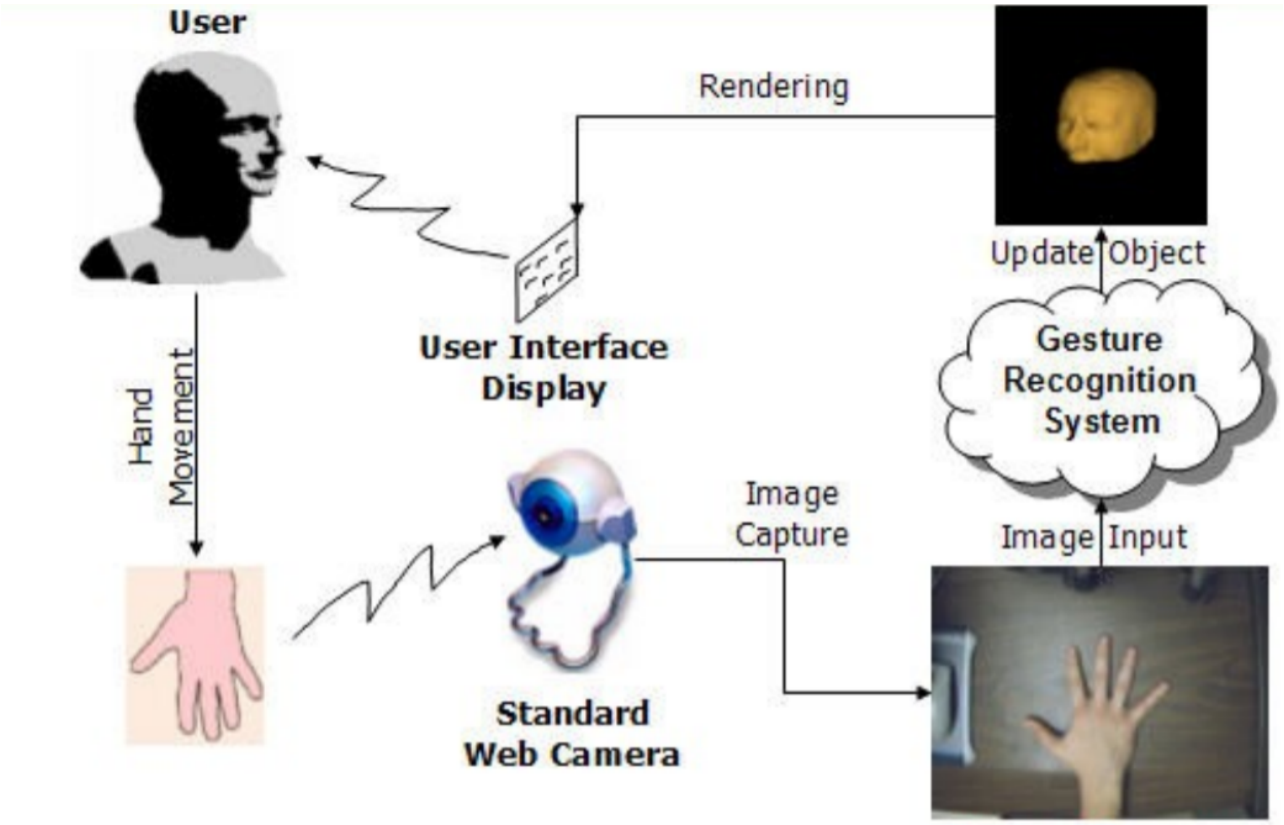
"Hand Gesture Recognition System" proposed the system which recognize the unknown input gestures by using hand masking. This system is applied to recognize the single gesture. There is assumption of stationary background so that system will have smaller search region for tracking. This system only control finger using it on web cam.

Controlling of media using hand gesture recognition this system uses various hand gestures as input to operate the media. This system uses single hand gestures and its directional motion which defines a particular gesture for the above mentioned application. In this system convolutional neural network used for classification. This system only supports media player and not any others. This system uses database that consists of various hand gestures and then the input was compared with this stored image and accordingly media was controlled.

In 2014, Viraj Shinde, Tushar Bacchav, Jitendra Pawar and Mangesh Sanap developed "Hand Gesture Recognition System Using Camera". They focus on using pointing behaviors for a natural interface to classify the dynamic hand gesture, they developed a simple and fast motion history image based method. This paper presents low complexity algorithm and gestures recognition complexity and more suitable for controlling real time computer system. It is applicable only for the application Of power point presentation.

DESIGN

System Architecture:



FLOW CHART

Created a Region of interest(ROI)

Capture the background

Create a background mask

Use threshold energy to create binary

Capture Data

Produce Action

ALGORITHM

Create a path for the data collection

Load dependencies

Background capture model

If a background has been captured

    Capture frame

    Flip frame

Applying smoothing filter that keeps edges sharp

Remove background

Selecting region of interest

Converting image to gray

Blurring the image

Threshold the image

Predicting and storing predictions

Draw new frame with graphs

Draw new data frame with mask

Show the frame

If q is pressed,

    quit the app

If r is pressed,

    reset the background

If d is pressed,

    go into to data collection mode

If p is pressed,

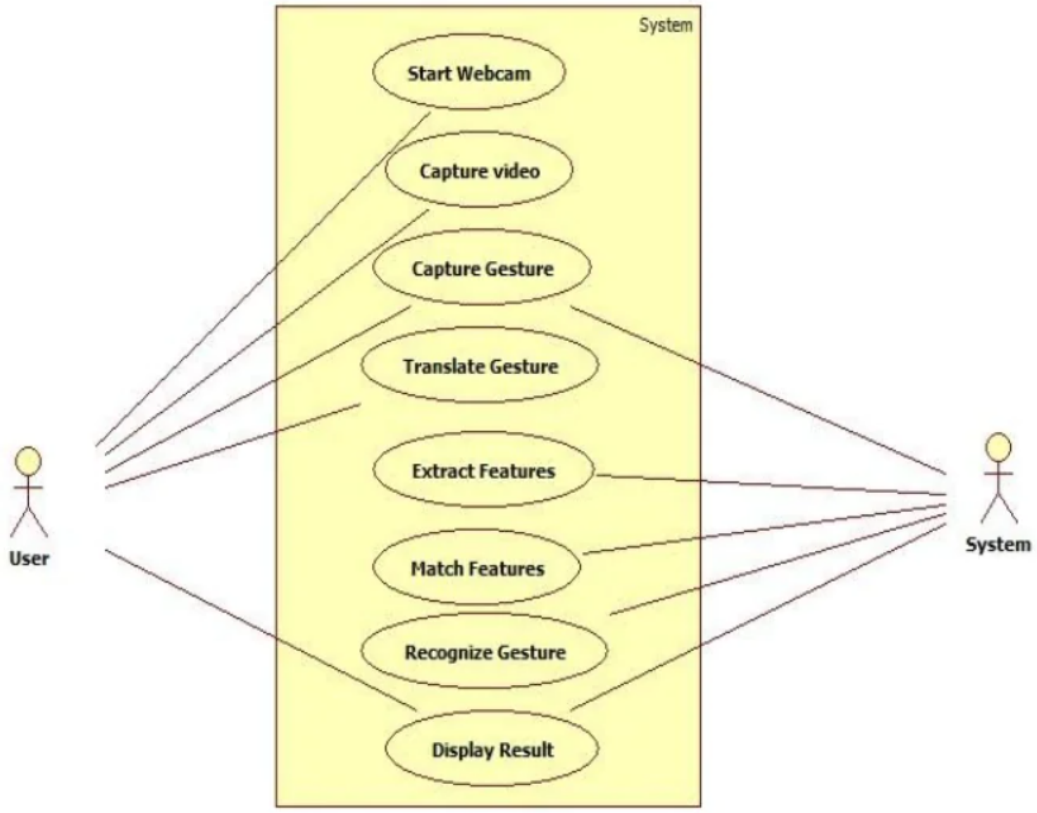
predict

If g is pressed

go into music player/gesture mode

Release the cap and close all windows if loop is broken

UML DIAGRAM



IMPLEMENTATION

```
print('Loading dependencies')
        # Importing Modules
import os
import time
import numpy as np
import cv2
import time
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense, Dropout
import tensorflow as tf
import pygame
        #GLOBAL VARIABLES
# Layout/FrontEnd of Frame
IMAGEHEIGHT = 480
IMAGEWIDTH = 640
ROIWIDTH = 256
LEFT = int(IMAGEWIDTH / 2 - ROIWIDTH / 2)
RIGHT = LEFT + ROIWIDTH
TOP = int(IMAGEHEIGHT / 2 - ROIWIDTH / 2)
BOTTOM = TOP + ROIWIDTH
SCOREBOXWIDTH = 320
BARCHARTLENGTH = SCOREBOXWIDTH - 50
BARCHARTTHICKNESS = 15
BARCHARTGAP = 20
BARCHARTOFFSET = 8
FONT = cv2.FONT_HERSHEY_SIMPLEX
```

 # Model variables

```
NUMBEROFGESTURES = 8

WEIGHTS_URL = './my_model_weights.h5'

GESTURE_ENCODING = {0: 'fist', 1: 'five', 2: 'none', 3: 'okay', 4: 'peace', 5: 'rad', 6: 'straight', 7: 'thumbs'}
```

 # OpenCV image processing variables

```
BGSUBTHRESHOLD = 50

THRESHOLD = 50
```

 # Gesture Mode variables

```
GESTUREMODE = False  # Don't ever edit this!

GESTURES_RECORDED = [10, 10, 10, 10, 10, 10, 10, 10, 10, 10]

SONG = 'The Beatles - I Saw Her Standing There'

ACTIONS_GESTURE_ENCODING = {'fist': 'Play/Unpause', 'five': 'Pause', 'none': 'Do Nothing', 'okay': 'Increase Volume', 'peace': 'Decrease Volume', 'rad': "Load Song", 'straight': "Stop", "thumbs": "NA"}
```

 # Data Collection Mode variables

```
DATAMODE = False  # Don't ever edit this!

WHERE = "train"

GESTURE = "okay"

NUMBERTOCAPTURE = 100
```

 # Testing Predictions of Model Mode variables

```
PREDICT = False  # Don't ever edit this!

HISTORIC_PREDICTIONS = [np.ones((1, 8)), np.ones((1, 8)), np.ones((1, 8)), np.ones((1, 8)), np.ones((1, 8))]

IMAGEAVERAGING = 5
```

#MUSIC PLAYER CLASS

 # Music Player Class. Contains functions to load, play, pause, adjust volume, and stop music

```
class MusicMan(object):

    def __init__(self, file):
```

```
        print("Loading music player...")
        pygame.mixer.init()
        self.player = pygame.mixer.music
        self.song = file
        self.file = f"./music/{file}.mp3"
        self.state = None
    def load(self):
        if self.state is None:
            self.player.load(self.file)
            self.state = "loaded"
    def play(self):
        if self.state == "pause":
            self.player.unpause()
            self.state = "play"
        elif self.state in ["loaded", "stop"]:
            self.player.play()
            self.state = "play"
    def pause(self):
        if self.state == "play":
            self.player.pause()
            self.state = "pause"
    def increase_volume(self):
        if self.state is not None:
            self.player.set_volume(self.player.get_volume() - 0.02)
    def decrease_volume(self):
```

```
        if self.state is not None:
            self.player.set_volume(self.player.get_volume() + 0.02)
    def stop(self):
        if self.state == "play":
            self.player.stop()
            self.state = "stop"
            #USEFUL FUNCTIONS
            # Creating a path for storing data
def create_path(WHERE, GESTURE):
    print("Creating path to store data for collection...")
    DIR_NAME = f"./data/{WHERE}/{GESTURE}"
    if not os.path.exists(DIR_NAME):
        os.makedirs(DIR_NAME)
    if len(os.listdir(DIR_NAME)) == 0:
        img_label = int(1)
    else:
        img_label = int(sorted(os.listdir(DIR_NAME), key=len)[-1][:-4])
    return img_label
            # Creating our deep learning model to recognize the hand image
def create_model(outputSize):
    model = Sequential()
    model.add(Conv2D(filters=32, kernel_size=(3, 3), activation='relu', input_shape=(256, 256, 1)))
    model.add(Conv2D(filters=32, kernel_size=(3, 3), activation='relu'))
    model.add(MaxPooling2D(pool_size=2))
    model.add(Conv2D(filters=64, kernel_size=(3, 3), activation='relu'))
    model.add(Conv2D(filters=64, kernel_size=(3, 3), activation='relu'))
```

```
    model.add(MaxPooling2D(pool_size=2))
    model.add(Conv2D(filters=128, kernel_size=(3, 3), activation='relu'))
    model.add(Conv2D(filters=128, kernel_size=(3, 3), activation='relu'))
    model.add(MaxPooling2D(pool_size=2))
    model.add(Flatten())
    model.add(Dropout(rate=0.5))
    model.add(Dense(512, activation='relu'))
    model.add(Dense(units=outputSize, activation='softmax'))
    model.compile(optimizer=tf.keras.optimizers.Adam(lr=1e-4), loss='categorical_crossentropy',
metrics=['accuracy'])
    return model
```

 # Function to load the model

```
def load_model(outputSize, weight_url):
```

 # Loading the model

```
    modelName = 'Hand Gesture Recognition'
    print(f'Loading model {modelName}')
    model = create_model(NUMBEROFGESTURES)
    model.load_weights(weight_url)
    return model, modelName
```

 # Function that counts the number of times the last element is repeated (starting at the end of the array)

```
# without any gap. Returns the count and the percentage (count/length of array)
# For example [1, 1, 1, 2] would return 1, 0.25 while [1,1,2,2] would return 2, 0.5
# [1,1,1,1] would return 4, 1
def find_last_rep(array):
    last_element = array[-1]
    count = 0
```

```
    for ele in reversed(array):
        if last_element == ele:
            count += 1
        else:
            return count, count / len(array)
    return count, count / len(array)
# Draw frame to side of video capture. Populate this frame with front
# end for gesture and prediction modes
def drawSideFrame(historic_predictions, frame, modelName, label):
    global GESTURES_RECORDED
            # Streaming
    dataText = "Streaming..."
            # Creating the score frame
    score_frame = 200 * np.ones((IMAGEHEIGHT, SCOREBOXWIDTH, 3), np.uint8)
            # GESTURE MODE front end stuff
    if GESTUREMODE:
        GESTURES_RECORDED.append(label)
        GESTURES_RECORDED = GESTURES_RECORDED[-10:]
        count, percent_finished = find_last_rep(GESTURES_RECORDED)
            # If the array recording the timeline of gestures only contains one gesture
        if len(set(GESTURES_RECORDED)) == 1:
            # See the command
            command = GESTURE_ENCODING[GESTURES_RECORDED[-1]]
            # Use the Music Class to play the command accordingly
            if command == "fist":
                music.play()
            elif command == "five":
                music.pause()
```

```
        elif command == "none":
            pass
        elif command == "okay":
            music.decrease_volume()
        elif command == "peace":
            music.increase_volume()
        elif command == "rad":
            music.load()
        elif command == "straight":
            music.stop()
        elif command == "thumbs":
            pass
    # Colors of the bar graph showing progress of the gesture recognition
    if percent_finished == 1:
        color = (0, 204, 102)
    else:
        color = (20, 20, 220)
    # Drawing the bar chart
    start_pixels = np.array([20, 175])
    text = '{} ({}%)'.format(GESTURE_ENCODING[GESTURES_RECORDED[-1]],
percent_finished * 100)
    cv2.putText(score_frame, text, tuple(start_pixels), FONT, 0.5, (0, 0, 0), 2, cv2.LINE_AA)
    chart_start = start_pixels + np.array([0, BARCHARTOFFSET])
    length = int(percent_finished * BARCHARTLENGTH)
    chart_end = chart_start + np.array(
        [length, BARCHARTTHICKNESS])
    cv2.rectangle(score_frame, tuple(chart_start), tuple(chart_end), color, cv2.FILLED)
    # Adding text
```

```
        cv2.putText(score_frame, 'Press G to turn of gesture mode', (20, 25), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

        cv2.putText(score_frame, f'Model : {modelName}', (20, 50), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

        cv2.putText(score_frame, f'Data source : {dataText}', (20, 75), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

        cv2.putText(score_frame, f'Song : {music.song}', (20, 100), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

        cv2.putText(score_frame, f'Label : {GESTURE_ENCODING[label]}', (20, 125), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

        cv2.putText(score_frame, f'Action : {ACTIONS_GESTURE_ENCODING[GESTURE_ENCODING[label]]}', (20, 150), FONT, 0.55,

                    (0, 0, 0), 2, cv2.LINE_AA)

    # PREDICT MODE front end stuff

    elif PREDICT:

        cv2.putText(score_frame, 'Press P to stop testing predictions', (20, 25), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

        cv2.putText(score_frame, f'Model : {modelName}', (20, 50), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

        cv2.putText(score_frame, f'Data source : {dataText}', (20, 75), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)

     # Converting predictions into an array

        predictions = np.array(historic_predictions)

        # Taking a mean of historic predictions

        average_predictions = predictions.mean(axis=0)[0]

        sorted_args = list(np.argsort(average_predictions))

        # Drawing the prediction probabilities in a bar chart

        start_pixels = np.array([20, 150])

        for count, arg in enumerate(list(reversed(sorted_args))):

            probability = round(average_predictions[arg])

           predictedLabel = GESTURE_ENCODING[arg]

           if arg == label:
```

```
            color = (0, 204, 102)
        else:
            color = (20, 20, 220)
        text = '{}. {} ({}%)'.format(count + 1, predictedLabel, probability * 100)
        cv2.putText(score_frame, text, tuple(start_pixels), FONT, 0.5, (0, 0, 0), 2, cv2.LINE_AA)
        chart_start = start_pixels + np.array([0, BARCHARTOFFSET])
        length = int(probability * BARCHARTLENGTH)
        chart_end = chart_start + np.array(
            [length, BARCHARTTHICKNESS])
        cv2.rectangle(score_frame, tuple(chart_start), tuple(chart_end), color, cv2.FILLED)
        start_pixels = start_pixels + np.array([0, BARCHARTGAP + BARCHARTTHICKNESS +
BARCHARTOFFSET])
    # No mode active front end stuff
    else:
        cv2.putText(score_frame, 'Press P to test model', (20, 25), FONT, 0.55, (0, 0, 0), 2, cv2.LINE_AA)
        cv2.putText(score_frame, 'Press G for Gesture Mode', (20, 50), FONT, 0.55, (0, 0, 0), 2,
cv2.LINE_AA)
        cv2.putText(score_frame, 'Press R to reset background', (20, 75), FONT, 0.55, (0, 0, 0), 2,
cv2.LINE_AA)
        cv2.putText(score_frame, f'Model : {modelName}', (20, 100), FONT, 0.55, (0, 0, 0), 2,
cv2.LINE_AA)
        cv2.putText(score_frame, f'Data source : {dataText}', (20, 125), FONT, 0.55, (0, 0, 0), 2,
cv2.LINE_AA)
        music.stop()
    return np.hstack((score_frame, frame))
# The controller/frontend that subtracts the background
def capture_background():
    cap = cv2.VideoCapture(0)
    while True:
        ret, frame = cap.read()
```

```
        if not ret:
            break
        frame = cv2.flip(frame, 1)
        cv2.putText(frame, "Press B to capture background.", (5, 50), FONT, 0.7, (255, 255, 255), 2, cv2.LINE_AA)
        cv2.putText(frame, "Press Q to quit.", (5, 80), FONT, 0.7, (255, 255, 255), 2, cv2.LINE_AA)
        cv2.rectangle(frame, (LEFT, TOP), (RIGHT, BOTTOM), (0, 0, 0), 1)
        cv2.imshow('Capture Background', frame)
        k = cv2.waitKey(5)
        # If key b is pressed
        if k == ord('b'):
            bgModel = cv2.createBackgroundSubtractorMOG2(0, BGSUBTHRESHOLD)
            # cap.release()
            cv2.destroyAllWindows()
            break
        # If key q is pressed
        elif k == ord('q'):
            bgModel = None
            cap.release()
            cv2.destroyAllWindows()
            break
    return bgModel
# Remove the background from a new frame
def remove_background(bgModel, frame):
    fgmask = bgModel.apply(frame, learningRate=0)
    kernel = np.ones((3, 3), np.uint8)
    eroded = cv2.erode(fgmask, kernel, iterations=1)
    res = cv2.bitwise_and(frame, frame, mask=eroded)
```

```
    return res
# Show the processed, thresholded image of hand in side frame on right
def drawMask(frame, mask):
    mask = cv2.cvtColor(mask, cv2.COLOR_GRAY2BGR)
    mask_frame = 200 * np.ones((IMAGEHEIGHT, ROIWIDTH + 20, 3), np.uint8)
    mask_frame[10:266, 10:266] = mask
    cv2.putText(mask_frame, "Mask",
                (100, 290), FONT, 0.7, (0, 0, 0), 2, cv2.LINE_AA)
    return np.hstack((frame, mask_frame))
if __name__ == '__main__':
    # Create a path for the data collection
    img_label = create_path(WHERE, GESTURE)
    # Load dependencies
    model, modelName = load_model(NUMBEROFGESTURES, WEIGHTS_URL)
    music = MusicMan(SONG)
    print("Starting live video stream...")
    # Background capture model
    bgModel = capture_background()
    # If a background has been captured
    if bgModel:
        cap = cv2.VideoCapture(0)
       while True:
            # Capture frame
            label, frame = cap.read()
        # Flip frame
           frame = cv2.flip(frame, 1)
            # Applying smoothing filter that keeps edges sharp
            frame = cv2.bilateralFilter(frame, 5, 50, 100)
```

```
        cv2.rectangle(frame, (LEFT, TOP), (RIGHT, BOTTOM), (0, 0, 0), 1)
        # Remove background
        no_background = remove_background(bgModel, frame)
        # Selecting region of interest
        roi = no_background[TOP:BOTTOM, LEFT:RIGHT]
        # Converting image to gray
        gray = cv2.cvtColor(roi, cv2.COLOR_BGR2GRAY)
        # Blurring the image
        blur = cv2.GaussianBlur(gray, (41, 41), 0)
        # Thresholding the image
        ret, thresh = cv2.threshold(blur, THRESHOLD, 255, cv2.THRESH_BINARY)
        # Predicting and storing predictions
        prediction = model.predict(thresh.reshape(1, 256, 256, 1) / 255)
        prediction_final = np.argmax(prediction)
        HISTORIC_PREDICTIONS.append(prediction)
        HISTORIC_PREDICTIONS = HISTORIC_PREDICTIONS[-IMAGEAVERAGING:]
        # Draw new frame with graphs
        new_frame = drawSideFrame(HISTORIC_PREDICTIONS, frame, 'Gesture Model',
prediction_final)
        # Draw new dataframe with mask
        new_frame = drawMask(new_frame, thresh)
        # If Datamode
        if DATAMODE:
            time.sleep(0.03)
            cv2.imwrite(f"./data/{WHERE}/{GESTURE}" + f"/{img_label}.png", thresh)
            cv2.putText(new_frame, "Photos Captured:", (980, 400), FONT, 0.7, (0, 0, 0), 2,
cv2.LINE_AA)
            cv2.putText(new_frame, f"{i}/{NUMBERTOCAPTURE}", (1010, 430), FONT, 0.7, (0, 0,
0), 2, cv2.LINE_AA)
```

```
            img_label += 1
            i += 1
            if i > NUMBERTOCAPTURE:
                cv2.putText(new_frame, "Done!", (980, 400), FONT, 0.7, (0, 0, 0), 2, cv2.LINE_AA)
                DATAMODE = False
                i = None
        else:
            cv2.putText(new_frame, "Press D to collect", (980, 375), FONT, 0.6, (0, 0, 0), 2,
cv2.LINE_AA)
            cv2.putText(new_frame, f"{NUMBERTOCAPTURE} {WHERE} images", (980, 400),
FONT, 0.6, (0, 0, 0), 2,cv2.LINE_AA)
            cv2.putText(new_frame, f"for gesture {GESTURE}", (980, 425), FONT, 0.6, (0, 0, 0), 2,
cv2.LINE_AA)
        # Show the frame
        cv2.imshow('Gesture Jester', new_frame)
        key = cv2.waitKey(5)
        # If q is pressed, quit the app
        if key == ord('q'):
            break
        # If r is pressed, reset the background
        if key == ord('r'):
            PREDICT = False
            DATAMODE = False
            cap.release()
            cv2.destroyAllWindows()
            bgModel = capture_background()
            cap = cv2.VideoCapture(0)
        # If d is pressed, go into to data collection mode
        if key == ord('d'):
```

```
            PREDICT = False
            GESTUREMODE = False
            DATAMODE = True
            i = 1
        # If p is pressed, predict
        if key == ord('p'):
            GESTUREMODE = False
            DATAMODE = False
            PREDICT = not PREDICT
       # If g is pressed go into music player/gesture mode
        if key == ord('g'):
            DATAMODE = False
            PREDICT = False
            GESTUREMODE = not GESTUREMODE
    # Release the cap and close all windows if loop is broken
    cap.release()
cv2.destroyAllWindows()
```

TESTING

S.no	Description	Gestures	Status
1)	Capturing, masking Background	Background is captured and masked accordingly.(Fig-1)	Success
2)	Load song	Song is loaded by **rad gesture** (fig-3)	Success
3)	Play song	Song is played by **fist gesture** (fig-4)	Success
4)	Increase volume	Volume is increased by **okay gesture**(fig-6)	Success
5)	Decrease volume	Volume is decreased by **peace gesture**(fig-5)	Success
6)	Pause song	Song is paused by **five gesture**(fig-7)	Success
7)	Stop song	Song is stopped by **straight gesture**(fig-8)	Success
8)	Doing Nothing	**None**(fig-2)	Success
9)	Action not applicable	**Thumb gesture**(fig-9)	Success

SCREENSHOTS

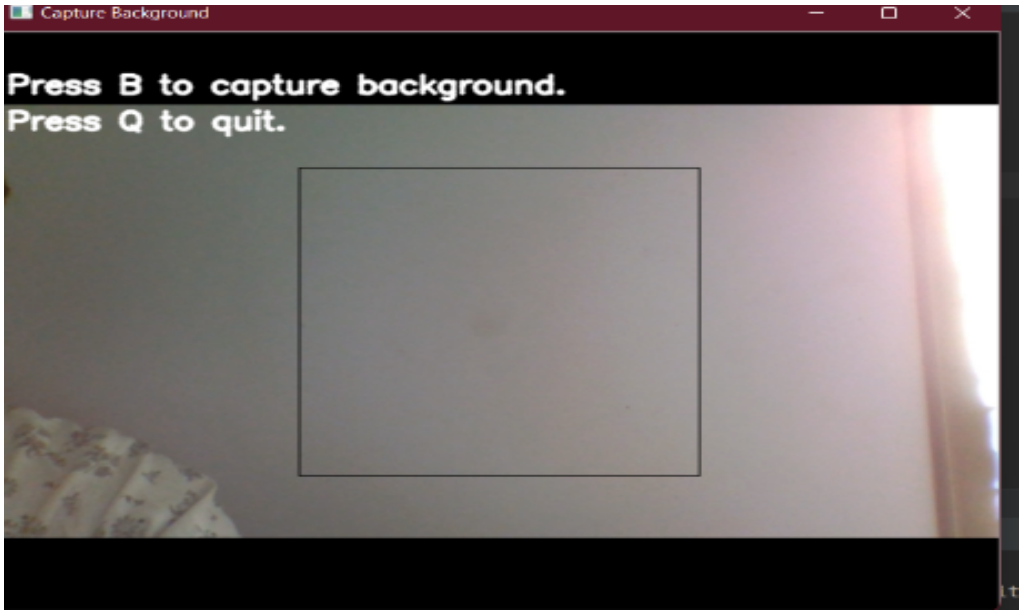


FIG-1

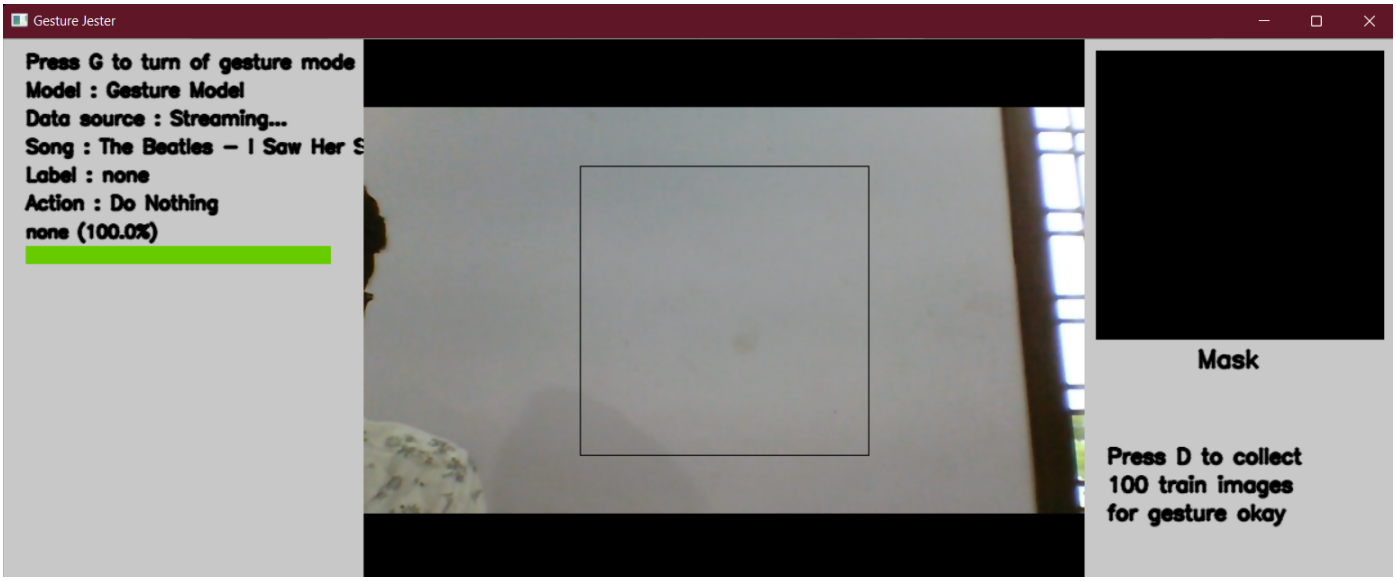


FIG-2

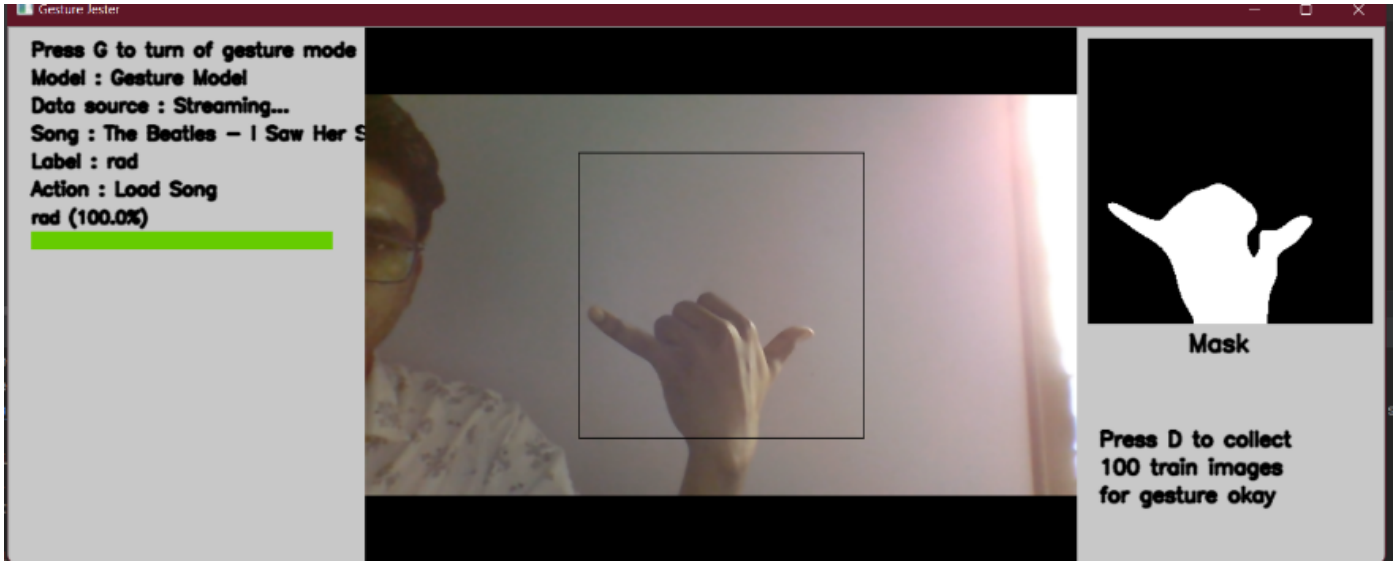

Gesture Jester
Press G to turn of gesture mode
Model : Gesture Model
Data source : Streaming...
Song : The Beatles – I Saw Her S
Label : rad
Action : Load Song
rad (100.0%)
Mask
Press D to collect
100 train images
for gesture okay

FIG-3

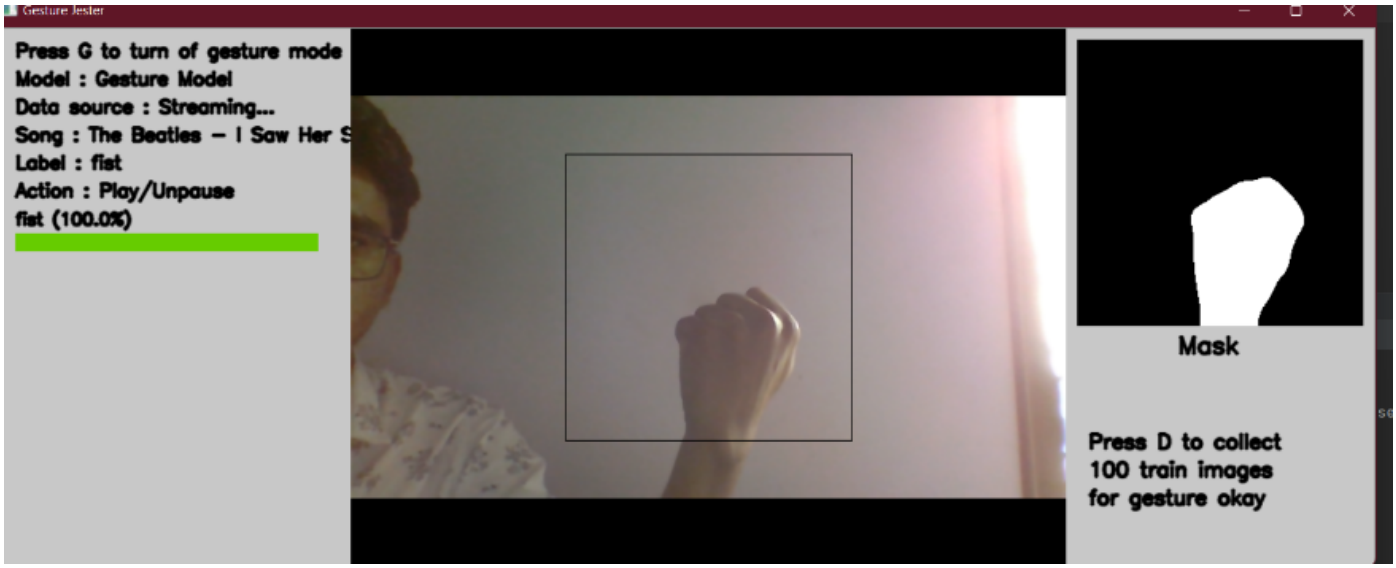

Gesture Jester
Press G to turn of gesture mode
Model : Gesture Model
Data source : Streaming...
Song : The Beatles – I Saw Her S
Label : fist
Action : Play/Unpause
fist (100.0%)
Mask
Press D to collect
100 train images
for gesture okay

FIG-4

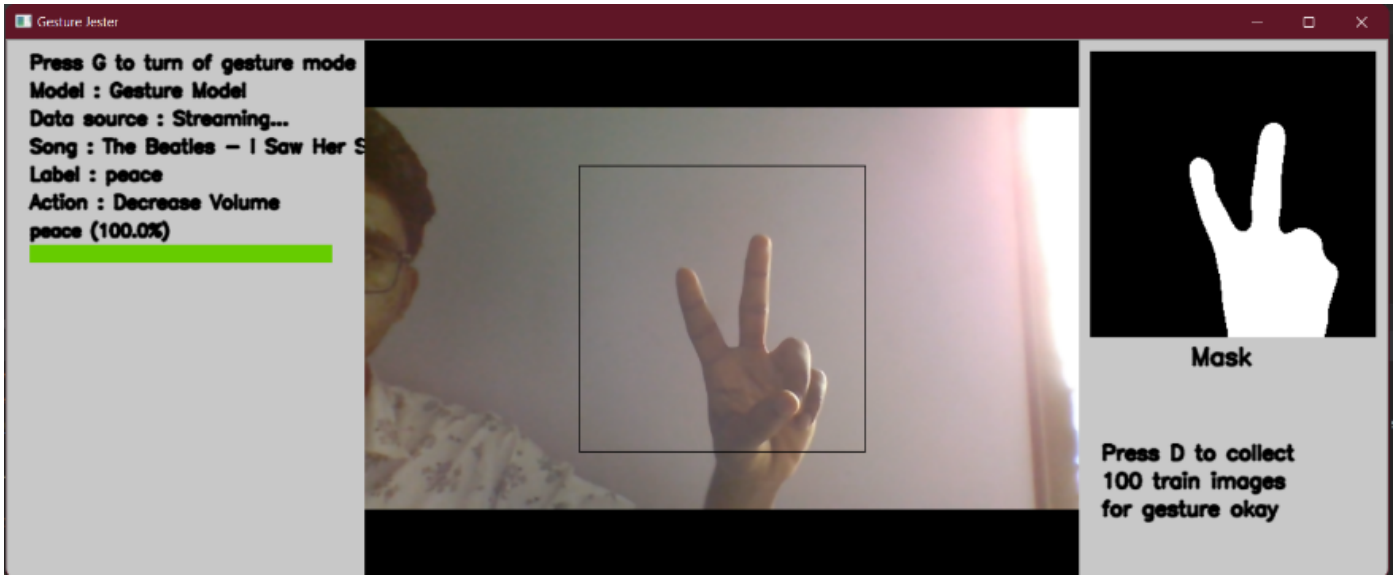

Gesture Jester
Press G to turn of gesture mode
Model : Gesture Model
Data source : Streaming...
Song : The Beatles – I Saw Her S
Label : peace
Action : Decrease Volume
peace (100.0%)
Mask
Press D to collect
100 train images
for gesture okay

FIG-5

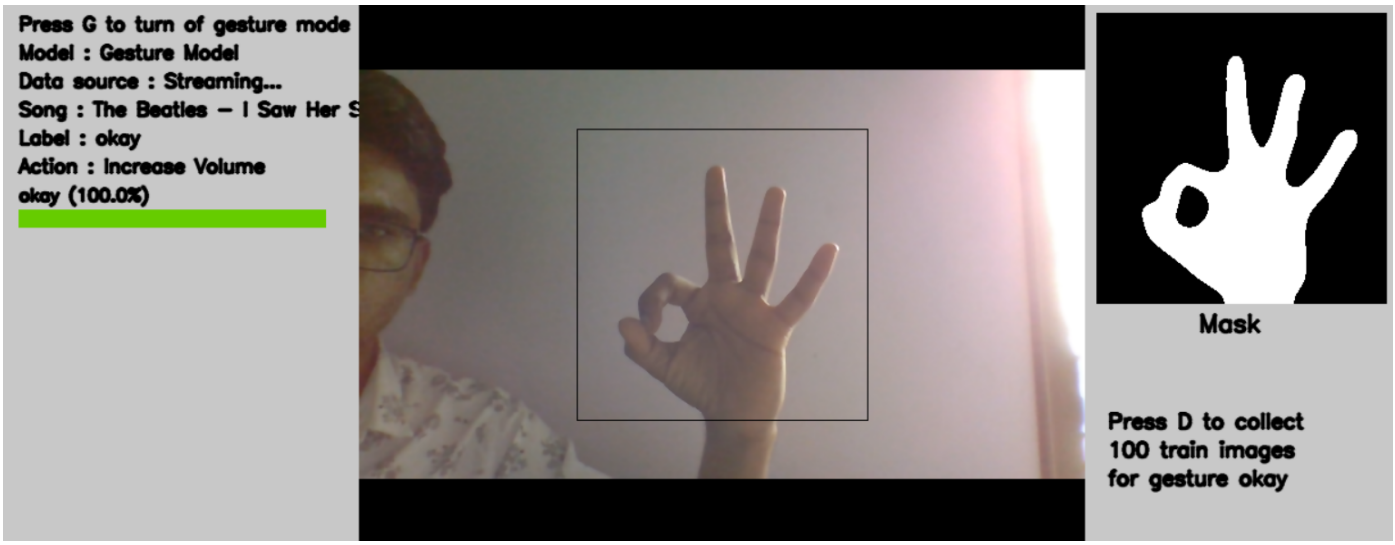

Press G to turn of gesture mode
Model : Gesture Model
Data source : Streaming...
Song : The Beatles – I Saw Her S
Label : okay
Action : Increase Volume
okay (100.0%)
Mask
Press D to collect
100 train images
for gesture okay

FIG-6

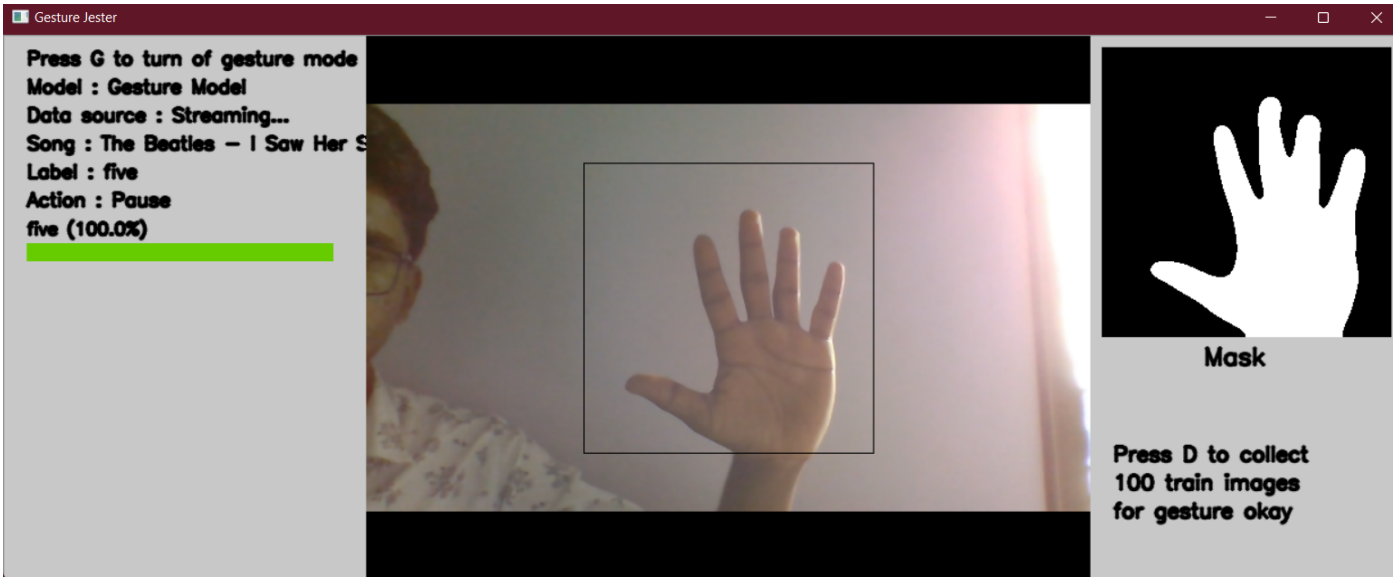

Gesture Jester
Press G to turn of gesture mode
Model : Gesture Model
Data source : Streaming...
Song : The Beatles – I Saw Her S
Label : five
Action : Pause
five (100.0%)
Mask
Press D to collect
100 train images
for gesture okay

FIG-7

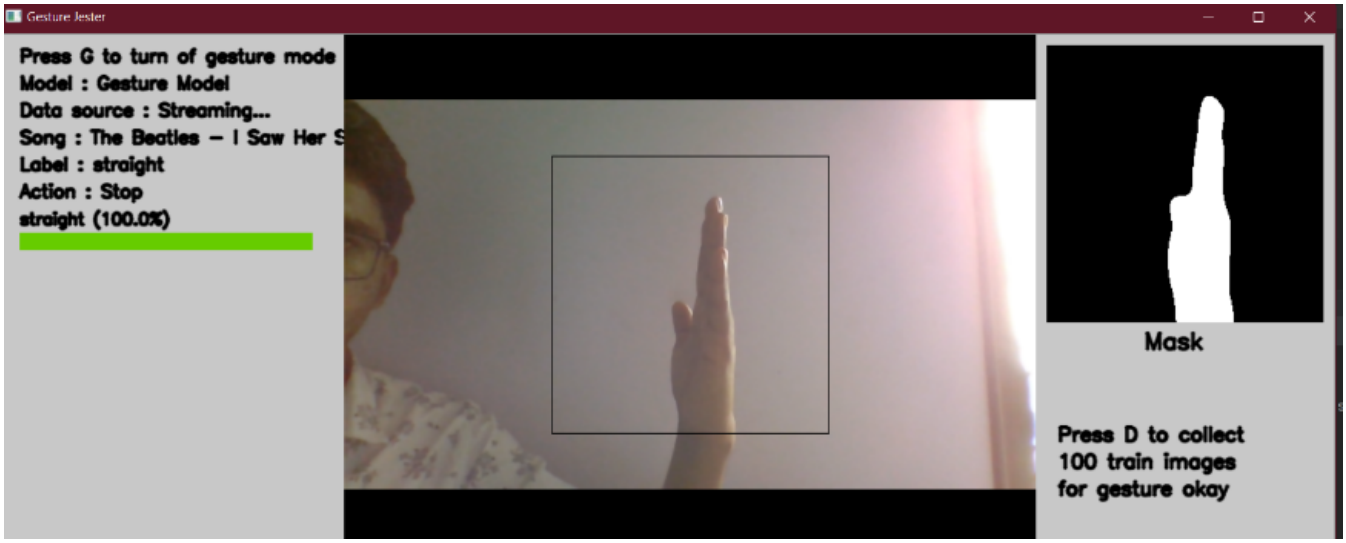

Gesture Jester
Press G to turn of gesture mode
Model : Gesture Model
Data source : Streaming...
Song : The Beatles – I Saw Her S
Label : straight
Action : Stop
straight (100.0%)
Mask
Press D to collect
100 train images
for gesture okay

FIG-8

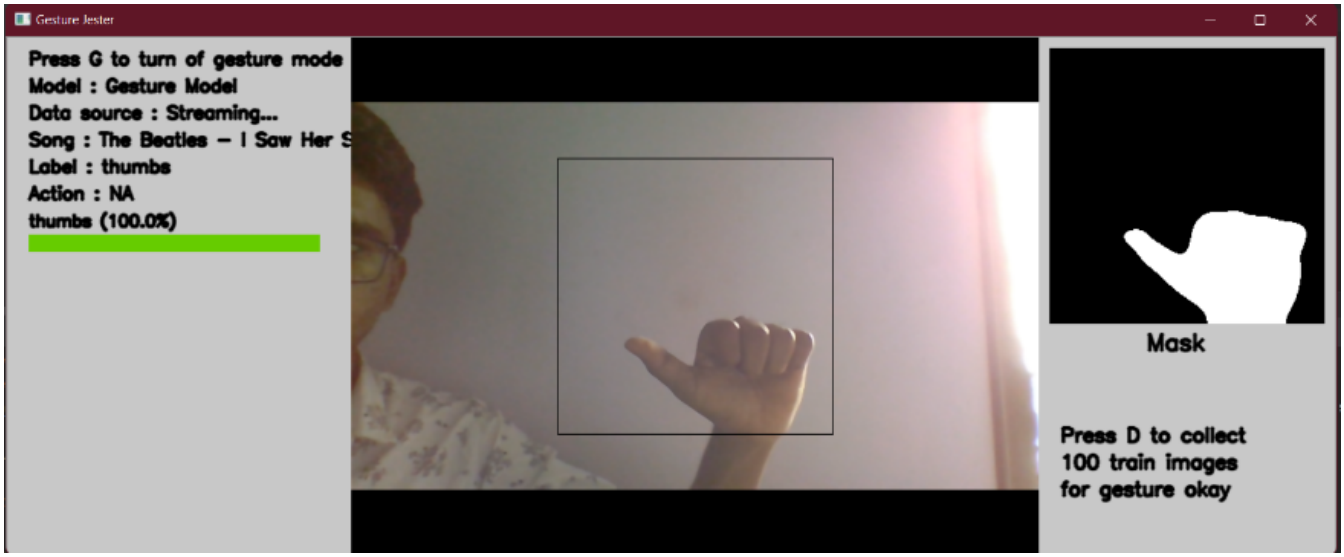

Gesture Jester
Press G to turn of gesture mode
Model : Gesture Model
Data source : Streaming...
Song : The Beatles – I Saw Her S
Label : thumbs
Action : NA
thumbs (100.0%)
Mask
Press D to collect
100 train images
for gesture okay

FIG-9

10. CONCLUSION AND FUTURE ENHANCEMENT

CONCLUSION

Through this System a user can interact with the computer easily without any traditional devices like Keyboard, Mouse and etc. future development can be made to recognize face gestures so even disabled people can easily interact with computer

FUTURE SCOPE

As a future prospect of this research we are also going to investigate with the large number of gestures with different persons and motion type hand gestures are developed. We are also going to generalize our system so that it can be useful for other different media players available in market.

REFERENCES

- Google Medium
- Kaggle Dataset
- OpenCv and autogui
- CNN Documentation
- N.Krishna Chaitanya and R.Janardhan Rao “Controlling of windows media player using hand recognition system”, The International Journal Of Engineering And Science (IJES), Vol. 3, Issue 12, Pages 01-04, 2014.
- For demo video click here

  https://youtu.be/LHZYJFbuRwY

APPENDICES

Abbreviations:

- **RAM**: Random Access Memory.
- **GB**: Gigabyte.

List of Figures:

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