Application building

After the model is trained in this particular milestone, we will be building our flask application which will be running in out local browser with a user interface

Build Python code

Importing Libraries

```
from flask import Flask,render_template,request
# Flask-It is our framework which we are going to use to run/serve our application.
#request-for accessing file which was uploaded by the user on our application.
import operator
import cv2 # opencv library
from tensorflow.keras.models import load_model#to load our trained model
import os
from werkzeug.utils import secure_filename
```

Creating our flask applications and loading our model

```
app = Flask(__name__,template_folder="templates") # initializing a flask app
# Loading the model
model=load_model('gesture.h5')
print("Loaded model from disk")
```

Routing to the html page

```
@app.route('/')# route to display the home page
def home():
    return render_template('home.html')#rendering the home page


@app.route('/intro') # routes to the intro page
def intro():
    return render_template('intro.html')#rendering the intro page

@app.route('/image1',methods=['GET','POST'])# routes to the index html
def image1():
    return render_template("index6.html")
```

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```

Code

Getting our input and storing it

```
if request.method == 'POST':
    print("inside image")
    f = request.files['image']

    basepath = os.path.dirname(__file__)
    file_path = os.path.join(basepath, 'uploads', secure_filename(f.filename))
    f.save(file_path)
```

Grab the frames from the web cam

```
cap = cv2.VideoCapture(0)
while True:
    _, frame = cap.read() #capturing the video frame values
    # Simulating mirror image
    frame = cv2.flip(frame, 1)
```

Creating ROI

```
# Got this from collect-data.py
# Coordinates of the ROI
x1 = int(0.5*frame.shape[1])
y1 = 10
x2 = frame.shape[1]-10
y2 = int(0.5*frame.shape[1])
# Drawing the ROI
# The increment/decrement by 1 is to compensate for the bounding box
cv2.rectangle(frame, (x1-1, y1-1), (x2+1, y2+1), (255,0,0) ,1)
# Extracting the ROI
roi = frame[y1:y2, x1:x2]

# Resizing the ROI so it can be fed to the model for prediction
roi = cv2.resize(roi, (64, 64))
roi = cv2.cvtColor(roi, cv2.COLOR_BGR2GRAY)
_, test_image = cv2.threshold(roi, 120, 255, cv2.THRESH_BINARY)
cv2.imshow("test", test_image)
```

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Predicting our results

```
result = model.predict(test_image.reshape(1, 64, 64, 1))
prediction = {'ZERO': result[0][0],
              'ONE': result[0][1],
              'TWO': result[0][2],
              'THREE': result[0][3],
              'FOUR': result[0][4],
              'FIVE': result[0][5]}
# Sorting based on top prediction
prediction = sorted(prediction.items(), key=operator.itemgetter(1), reverse=True)

# Displaying the predictions
cv2.putText(frame, prediction[0][0], (10, 120), cv2.FONT_HERSHEY_PLAIN, 1, (0,255,255), 1)
cv2.imshow("Frame", frame)
```

```
        #loading an image
        image1=cv2.imread(file_path)
        if prediction[0][0]=='ONE':

            resized = cv2.resize(image1, (200, 200))
            cv2.imshow("Fixed Resizing", resized)
            key=cv2.waitKey(3000)

            if (key & 0xFF) == ord("1"):
                cv2.destroyWindow("Fixed Resizing")

        elif prediction[0][0]=='ZERO':

            cv2.rectangle(image1, (480, 170), (650, 420), (0, 0, 255), 2)
            cv2.imshow("Rectangle", image1)
            cv2.waitKey(0)
            key=cv2.waitKey(3000)
            if (key & 0xFF) == ord("0"):
                cv2.destroyWindow("Rectangle")

        elif prediction[0][0]=='TWO':
            (h, w, d) = image1.shape
            center = (w // 2, h // 2)
            M = cv2.getRotationMatrix2D(center, -45, 1.0)
            rotated = cv2.warpAffine(image1, M, (w, h))
            cv2.imshow("OpenCV Rotation", rotated)
            key=cv2.waitKey(3000)
            if (key & 0xFF) == ord("2"):
                cv2.destroyWindow("OpenCV Rotation")

        elif prediction[0][0]=='THREE':
            blurred = cv2.GaussianBlur(image1, (11, 11), 0)
            cv2.imshow("Blurred", blurred)
            key=cv2.waitKey(3000)
            if (key & 0xFF) == ord("3"):
                cv2.destroyWindow("Blurred")
        else:
            continue


        interrupt = cv2.waitKey(10)
        if interrupt & 0xFF == 27: # esc key
            break


    cap.release()
    cv2.destroyAllWindows()
return render_template("home.html")
```