# Model Development Phase Template

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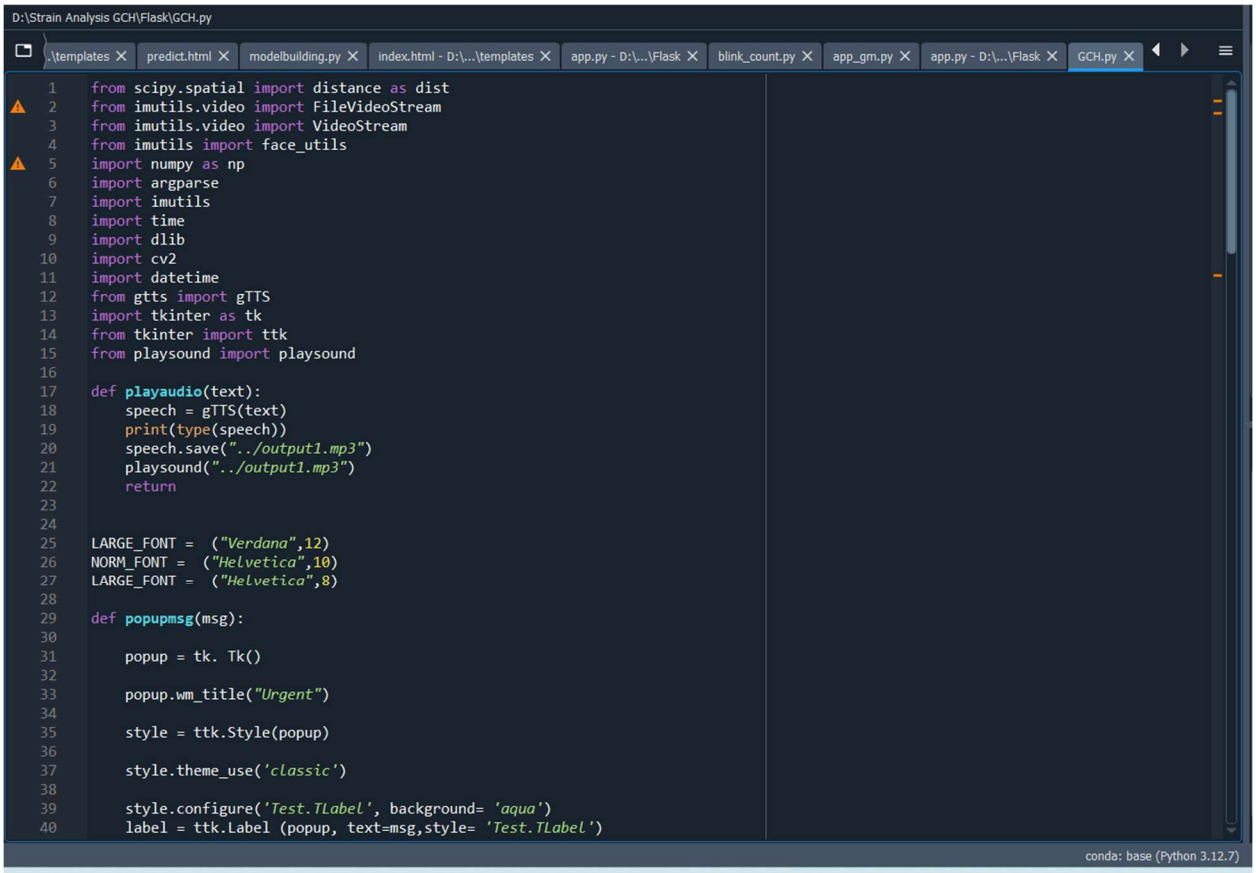
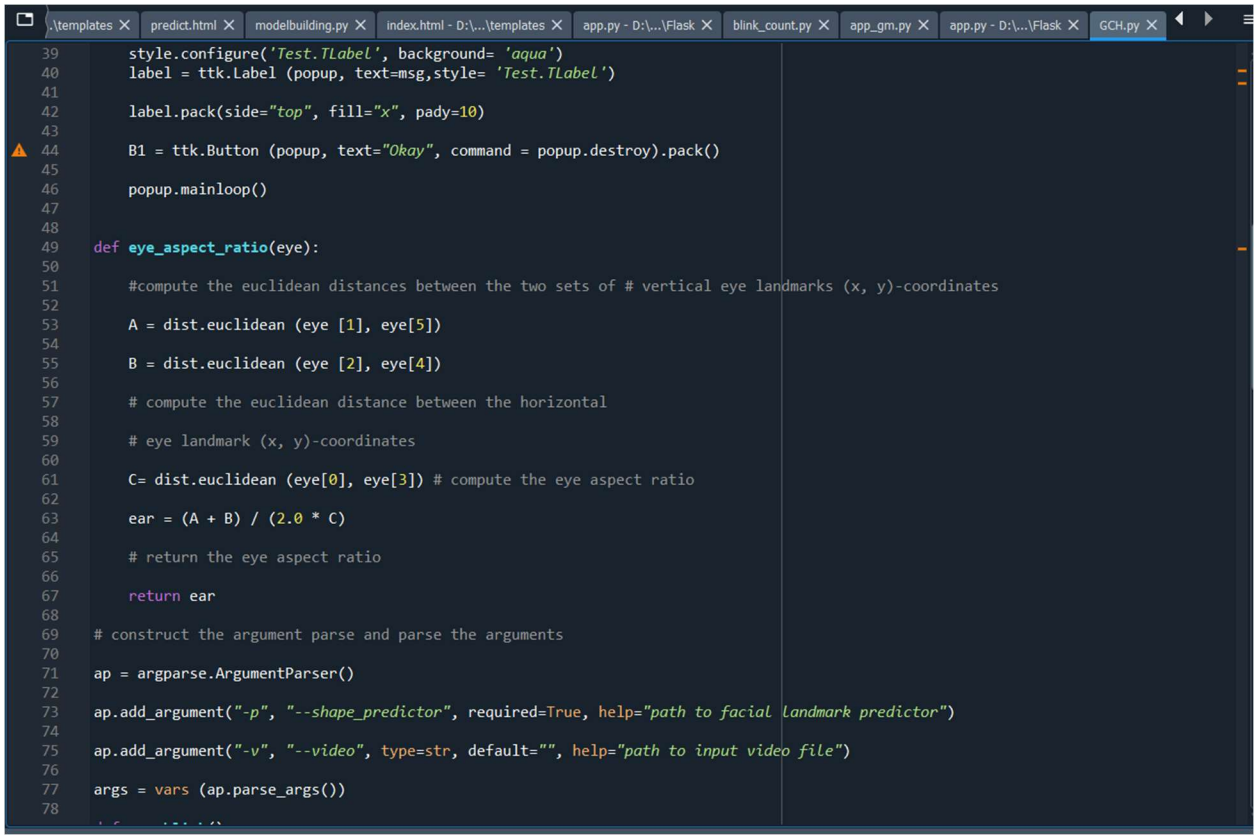
|---|---|
| Date | 21 October 2024 |
| Team ID | 739879 |
| Project Title | Strain analysis based on eye blinking |
| Maximum Marks | 10 Marks |

## Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

### Initial Model Training Code (5 marks):





```
    style.configure('Test.TLabel', background= 'aqua')
    label = ttk.Label (popup, text=msg,style= 'Test.TLabel')

    label.pack(side="top", fill="x", pady=10)

    B1 = ttk.Button (popup, text="Okay", command = popup.destroy).pack()

    popup.mainloop()


def eye_aspect_ratio(eye):

    #compute the euclidean distances between the two sets of # vertical eye landmarks (x, y)-coordinates

    A = dist.euclidean (eye [1], eye[5])

    B = dist.euclidean (eye [2], eye[4])

    # compute the euclidean distance between the horizontal

    # eye landmark (x, y)-coordinates

    C= dist.euclidean (eye[0], eye[3]) # compute the eye aspect ratio

    ear = (A + B) / (2.0 * C)

    # return the eye aspect ratio

    return ear

# construct the argument parse and parse the arguments

ap = argparse.ArgumentParser()

ap.add_argument("-p", "--shape_predictor", required=True, help="path to facial landmark predictor")

ap.add_argument("-v", "--video", type=str, default="", help="path to input video file")

args = vars (ap.parse_args())
```

D:\Strain Analysis GCH\Flask\GCH.py

.\templates | predict.html | modelbuilding.py | index.html - D:\...\templates | app.py - D:\...\Flask | blink_count.py | app_gm.py | app.py - D:\...\Flask | GCH.py

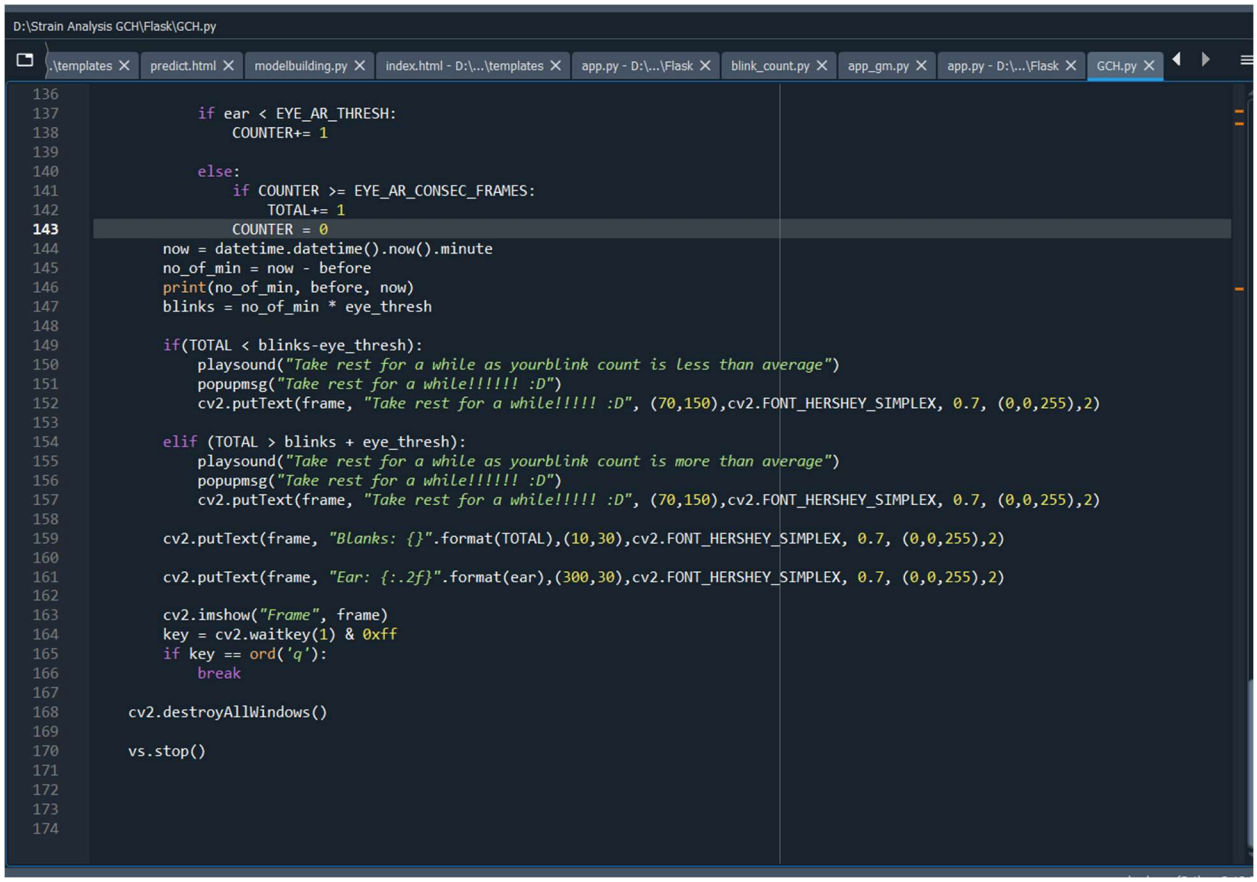
```
79  def eye_blink():
80      EYE_AR_THRESH = 0.3
81      EYE_AR_CONSEC_FRAMES = 3
82
83
84      COUNTER = 0
85      TOTAL = 0
86      print("[INFO] loading facial landmark predictor...")
87      detector = dlib.get_frontal_face_detector()
88      predictor = dlib.shape_predictor(args['shape_predictor'])
89
90      #predictor =dlib.shape_predictor(args['shape_predictor'])
91      #predictor = dlib.shape-predictor(args['shape-predictor'])
92      print(type(predictor),predictor)
93
94      (lStart, lEnd) = face_utils.FACIAL_LANDMARKS_IDXS["left_eye"]
95      (rStart, rEnd) = face_utils.FACIAL_LANDMARKS_IDXS["right_eye"]
96
97
98      eye_thresh = 10
99      before = datetime.datetime.now().minute
100
101     if not args.get("video", False):
102         print("[INFO] starting video stream..")
103         vs = VideoStream(src = 0).start()
104         time.sleep(1.0)
105
106     else:
107         print("[INFO] Opening video file...")
108         vs = cv2.VideoCapture(args["video"])
109         time.sleep(1.0)
110
111     while True:
112         frame = vs.read()
113         if frame is None:
114             print("unable to capture")
115             break
116         frame = imutils.resize(frame, width=450)
117         gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
118         rects = detector(gray, 0)
```

conda: base (Python 3.12.7)

D:\Strain Analysis GCH\Flask\GCH.py

.\templates | predict.html | modelbuilding.py | index.html - D:\...\templates | app.py - D:\...\Flask | blink_count.py | app_gm.py | app.py - D:\...\Flask | GCH.py

```
116         frame = imutils.resize(frame, width=450)
117         gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
118         rects = detector(gray, 0)
119         for rect in rects:
120             shape = predictor(gray,rect)
121             if shape is None:
122                 print("shape predictor returning none")
123                 continue
124             shape = face_utils.shape_to_np(shape)
125             leftEye = shape[lStart:lEnd]
126             rightEye = shape[rStart:rEnd]
127             leftEAR = eye_aspect_ratio(leftEye)
128             rightEAR = eye_aspect_ratio(rightEye)
129 
130             ear =(leftEAR + rightEAR) / 2.0
131 
132             leftEyeHull = cv2.convexHull(leftEye)
133             rightEyeHull = cv2.convexHull(rightEye)
134             cv2.drawContours(frame, [leftEyeHull], -1, (0,255,0),1)
135             cv2.drawContours(frame, [rightEyeHull], -1, (0,255,0),1)
136 
137             if ear < EYE_AR_THRESH:
138                 COUNTER+= 1
139 
140             else:
141                 if COUNTER >= EYE_AR_CONSEC_FRAMES:
142                     TOTAL+= 1
143                 COUNTER = 0
144         now = datetime.datetime().now().minute
145         no_of_min = now - before
146         print(no_of_min, before, now)
147         blinks = no_of_min * eye_thresh
148 
149         if(TOTAL < blinks-eye_thresh):
150             playsound("Take rest for a while as yourblink count is less than average")
151             popupmsg("Take rest for a while!!!!!! :D")
152             cv2.putText(frame, "Take rest for a while!!!!! :D", (70,150),cv2.FONT_HERSHEY_SIMPLEX, 0.7, (0,0,255),2)
153 
154         elif (TOTAL > blinks + eye_thresh):
155             playsound("Take rest for a while as yourblink count is more than average")
```




## Model Validation and Evaluation Report (5 marks):

| Model | Summary | Training and Validation Performance Metrics |
|---|---|---|
| Model 1 | Screenshot of the neural network summary | - |
| Model 2 | Screenshot of the neural network summary | - |
| … | … | … |