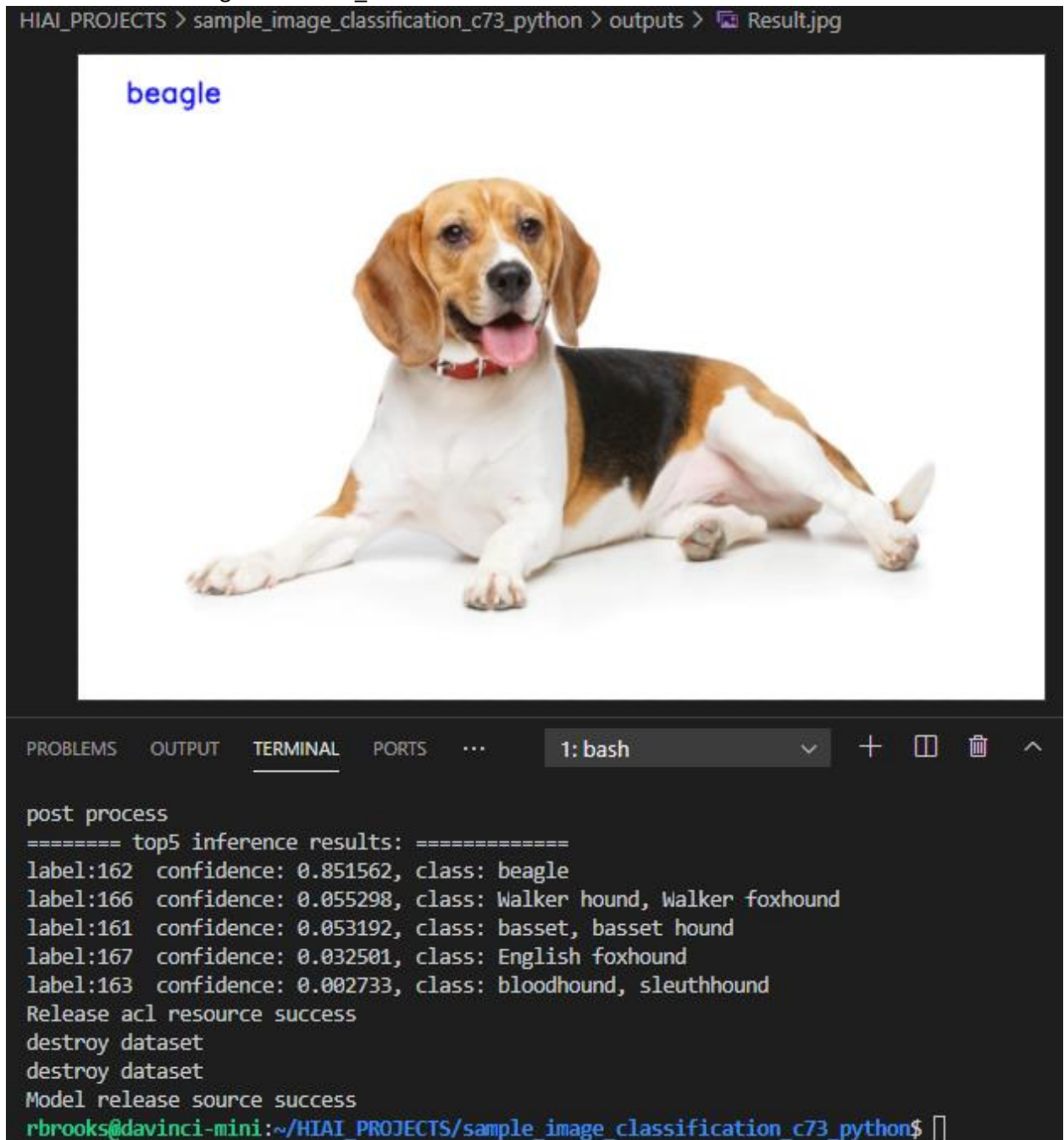


ECE 442 Lab 5

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1. See the attached image named Q1_ClassConfidenceResult



2. See attached head_pose_estimation.py file

```
# Step 1: initialize ACL and ACL runtime
# 1.1: one line of code to create an object of the 'AclResource' class
### Your code here, one line ###
ACLRes = AclResource()

# 1.2: one line of code, call the 'init' function of the AclResource object, to initialize ACL and ACL runtime
### Your code here, one line ###
ACLRes.init()
```

3. See attached head_pose_estimation.py file

```
# Step 2: Load models for face detection and head pose estimation
# 2.1 load offline model for face detection
# Path for face detection model
MODEL_PATH = model_name_face_det + ".om"
# one line of code to create an object of the 'Model' class with two parameters: the created 'AclResource' object and the
### Your code here, one line ###
mdlProcFaceDt = Model(ACLRes, MODEL_PATH)

# 2.2 load offline model for head pose estimation
# Path for head pose estimation model
MODEL_PATH = model_name_head_pose + ".om"
# one line of code to create an object of the 'Model' class with two parameters: the created 'AclResource' object and the
### Your code here, one line ###
mdlProcHeadPoseEst = Model(ACLRes, MODEL_PATH)
```

4. See attached head_pose_estimation.py file

```
# one line of code, use the 'Model' object for face detection, call its 'execute' function with parameter '[input_image]'
### Your code here, one line ###
resultList_face = mdlProcFaceDt.execute([input_image])
```

5. See attached head_pose_estimation.py file

```
# Step 4: Head Pose Estimation
# Preprocessing for head pose estimation
input_image = PreProcessing_head(image, bbox_list)
# head pose estimation model inference
# one line of code, use the 'Model' object for head pose detection, and call its 'execute' function with parameter '[input_image]'
### Your code here, one line ###
resultList_head = mdlProcHeadPoseEst.execute([input_image])

#post processing to obtain coordinates for lines drawing
```

6. See all attached files named with the Q5 prefix as well as the head_pose_estimation.py file

```
# Assign 'Up', 'Down' or 'OK' value
if pitch < -20:
    result_pitch = 'Up'
elif pitch > 20:
    result_pitch = 'Down'
else:
    result_pitch = 'OK'

# Assign 'Left', 'Right' or 'OK'
### Your code here ###
if yaw < -7:
    result_yaw = 'Right'
elif yaw > 7:
    result_yaw = 'Left'
else:
    result_yaw = 'OK'

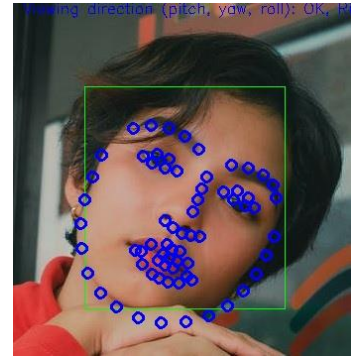
# Assign 'Swing Left', 'Swing Right' or 'OK'
### Your code here ###
if roll < -25:
    result_roll = 'Swing Right'
elif roll > 25:
    result_roll = 'Swing Left'
else:
    result_roll = 'OK'
```

```

box height: 224
Head angles: [array([[ -12.365723]], dtype=float32), array([[ -8.972168]], dtype=float32), array([[27.75879]], dtype=float32)]
Pose: Viewing direction (pitch, yaw, roll): OK, Right, Swing Left
Release acl resource success
destroy dataset
destroy dataset
Model release source success
destroy dataset
destroy dataset
Model release source success
rbrooks@davinci-mini:~/HIAI_PROJECTS/experiment/head_pose$ 

```

For head_bend, we can see that the person in the image is looking relatively straight on at the camera, but has their head tilted to their left. This is reflected by the results in the terminal image above, although the algorithm does detect that the head is rotated about the neck as well.

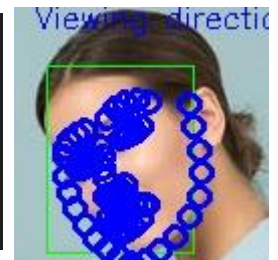


```

Head angles: [array([[ -3.8757324]], dtype=float32), array([[21.54541]], dtype=float32), array([[ -24.853516]], dtype=float32)]
Pose: Viewing direction (pitch, yaw, roll): OK, Left, OK
Release acl resource success
destroy dataset
destroy dataset
Model release source success
destroy dataset
destroy dataset
Model release source success
rbrooks@davinci-mini:~/HIAI_PROJECTS/experiment/head_pose$ 

```

For head_tilt, we can see that the user is looking directly at the camera, but their body is facing to the right. This is reflected in the program as the algorithm detects the person in the image facing the camera, but with a slight rotation of the head to the person's left.



```

box height: 342
Head angles: [array([[ -26.31836]], dtype=float32), array([[ -7.1289062]], dtype=float32), array([[ -24.58496]], dtype=float32)]
Pose: Viewing direction (pitch, yaw, roll): Up, Right, OK
Release acl resource success
destroy dataset
destroy dataset
Model release source success
destroy dataset
destroy dataset
Model release source success
rbrooks@davinci-mini:~/HIAI_PROJECTS/experiment/head_pose$ 

```

For head_upward, we can see that the person in the image has their head tilted up towards the sun as well as a slight tilt of the head to the right. This is reflected in the program outputs.

