Patrol TurtleBot

By Tuan Trinh

A robot moving freely in given spaces, recording unknown faces, recognizing known ones, while avoiding obstacles.

Project main tasks: facial recognition & movements.

Facial recognition task

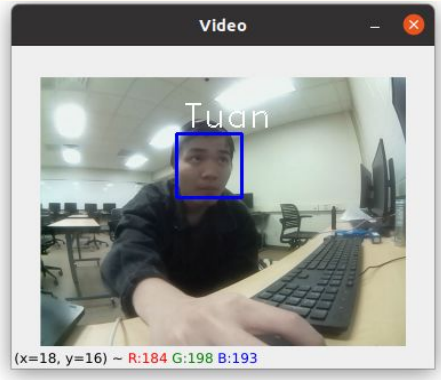
2 subtasks

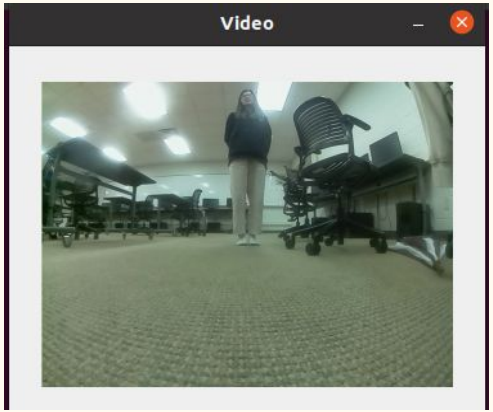
- Detection
- Recognition

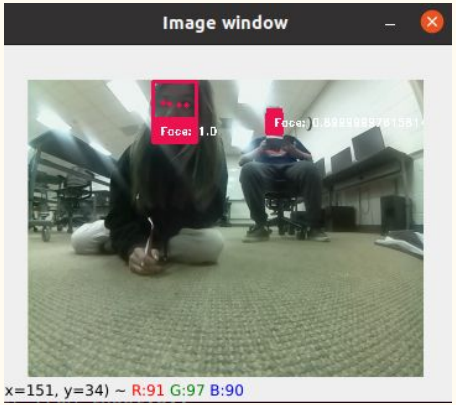
Detection

1. cv2.CascadeClassifier: worked well but unable to detect far-away-faces.

2. Ultralight Detector from https://github.com/Linzaer/Ultra-Light-Fast-Generic-Face-Detector-1MB

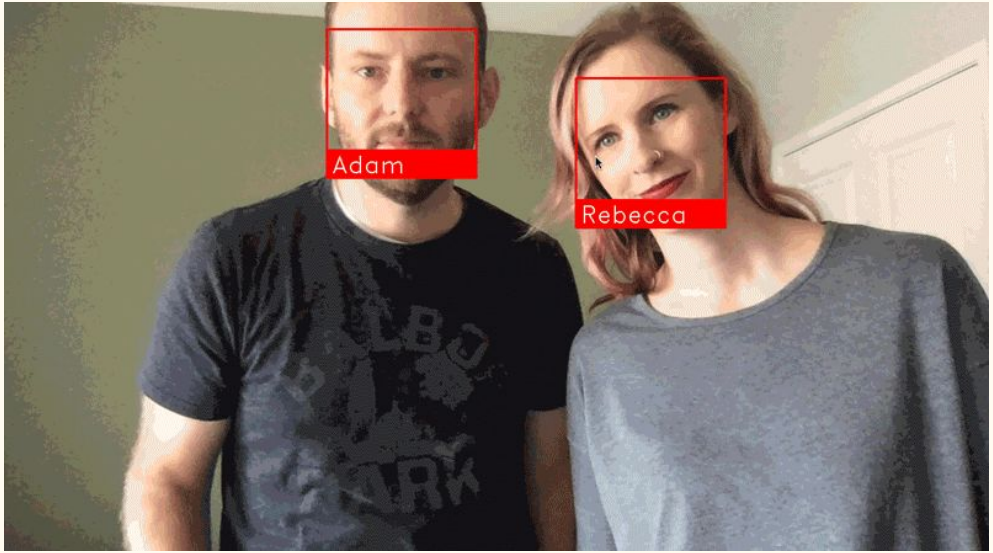






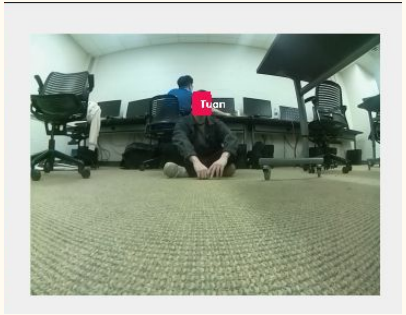
Recognition

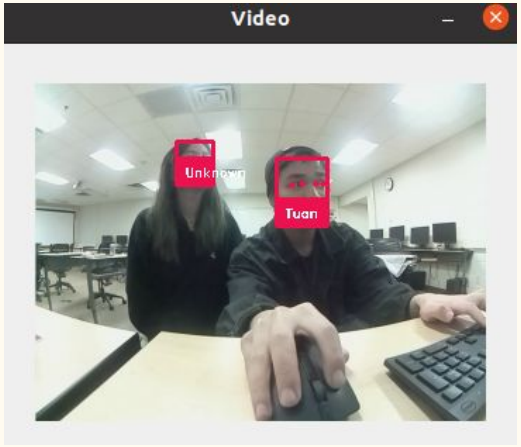
1. face_recognition library from https://github.com/ageitgey/face_recognition.

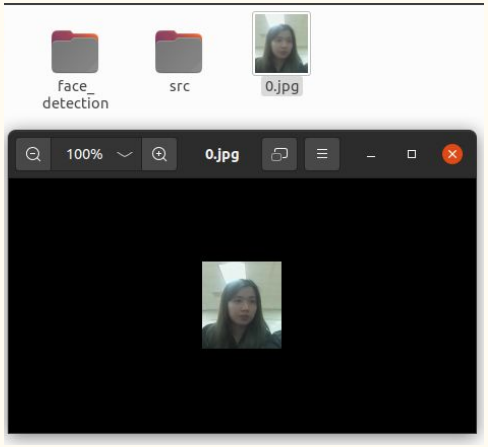


Detection (from Ultralight Detector) & Recognition (from face_recognition)

- Worked better, able to detect faces in greater distances, compared to cv2.CascadeClassifier
- Drawbacks recognizing a standing person.
- Crop unknown faces.







Moving task

```
#Helper function for callbackMove
def degrees2radians(self, angle):
  return angle * (math.pi / 180.0)

def callbackMove(self,data):
  pub = rospy.Publisher('/cmd_vel', Twist, queue_size=10)
  outData = Twist()

  if data.ranges[0] > 0.3:
      outData.linear.x = 0.35
      outData.angular.z = 0.0
  if data.ranges[0] < 0.3:
      outData.linear.x = 0
      outData.angular.z = self.degrees2radians(90)
  pub.publish(outData)
```

- Avoid Obstacles

Detection

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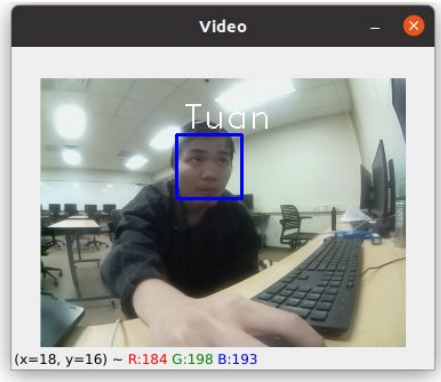
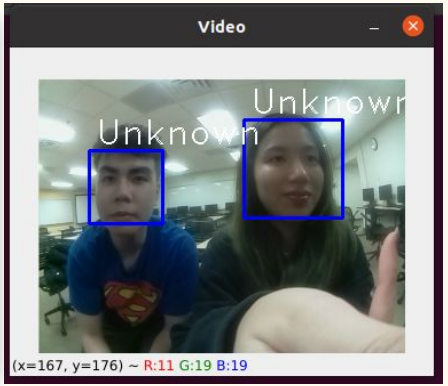
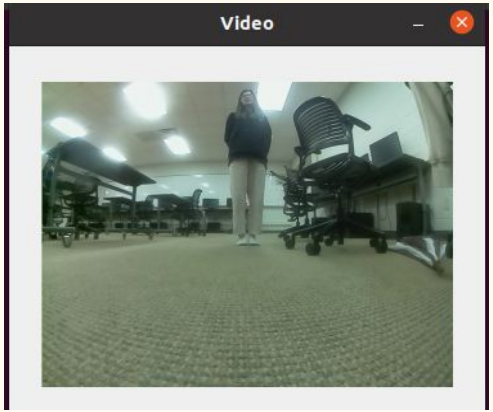
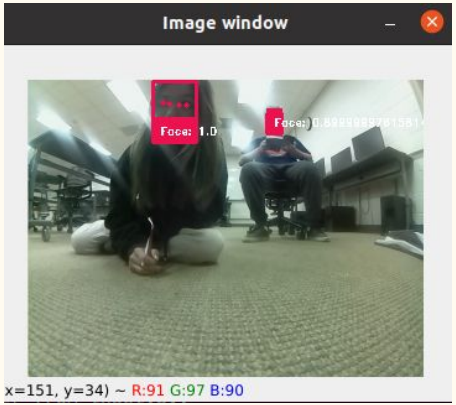






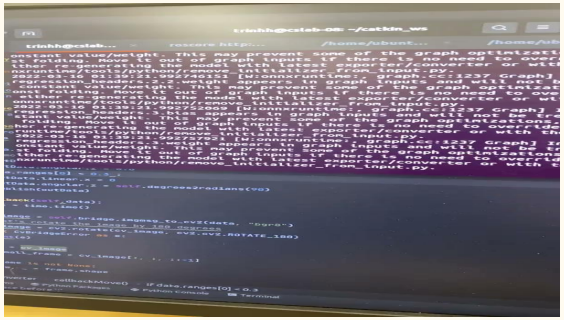


Demo videos

Robot recognizing me!

Robot avoiding an obstacle

Robot detects unknown face



Thank you for listening.