JIBEBE INTERNSHIP 2022

WEEKLY REPORT

Internship 2022

Progress report

Name: Allan were

Tasks completed last week

- [#66] Transfer of components from Arduino to raspberry pi4

Due to the need of having all components on the same board it was therefore necessary to transfer all the components from Arduino to raspberry. The raspberry pi will accommodate the camera comfortably and at the at same time run the other components. A test run was done and everything worked fine.

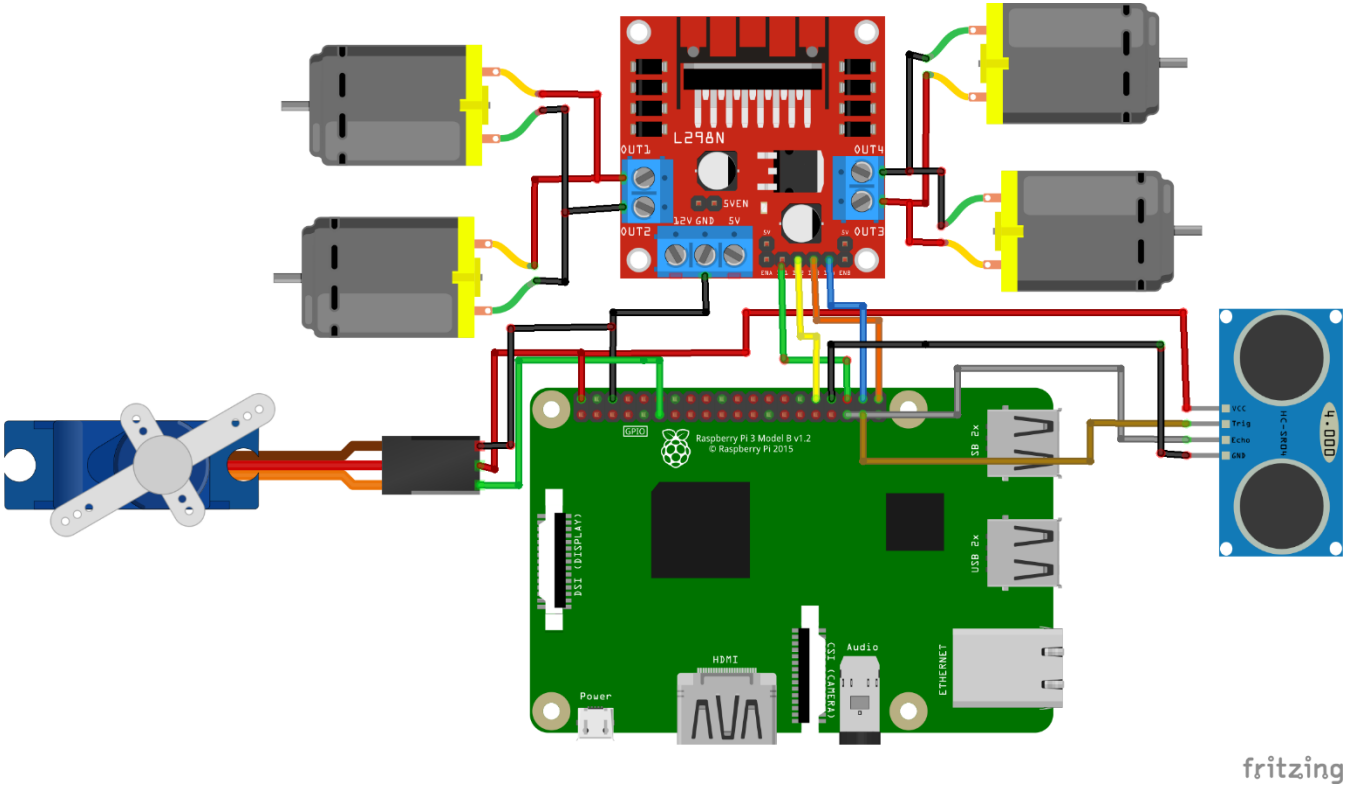
L298N
OUT1
OUT2
OUT3
OUT4
5VEN
12V GND 5V
GPIO
Raspberry Pi 3 Model B v1.2
© Raspberry Pi 2015
DSI (DISPLAY)
HDMI
Power
CSI (CAMERA)
Audio
USB 2x
USB 2x
ETHERNET
VCC
Trig
Echo
GND
HC-SR04
fritzing

Figure 1circuit diagram

- [#65] Human detection program

Human detection and tracking are tasks of computer vision systems for locating and following people in video imagery. Human detection is the task of locating all instances of human beings present in an image, and it has been most widely accomplished by searching all locations in the image, at all possible scales, and comparing a small area at each location with known templates or patterns of people.

```python
# import the necessary packages
import numpy as np
import cv2

# initialize the HOG descriptor/person detector
hog = cv2.HOGDescriptor()
hog.setSVMDetector(cv2.HOGDescriptor_getDefaultPeopleDetector())

cv2.startWindowThread()

# open webcam video stream
cap = cv2.VideoCapture(0)

# the output will be written to output.avi
out = cv2.VideoWriter(
    'output.avi',
    cv2.VideoWriter_fourcc(*'MJPG'),
    15.,
    (640,480))

while(True):
    # Capture frame-by-frame
    ret, frame = cap.read()

    # resizing for faster detection
    frame = cv2.resize(frame, (640, 480))
    # using a greyscale picture, also for faster detection
    gray = cv2.cvtColor(frame, cv2.COLOR_RGB2GRAY)

    # detect people in the image
    # returns the bounding boxes for the detected objects
    boxes, weights = hog.detectMultiScale(frame, winStride=(8,8) )

    boxes = np.array([[x, y, x + w, y + h] for (x, y, w, h) in boxes])

    for (xA, yA, xB, yB) in boxes:
        # display the detected boxes in the colour picture
        cv2.rectangle(frame, (xA, yA), (xB, yB),
                      (0, 255, 0), 2)
```

Figure 2 part of the human detection program in python

Figure 3 result on human detection

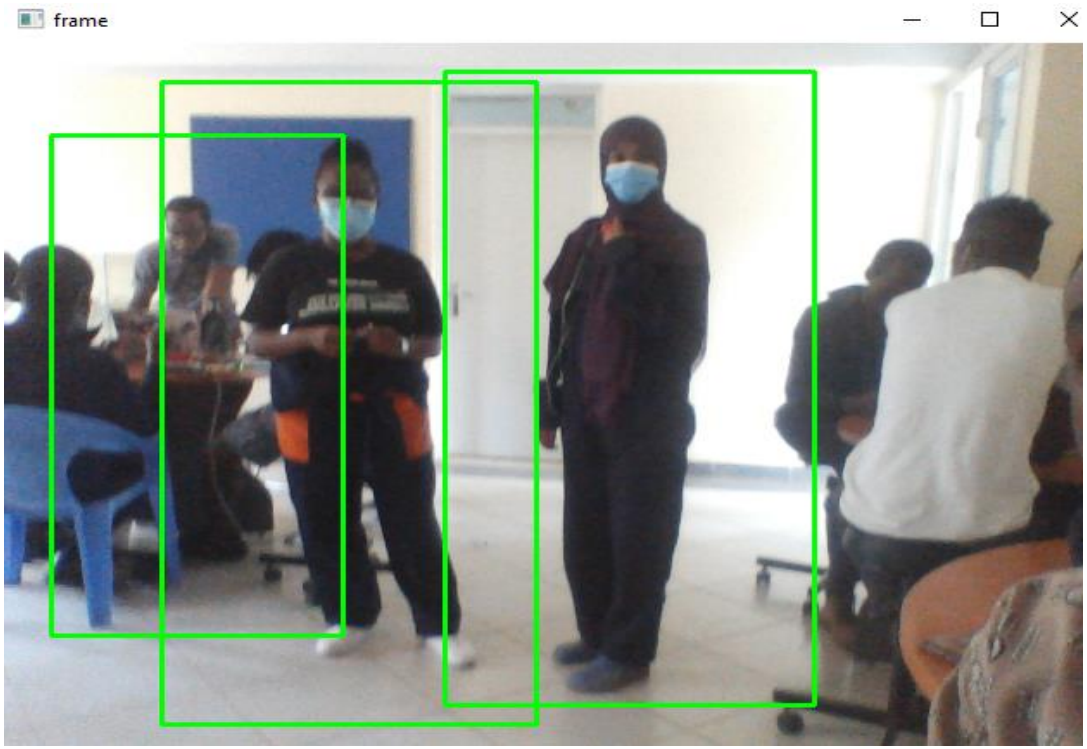

Figure 4 human detection output

- [#57] TCP/IP server client connection

TCP/IP stands for Transmission Control Protocol/Internet Protocol and is a suite of communication protocols used to interconnect network devices on the internet. TCP/IP specifies how data is exchanged over the internet by providing end-to-end communications that identify how it should be broken into packets, addressed, transmitted, routed and received at the destination. TCP/IP requires little central management and is designed to make networks reliable with the ability to recover automatically from the failure of any device on the network.

The TCP/IP will be used to transfer data from the raspberry pi to the server and it will also be used to control the vehicle remotely as well as stream the video/ image feeds

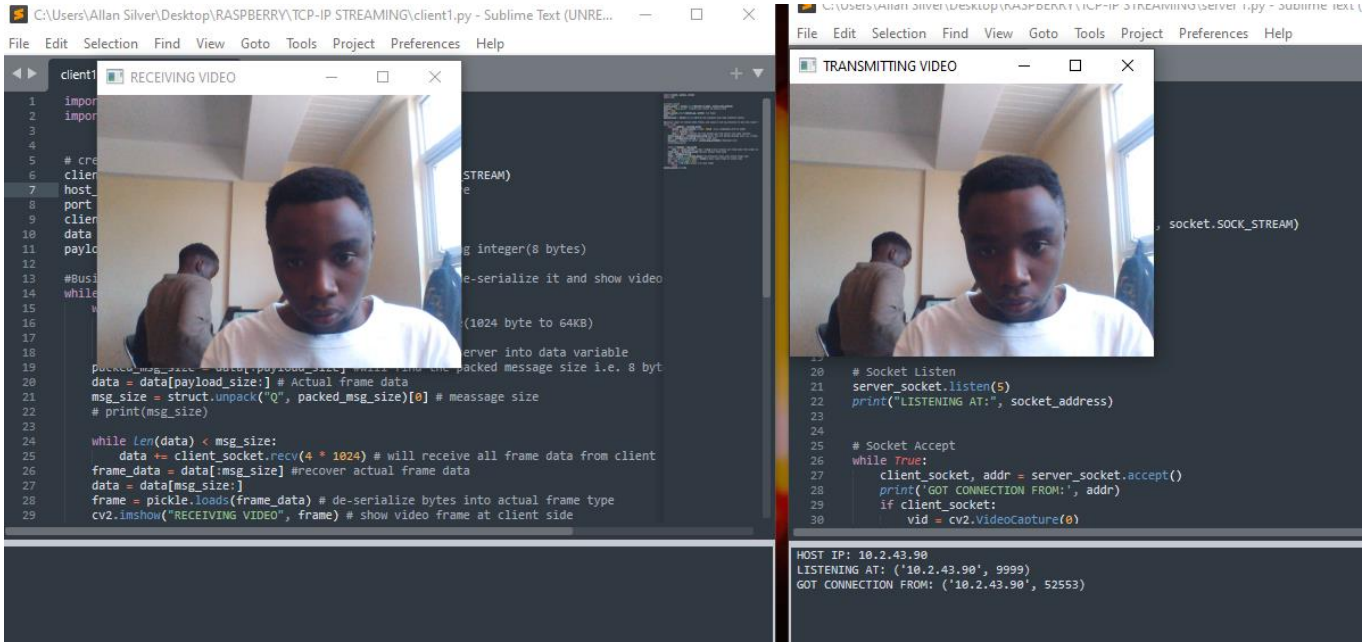

Figure 5 streaming a video using tcp/ip

Tasks in this week

- [#49] Computer vision (vehicle detection, static and dynamic objects)

Timeline

Month	Intern week	Tasks
Jan		
	Week 1	Identification of parts and drawing of the chassis diagram.
	Week 2	Circuit diagram and acquisition of parts.
	Week 3	Definition of the path to be followed by the robot car. Laser cutting of the parts.

Feb	Week 4	• Assembly of the robot • Ultrasonic program implementation
	Week 5	• GPS and compass navigation • Path definition
	Week 6	Object identification using computer vision. (Raspberry pi & camera)
	Week 7	Transmission of live feed and data from the robot (transmitter and receiver)
	Week 8	Object dection (static and dynamic)

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Thank You