Week1

Feb 24 2021

The first lesson of this course. Alen introduced what needs to be learned in this course. From this, I knew that there are 4 new knowledge. 1. We need to learn to understand python, ros and docker.

2. The second is computer vision.

3. The third is Robotics estimation

4. The fourth is deep learning.

Then, Ben introduces 3D Transformation.

I learned that this course we need to use computer vision to detect lanes and locate the robot location. Also training the neural network to classify the object. From Ben introduction, I knew how to represent a point in 3D space with another coordinate frame.

Feb 25 2021

Learn the python language on the website and use Google Colab to practice Python

After learning, I have a preliminary understanding of python and learned that there are 4 types in python which are string, numeric, bool and sequence. Also, I learned while and for loops and try to build loops on the website, and print the results.

fruits = ['banana', 'apple', 'mango']

for index in range (len(fruits)):

print 'fruit :', fruits[index]

print "Good bye!"

Additionally, the Defining functions and Creating classes are understood and practiced.

What’s next ?

I will follow the courses on the website to continue learning python language and preview for the second week of courses.

Week 2

Mar 3 2021

In the class, Alen introduced the importance of sensors for autonomous driving and several different sensors.

Then Ben introduce how to set software on the duckerbot and Point Cloud Visualization With Rviz.

I learned how to visualize point cloud data with ROS. Pointcloud data consists of points with X,Y,Z locations and generated by cameras. Also, learn how to process point cloud data using ROS\_PCL library. Frist, we need to create a package and then we need to modify the package.xml to link some library. Then download the file that is the main file from Canvas. Finally, type catkin\_make and rosrun my\_pcl\_tutorial voxel\_filter input:=/cloud\_pcd . we can see the output.

Mar 5 2021

I continue to learn python language.

I learned the Operator of the language. There are six commonly used operator which are +,-,\*,/,%, \*\*.

Also I learned the conditional statements and I tried a simple code on the website to test the result.

flag = False

name = 'luren'

if name == 'python':

flag = True

print 'welcome'

else:

print name

I also learned how to define a function. The function starts with the def keyword, followed by the function identifier name and (). Next is to define this function. In the end, we need to return [expression] end function.

Mar 6 2021

I contacted Alen to purchase the dockerbot.

Week3

Mar 10 2021

In the class, Ben introduced how to make a publisher and subscriber on ROS and HSV-Filter, Lane-color-filter, Edge-filter, ROI-Filter and Hough-Line-Detector. Also, Ben shows how to create a nodes.

I understand that HSV mainly dyes the tape to make it appear on the image. The Lane color filter is the way to filter out lane from the HSV image. The Edge- filter is used to filter out edges of the lane. The ROI-Filter is used to remove the uninteresting part of the picture. After the above four steps, we can get 4 lines. The Hough-Line-Detector is used to find the exact coordinates of these lines.

Mar 13 2021

I received the robot and install the robot according to the instructions.

Mar 14 2021

Following the guidance on the canvas, I build the system for the robot.

But I stuck at the step of docker establishment.

Mar 15 2021

I asked Ben how to solve the problem of docker.

The cause of the problem is that the ip address was entered incorrectly when entering the command. Then I used ping raspberrypi.local, the problem was solved.

What next

Keep studying hard to catch up with the progress of course and completing task 2

Week 4

Mar 17 2021

In the class, Ben introduced the Lane Following and Control and explained the meaning of the code. In the end, I demonstrated the task 1 to Ben.

From Ben, I learned orig = cv2.imdecode(np\_arr, cv2.IMREAD\_COLOR) is the way to convert the compressed image to normal image. Also, I learned the logic of controlling the movement of a car. When the number of the lanes is two, the duckiebot was published a forward velocity. When the number of the lanes is one, the duckiebot was published an angular velocity to complete the turn.

Mar 18 2021

I continue to learn the Lane Following and Control and try to finish task 3.

After learning the code, I learned when two lanes are detected，the average of the far endpoints of both lane lines which is the heading direction. When one line is detected, the code set the heading line parallel to the detected lane.

Mar 21 2021

I have a problem with the task 3. The terminal shows that local variable ‘lane\_line’ referenced before assignment.

After discussing with Bingceng, I found that I set a worry variable under the process\_image function. So I changed it and it works.

What is next?

I do not know about the how to use the ros bag file. So I will try to understand it.

Week 5

Mar 24 2021

In the class, Alen explain how to write the design contract. Ben introduced the principle of Discrete Bayes Filter, one Dimensional Kalman Filters and Particle Filters. Also, Ben shows the Machine Learning and object detection. The system can detect the object and can classify detected objects.

The principle of these filtering is difficult to understand, so I did not understand in the class.

In the end, I ask Ben why the detection lane of my duckerbot are always shaking. Then, Ben told me that I used black tape, which makes a lot of noise. So I changed it and fix the problem.

Mar 25 2021

I tried to understand the principle of these filtering and finish task 3.

According to the example of the detection dog. I think Discrete Bayes Filter is to increase the probability of the one case based on the data sent back from the sensor many times, so as to finally determine the occurrence of an event. The Particle Filters is mainly divided into 4 steps to locate where robot is. The first is generating random points. Next is the point movement. Then according to the sensor data, set the weight for each point. Finally is the Resampling.

What is next?

I still don't understand these filtering and its code very well. So I will continue to learn and understand it. Then complete task 3.