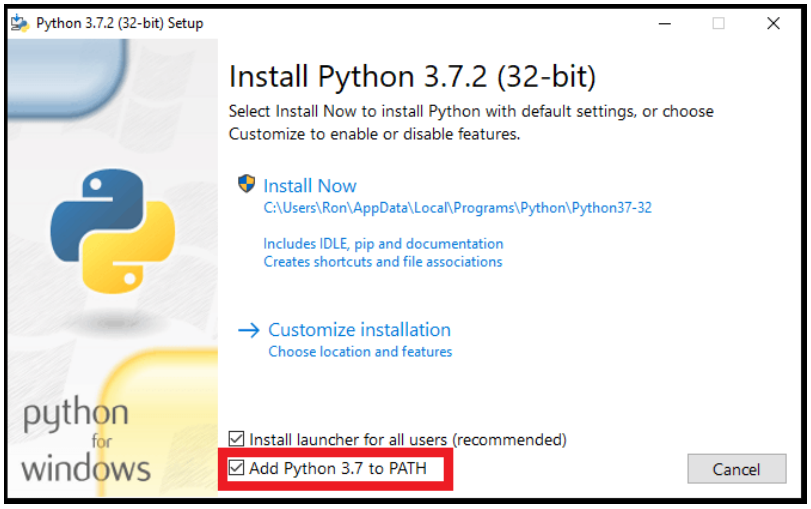
Building connection between Matlab and Carla with matlab.engine in Windows 10

: shown with a Carla automatic control demo

1. Installation

    a. Download and Install Matlab R2021a(version newer than 2018b is fine):
    https://de.mathworks.com/downloads/
    b. Download and Install Carla 0.9.8:
    https://github.com/carla-simulator/carla/releases/tag/0.9.8/
    c. Download and Install Pycharm Community Edition:
    https://www.jetbrains.com/de-de/pycharm/download/#section=windows
    d. Download and Install Python 3.7.9 (using Windows x86-64 executable installer):
    https://www.python.org/downloads/windows/
    remeber to select :



2. Building Python API in Carla and setting up for the demo Carla-Matlab-automatic-control

    a. Building Python API:
    Follow this tutorial video from 1:02 – 2:03:

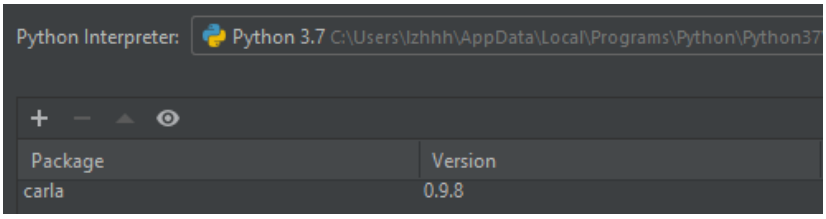
    https://github.com/darkscyla/MATLAB-Carla-Interface/tree/master/Tutorial_Carla_Setup

    b. Open Pycharm
    c. Open a Project: Carla-Matlab-automatic-control
    d. Setting up for the demo in Pycharm:

        1. Set up Python Intepreter:
        File >> Setting >> Python Intepreter (now there is nothing)>> Show all >> + >> System Interpreter >> select “path\to\python37\python.exe” >> click OK, now you should see “Python 3.7” on “Python Interpreter”.

        2. Install Libraries for the demo:

First, check if “carla” is shown here, if yes, the step a. above is successfully done:



Stay on this window, click the “+”under “Python Interpreter” and come to “Available Packages”. Now install the following libraries by direct searching:
numpy, networkx.

3. Set up matlab.engine for Python:

    a. Install the MATLAB agent using the following lines in cmd:

    cd matlabroot\extern\engines\python

    (type matlabroot in MATLAB command window to get the directory)

    py -3.7 setup.py install

    b. You might have to do this in MATLAB command line too.

    cd (fullfile(matlabroot,'extern','engines','python'))

    system('py -3.7 setup.py install')

    c. Check if the package “matlabeingineforpython” is successfully installed in Python3.7:

    Follow the exact steps above in 2.d.2 when we checked the package “carla”.

4. Run the demo:

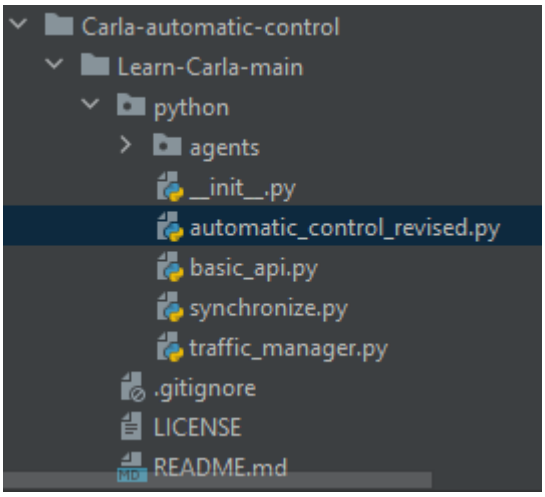
    a. Open Carla 0.9.8:

    cd path/to/carla/root

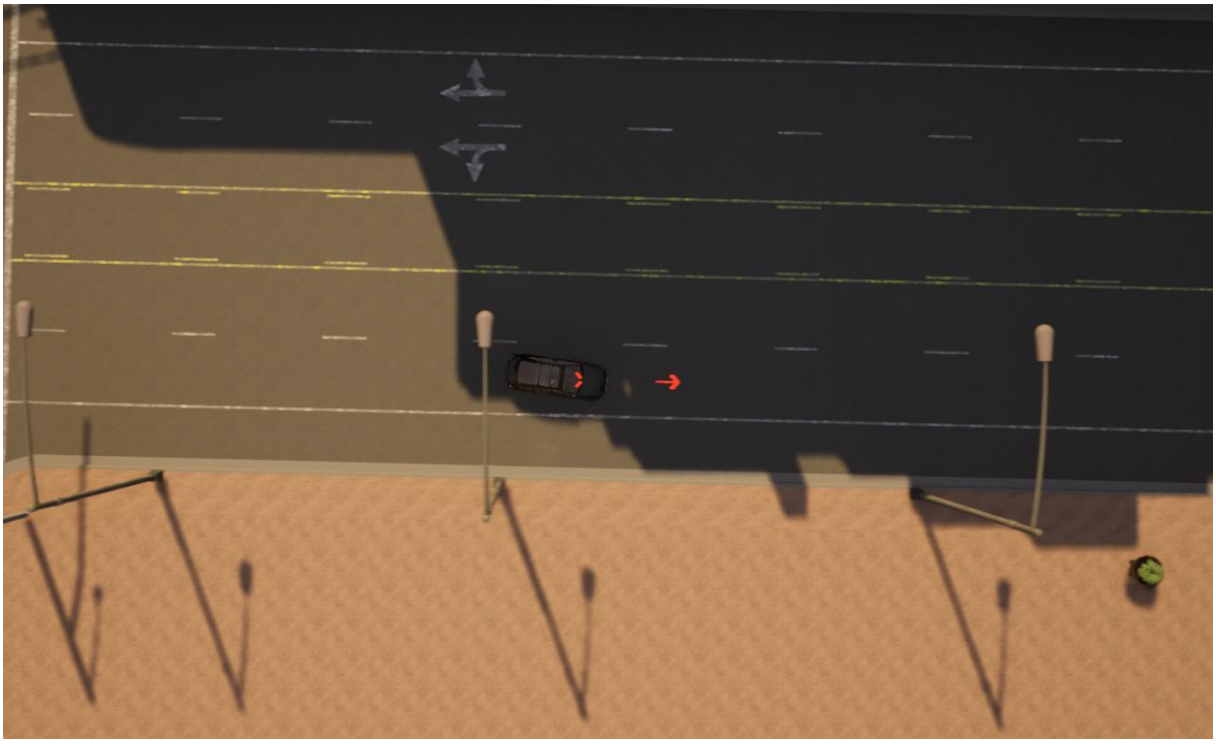
    CarlaU4.exe

    b. Open Matlab, open Carla-Matlab-automatic-control\python\LongPID.m and set path, type matlab.engine.shareEngine in the MATLAB command window to share the currently opened MATLAB instance.

    c. Open automatic_control_revised.py in Pycharm, and press Ctrl+Shift+F10 to run the demo:



You should see that a car runs along a red arrow at a random start point, and it will dissappear after it hits the end point, which is also randomly generated:



5. Code for the connection between matlab and Carla:

path/to/ Carla-Matlab-automatic-control / Carla-Matlab-automatic-control /python/agents/navigation/controller.py:

```
146         ## 1. option: direct computation for throttle
147         # throttle = (self._k_p * error) + (self._k_d * _de) + (self._k_i * _ie)
148
149         ## 2. option: connect matlab, compute the throttle in matlab and get it back through matlab.engine
150         ## Ps: make sure the following command is executed in matlab command window, before running python scripts:
151         ## matlab.engine.shareEngine
152         eng = matlab.engine.connect_matlab()
153         throttle = eng.LongPID(self._k_p,error,self._k_d,_de,self._k_i,_ie)
```