Summer School on Autonomous Vehicles 2017: Simulation Environments

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1 Setting Up and Running the Simulation

1.1 Running OMNeT++ IDE

- Open up your terminal by clicking  or press Ctrl+Alt+T on your keyboard.
- Type `omnetpp` in the terminal and press Enter

1.2 Changing the configuration in `platooning` scenario

- Select the `Run Configurations..` as shown in Fig. 1
- Select `platooning` scenario
- Now you can select different configuration by changing `Config name:` as shown in Fig. 2

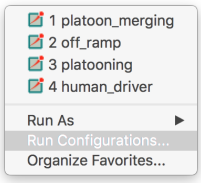

Figure 1:

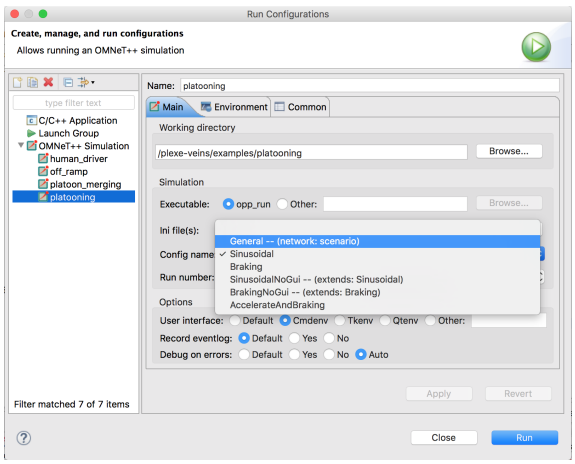

Figure 2:

1.3 Changing the controllers

Three controllers for autonomous vehicles will be used in this course: `ACC`, `CACC`, and `PLOEG`. By default the `CACC` controller is selected. Following is how to switch the controller:

- Select the `Run Configurations..` as shown in Fig. 1
- Different controllers are defined by the `Run(s):` option as shown in Fig. 3

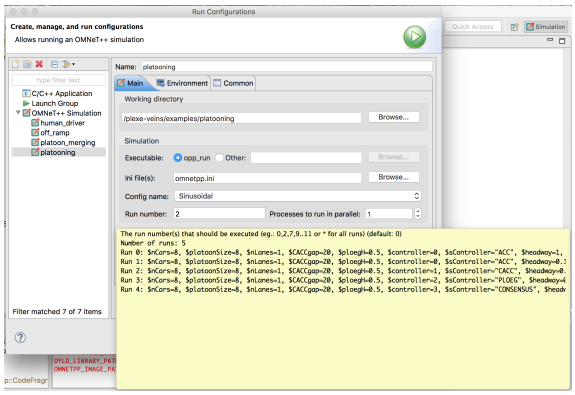

Figure 3:

1.4 Run different scenarios

To choose the run configuration just press the down arrow to call the drop-down menu (see the instructions shown on Fig. 4). **Before** running the scenario, be sure to check that the correct folder for NED files is selected:

- In the Project Explorer, right-click on the project (`plexe-veins`) and select `Properties`
- Under `OMNeT++` tab, select `NED Source Folders`, and select the folder that match your scenario name. For example, to run `platooning` scenario, choose `platooning` as shown in Fig. 5.

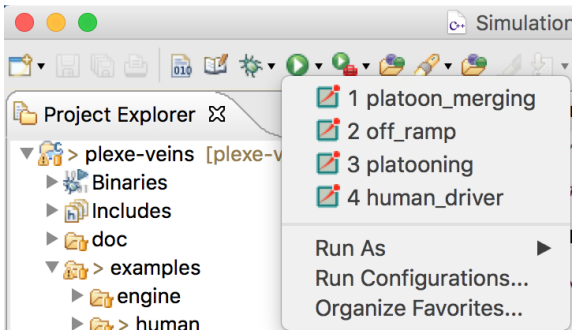

Figure 4:

1.5 Visualizing the SUMO simulation

After running a scenario in OMNeT++ IDE, you will see SUMO graphical user-interface. Click  to run the simulation. To quickly zoom-in to a vehicle, choose `> Locate> Locate Vehicles` from the menu (Fig. 6), then select a vehicle from the list and press `Center`. If the simulation is running too fast, you may put a delay as shown in Fig. 7. Also, selecting `real world` from the option (Fig. 7) give better visualization.

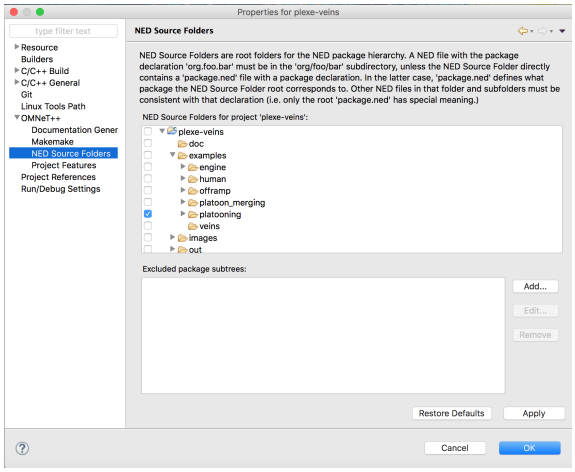

Figure 5:

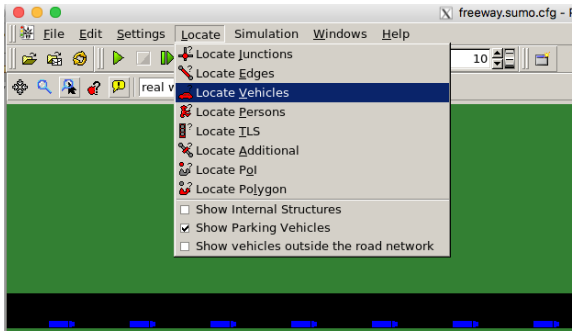

Figure 6:

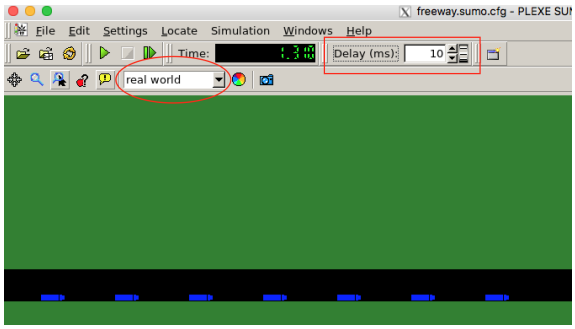

Figure 7:

1.6 Visualizing the results

After a simulation is finished, the simulation result is saved in the `results` folder. In the `Project Explorer`, under > `plexe-veins`> `examples`> `{scenario_name}`> `results`. For example, Fig. 8 shows how to find the results for `Braking` configuration in `platooning` scenario. Following is how to plot the result:

- Double-click at a result file, if you open it for the first time, the " New Analysis File" window will pop-up, just click `Finish`.
- On the tab below, click `Browse Data`

Figure 9, and 10 show how to select and plot the `distance` data.

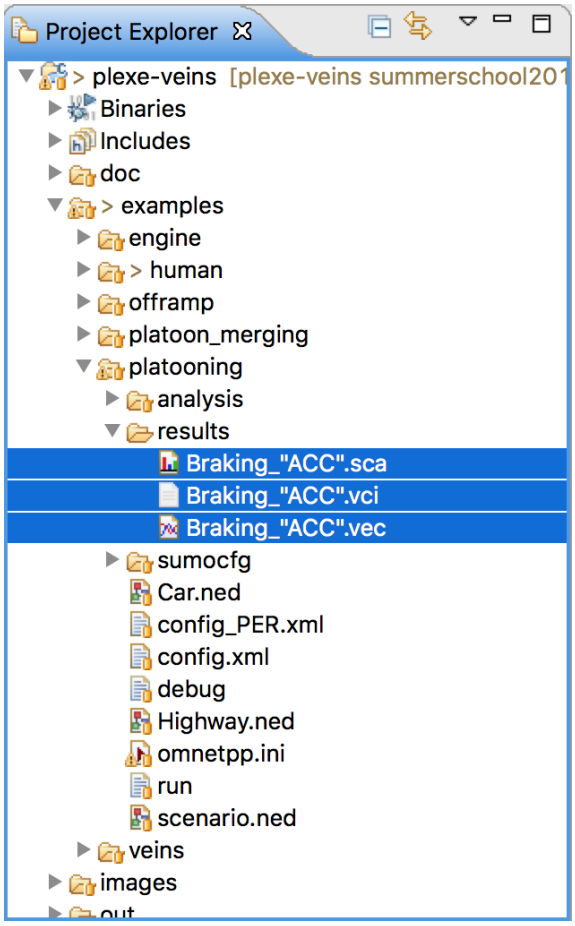

Figure 8:

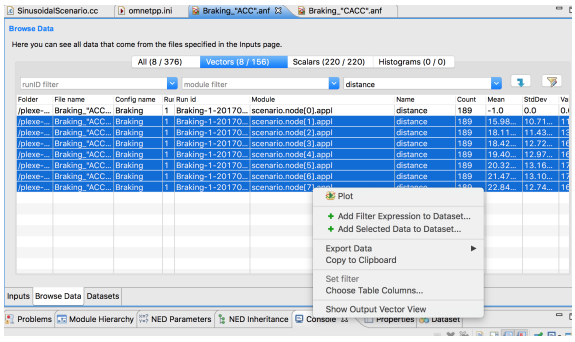

Figure 9:

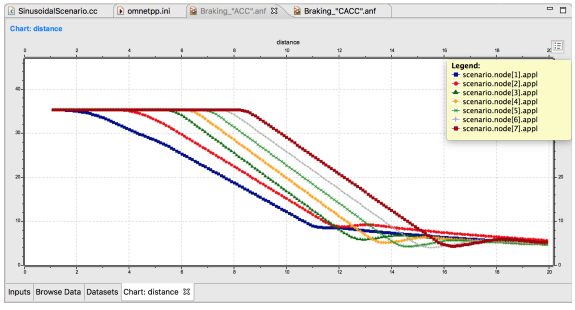

Figure 10:

1.7 Further readings

Detailed documentation of the simulation platforms used in this summer school can be found at:

- For Plexe – http://plexe.car2x.org/documentation/
- For SUMO – http://sumo.dlr.de/wiki
- For OMNeT++ – https://omnetpp.org/documentation