Virtual Car Project Instruction

The procedures for modeling, control, and demonstration experiments are described below. While the modeling and control experiments require a VR interface such as Oculus Quest2, the demonstration experiment can be performed with a Unity-downloaded pc.

➢ Modeling

1. Open Unity, check ¥SampleScene¥Controller¥Movecar or MoveLight and uncheck ¥SampleScene¥Controller¥MoveLightMPCRBF, MoveLightdemo.

2. Open Script "Accelerate_v2.cs and rewrite the path on line 41 to save the driving data."

3. Execute VR experiment.

4. Open modeling.m (MATLAB), import Unity data, and execute the program.

- Control

  1. Open controller.m(MATLAB), rewrite lines 34-49 to parameters identified by Modeling and on lines 59-66 to Preferred MPC weight parameters.

  2. Open Unity and rewrite lines 36-39 in ¥SampleScene¥Controller¥Movecar and MoveLightMPCRBF to W value output by controller.m.

  3. Check ¥SampleScene¥Controller¥Movecar and MoveLightMPCRBF and uncheck ¥SampleScene¥Controller¥MoveLight, MoveLightdemo.

  4. Open Script "Accelerate_v2.cs and rewrite the path on line 41 to save the driving data."

  5. Execute VR experiment.

  6. Open control_result.m, import Unity data, and execute the program.

➢ Demo

Open 'demonstration.m' and select Drivernumber from 1-10 in line 8.

Then, run the simulation.

Write either Robust or Select on the command line and press enter.

In the case of Robust, a graph of the simulation results with and without PML

control for 10 drivers, the average of the $v_{\mathrm{pv}} - v$ squares, and the graph of

the results with the worst control results, the average of the $v_{\mathrm{pv}} - v$ squares,

will be output.

In the case of Select, the graph of the control results for the driver selected in

line 8 and the average of the squares of $v_{\mathrm{pv}} - v$ are output.

Regarding Select, if you want to see the demo visually, follow these steps to

simulate it in Unity.

You will see the vehicle driven by the selected driver, and the PML in motion.

1. Open Unity, check ¥SampleScene¥Controller¥Movecarfordemo,

   Acceleration_fordemo, and MoveLightdemo and uncheck

   ¥SampleScene¥Controller¥MoveLight, Acceleration_v2, and

   MoveLightMPCRBF.

2. Change MoveLightdemo¥Avatarnumber in the Controller's inspector

   screen to any value from 1-10.

3. Execute simulation.