Collaborative Control of Autonomous Cars

Team Members:
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Faculty Advisor:
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Client:
Tom Eskridge, affil. Florida Institute of Technology

Progress Matrix

Task	Completion	John	Brennan	Isaya	To Do
Adjustments to Local Planner for Collaborative Control	33%	5%	90%	5%	Testing, bug fixing, possible implementation changes
Logitech Steering Wheel Haptic Feedback	75%	90%	5%	5%	Learning how it works, if it can be implemented, and implementing
Scenarios implementation using RoadRunner	30%	5%	5%	90%	Learning how to use RoadRunner's GUI to implement required scenarios

Tasks Accomplished

Adjustments to Local Planner for Collaborative Control:

Completion of this task was stalled by an unexpected compilation error that began to occur for the collaborative control program. We are still investigating the cause of this error. However, once the error is resolved, completion of this task should become simple.

Logitech Steering Wheel Haptic Feedback:

Upon doing some test runs with students outside of the project, they told us that the steering wheel did not feel real. Sometimes they would turn and the vehicle would turn too much or too little. In our code, the steering wheel angle is a 1:1 ratio of a real car, so we decided that there may not be enough "feedback" on the steering wheel.

John was tasked with learning how the API and the Logitech Steering wheel currently in use works, and to see if it can be implemented into CARLA. The students know for a fact that there is haptic feedback on the wheel because if a game was launched (like Forza Horizon) the steering wheel would vibrate based on the terrain being driven on.

Upon investigation, it was learned that John can use the Logitech G29 SDK to access and enable force feedback in CARLA. The test computer already has the Logitech Gaming Software downloaded, so it is as simple as downloading the SDK through the Logitech Developer website. In order to add the force feedback to CARLA, the SDK must be initialized and then set up base parameters as starting points to test within the simulator.

The idea of adding force feedback on the steering wheel is to make the simulator feel more realistic. In real life, when turning the steering wheel in a car, there is usually some resistance, which allows the driver to feel more connected to the car. In CARLA, this is not the case, there is no resistance, and you do not physically feel the car moving. So, by adding force feedback, the hope is that the simulator feels more realistic.

Scenario Implementation using RoadRunner's GUI:

We figured implementing scenarios using RoadRunner's graphical user interface might be easier and faster as compared to hard-coding them. In addition it lets us create new roads or maps based on the scenario we want to implement. Isaya spent some time trying to learn how to use it in implementing new scenarios required for this milestone but no new scenarios have been implemented so far.

Scenario Debugging:

We noticed some of the scenarios that were fully implemented and successfully compiled on the previous milestones no longer compiled as some errors arose during compilation. Isaya started debugging the codes and would try to fix any errors that occur during compilation and running of the scenarios.

Member Contributions

John Vitali:

John focused on learning the Logitech G29 force feedback. He spent time learning about the necessary components and requirements for adding force feedback into CARLA, like the SDK and the need for the Logitech software. He is now ready to begin implementing it into CARLA and hopes to have the starting point implemented within the next week. After that, fine tuning may be needed, but it should be quick changes, not an entire rewrite.

Brennan Pike:

Brennan's work was focused on making the necessary final changes to the local planner for collaborative control, a task which he was unable to accomplish due to unforeseen compilation errors in the collaborative control program, as previously mentioned. Investigation into the reason for these errors is ongoing, and Brennan is also in charge of that.

Isaya Danice:

Isaya's was learning how to use the RoadRunner in implementing scenarios, not much progress has been made yet as no new scenarios have been implemented so far. Some challenges were encountered as some of the scenarios implemented on the last milestone won't compile anymore so debugging of the scenario codes have to be done. Isaya is working on resolving the issues that occur during compilation and hopefully implement required scenarios using RoadRunner's graphical user interface instead of having to hard-code scenarios.

Plan for Next Milestone

Task	John	Brennan	Isaya
Finish Adjustments to Local Planner	Troubleshooting (10%)	Troubleshooting, testing, bug fixing (80%)	Troubleshooting (10%)
Implement Force Feedback	Implementation (80%)	Testing & troubleshooting (10%)	Testing & troubleshooting (10%)
Scenario Implementation	Testing & troubleshooting (10%)	Testing & troubleshooting (10%)	Implementation (80%)

Dates of Meetings with Client

February 05, 2024 - First meeting, plans for next steps
February 19, 2024 - Second meeting, progress evaluation, plans for next steps

Faculty Advisor Feedback on each Task:

Adjustments to Local Planner for Collaborative Control:
Logitech Steering Wheel Haptic Feedback:
Scenario Implementation using RoadRunner's GUI:
Scenario Debugging:

Faculty Advisor Signature: _____ Date: _____

Evaluation by Faculty Advisor

- Faculty Advisor: detach this page and return to Dr. Chan or email scores.
- Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

John Vitali	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Brennan Pike	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Isaya Danice	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: _____ Date: _____