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	80%	5%	90%	5%	Adjust traffic light recognition, test with global planner
Logitech Steering Wheel Haptic Feedback	100%	90%	5%	5%	Implementing, making minor adjustments based on client feedback, and adding more feedback based on road conditions
Scenarios implementation using RoadRunner	80%	5%	5%	90%	Learning how to use RoadRunner's GUI to implement required scenarios

Tasks Accomplished

Adjustments to Local Planner for Collaborative Control:
      The error encountered in the previous milestone was resolved after some effort. The changes made to the local planner work, causing the car to now properly update its waypoints when the user provides input. However, changes are not yet complete. The autopilot agent currently brakes at red lights, and if user input is used while the light is still red, the agent will still act as though it is stopped at that light until it turns green. Additionally, further testing is required to ensure that the local planner changes work with a global planner included.

Logitech Steering Wheel Haptic Feedback:
      The Logitech steering wheel haptic feedback has been added to the code. The only thing left to do is to make minor adjustments to the strength of the resistance based on client feedback and user feedback. Along with this, John is also waiting for one of the custom maps that will be made to be completed so he can try to implement some feedback based on the road conditions. For example, if the car goes over a bump (like sidewalk), then the steering wheel should jerk for a second. This is something that can be focused on mostly for the last milestone, as the custom maps are not yet completed.

Custom map Implementation using RoadRunner's GUI:
      The implementation of custom CARLA maps on RoadRunner is progressing well, with drafts of several simple maps already completed. These maps feature intricate intersections, numerous turns (with trees on the sides), and roads with varying elevations, including highways to facilitate lane switching tests if needed. The objective was to have the driver concentrate on the road as well as slightly block their line of sight. One of the maps has already been exported to Carla's source folder and rebuilding the entire Carla package was successful with no errors. The generated files were then copied to the Carla version (with the executable UE) currently being used by the team. The map can be accessed by scenario runner and simple basic scenarios were implemented for testing if the map had any issues. The map can be used for different scenarios implementations using collaborative control.

Member Contributions

John Vitali:

Again, John focused on completing the implementation of haptic feedback for the Logitech steering wheel. He was able to implement resistance when turning the wheel fully, and is waiting for Isaya to finish creating a custom map so he can try to add some more haptic feedback based on the environment that the car is driving on.

Brennan Pike:

Brennan's work was once again focused on making the necessary final changes to the local planner for collaborative control. This task is now mostly completed, with only a few changes still pending. This is not unexpected; it was predicted that the work on the autopilot agent itself would be more time-consuming than the collaborative control program itself.

Isaya Danice:

Isaya was tasked with implementing custom maps that will be required in testing changes made to collaborative control. Several simple maps have already been implemented using RoadRunner. The main focus was on roads that have numerous turns and different elevations, intersections and highways were also added. He is already working on it and has already exported one of the maps created to Carla thus scenario runner, given the path to the file, can access, load the map and be used to implement various scenarios for testing code enhancements made by the team . Only thing that's left for him to do is export the rest of the maps to Carla. Rebuilding Carla is time consuming and that is the only time one can detect issues with the created map as errors would arise. Fixing errors was not easy, sometimes it would require him to head back to the original design in roadrunner and sometimes start from scratch.

Plan for Next Milestone

Task	John	Brennan	Isaya
Final Adjustments To Local Planner	Testing (10%)	Implementation and testing (80%)	Testing (10%)
Implement Force Feedback	Implementation (80%)	Testing & troubleshooting (10%)	Testing & troubleshooting (10%)
Scenario Implementation	Testing & troubleshooting (10%)	Testing & troubleshooting (10%)	Implementation (80%)
Combination of discrete elements	Implementation (33%)	Implementation (33%)	Implementation (33%)

Dates of Meetings with Client

March 04, 2024 - Caught up on current progress and plans moving forward.
March 18, 2024 - Gave progress report and explained what the team needs to do for the showcase.

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: _____