

Operations

Kiarash jamshidi

Exploiting video games to test autonomous vehicle

Two groups of modification

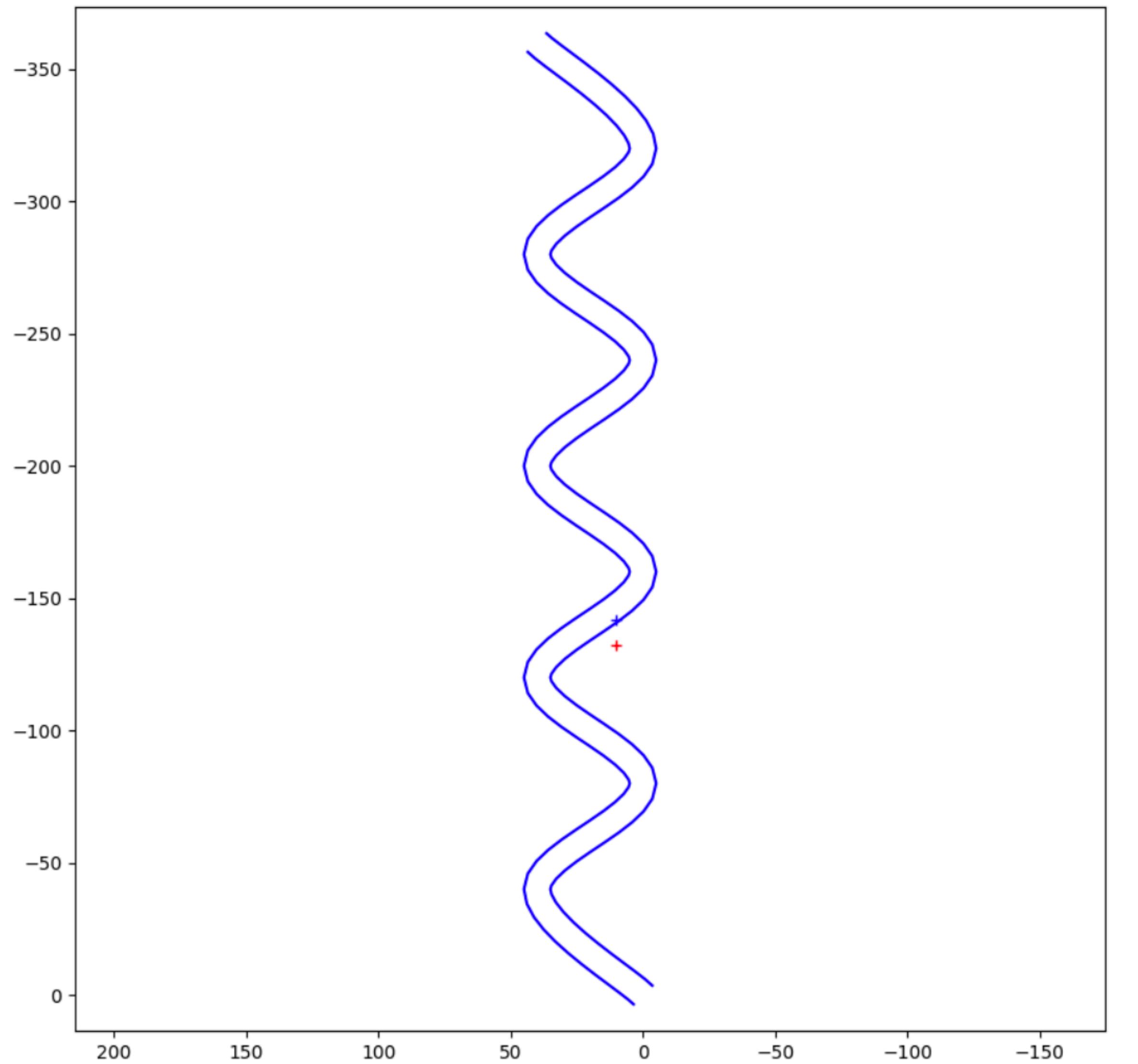
- 1- the group which operates with changing the JSON files of the level. At first, they delete the "level" file in the document, and then they put their JSON inside the level. After getting the outcome, they return the JSON files as it was before.
- 2- they do not touch the levels. Every operation works only with the python commands. Also, this group is faster than the first group.

1 - Adding obstacle

First group

- This operator is about adding some obstacles to the simulated scenario, e.g., pedestrians or signs. These obstacles may interfere with the lane-keeping feature.
- At first, add the obstacle, and in the second run, it modified the obstacle's position.
- In our example, the obstacle is one cube.

Time
00:15:350



2 - Adding bump

First group

- The bump is inevitable in the road. This scenario tries to test the tolerance of the car for the bump in every aspect (height, width, length, upper length, upper width).
- This scenario makes the bump first as the valid one and changes the bump in every index mentioned.

Time
00:15:751

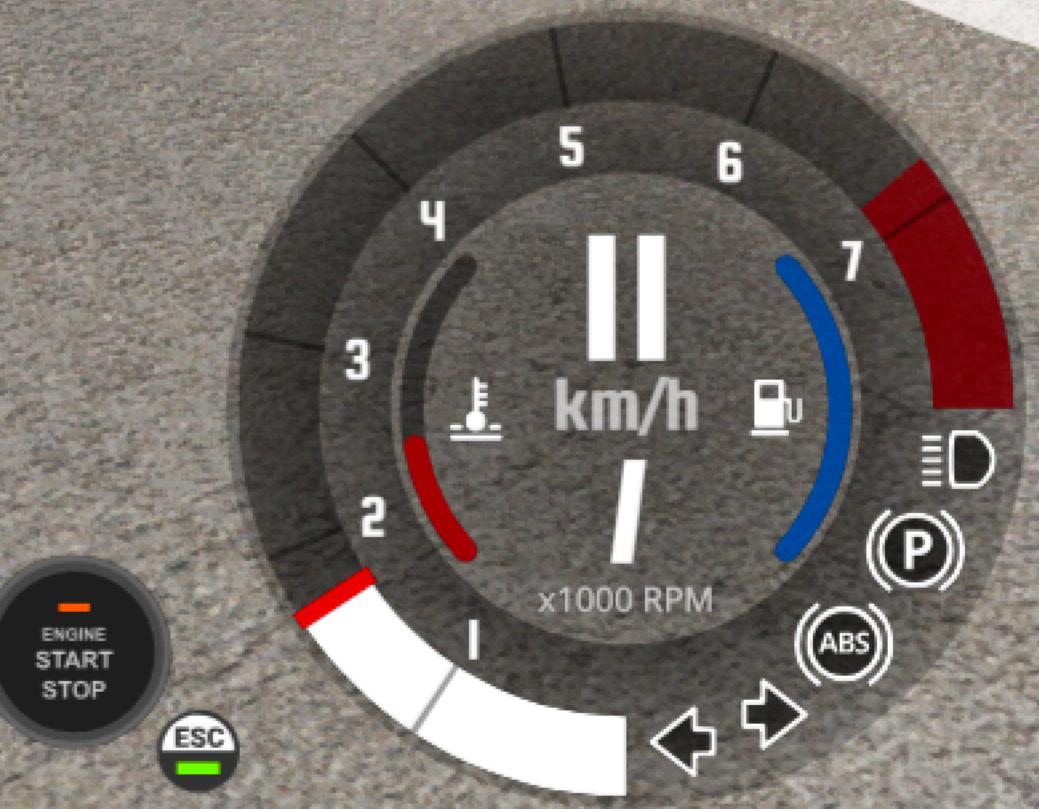


3 - Adding rocks

First group

- This function tries to modify the captured image by the camera sensor. Furthermore, see that the lane-keeping assist is still working or not.
- It tries to implement the grid of a few rocks on the map with a high distance.
- In the modification function, it changes the rock amount to higher and tests the lane-keeping system again.

Time
00:02:947



4 - Changing the illumination

First group

- Simulate at different hours of the day.
- first time, the program chooses the number between 0 and 1. the 24 hours is divided into 0 and 1, which means 0.5 is 12 am and 0 and 1 is midnight. This class also adds one extra feature, which is turning on the light. If the program's random number shows the illumination of the scenario is between 0.2 and 0.65, it means the scenario is the night time of the day, which has no good light. So the program turns on the headlight.
- in the second time, which is the modified version of the first scenario, the program chooses the number between zero and the brightness of the main scenario and another one between the brightness of the main scenario and one and pass these two number two the function, the function also chooses randomly between the two number and set the new brightness for the program.



main brightness is = 0.15010970544232172
amount of changing is = 0.5818993661497818
modify brightness is = 0.7320090715921035

5 - Changing the amount of fog

Second group

- This operation will modify the amount of fog density.
- This function is categorised as a weather condition operation.

Time
00:05:204



6 - Changing the amount of rain

Second group

- Same as the fog , it is considered as a weather condition operation .
- In this function, the program changes the number of the drop of rain and get it an outcome.

Time
00:03:197



7 - Add the water into the road

Second group

- This operation has two-part, it tries to put water on the road and see the result.
- The first function tries to manipulate the foam density of the water. If the foam rails, the clearness of the water will fall.
- The second function tries to modify the number of ripples in the water. If the number of the ripple raise, the road seems more wavy and unclear to understand.

Time
00:19:142



8 - Changing the Slope

First group

- Change the slope.....
- This operation is still under building

Thank for listening