

Operations

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Exploiting video games to test autonomous vehicle

Two groups of modification

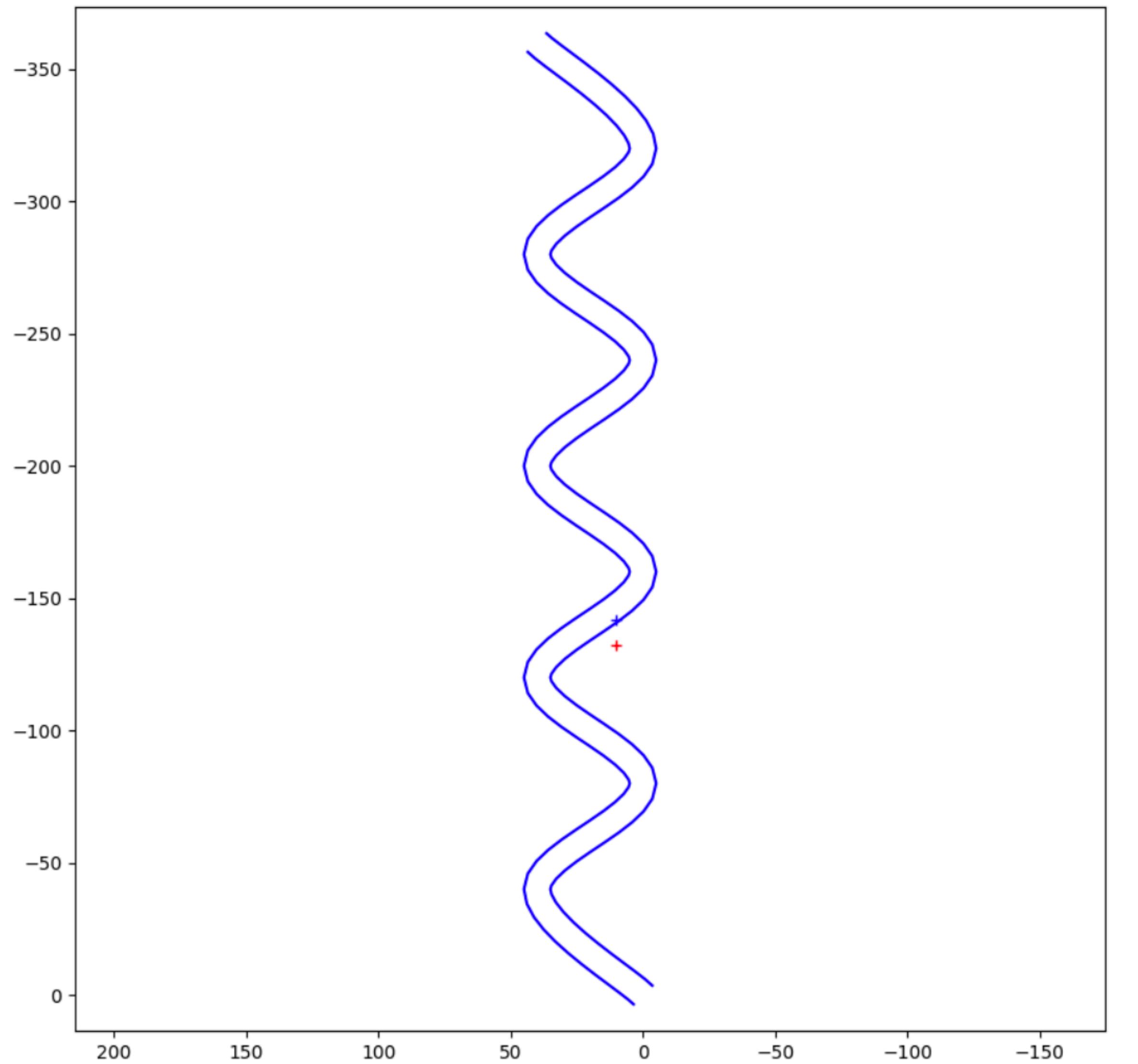
- 1- the group which operate with changing the json files of the level . At first they delete the level in document and then they put their json inside the level . After getting the outcome , they return the json files as it was before
- 2- they don't touch the levels . Every operation works only with the python commands. Also these 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 in valid part of the road and in second run, it modified the position of the obstacle.
- 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 make the bump first as the valid one and change the bump in every criteria which were mentioned.

Time
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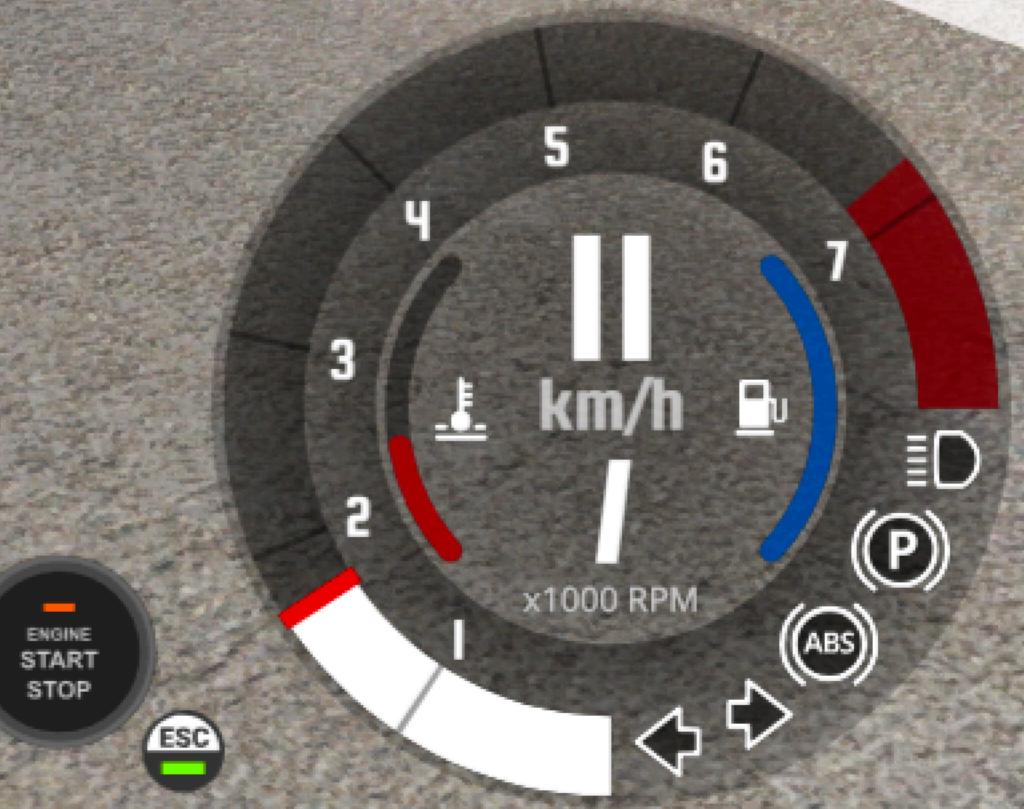


3 - Adding rocks

First group

- These function tries to modify the captured image by camera sensor . And see that the lane keeping assist is still working or not
- At first it try to implement the grid of few amount of rocks on the map with high distance.
- In the modification function it change the rock amount to higher and test the lane keeping system again

Time
00:02:947



4 - Changing the illumination

First group

- Run the simulation in 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

- In this operation . The amount of fog density will modify
- 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 outcome.

Time
00:03:197



7 - Add the water into the road

Second group

- This operation has two part , it try to put water on the road and see the result
- The first function try to manipulate the foam density of the water , if the foam rails the clearness of the water will fall .
- In the second function it try to modify the number of ripple 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