Feature Description

Murat Can Üste, Zhaoying Chen
Technische Universität München
Email: can.ueste@tum.de, zhaoying.chen@tum.de

I. Definition of Several Maneuvers

As is mentioned in the report, we decided to have total 81 time steps in our generated scenarios, which will result in a total timespan of 3.24 seconds. Since the recordings have 25 frames per second, the $\Delta time$ between each time step is 0.04 seconds.

A. Lane Change

Lane Change occurs when the ego vehicle changes its lane, comparing two adjacent timesteps.

B. Cut-in

If there is a *Lane Change* and the ego vehicle runs in front of a surrounding vehicle which was preceding the ego vehicle before, it is defined as *Cut-in*.

C. Brake

Compared the acceleration at two adjacent timesteps, if the vehicle decelerates, it is considered as braking during this $\Delta time$.

II. Description of Each Feature

1) ego-v-init: the absolute velocity at the beginning.
2) ego-acc-init: the acceleration at the beginning.
3) l-rel-pos-init: the relative distance between the rear vehicle and the ego vehicle at the beginning. If there is no rear vehicle at that time, return -1.
4) p-rel-pos-init: the relative distance between the preceding vehicle and the ego vehicle at the beginning. If there is no preceding vehicle at that time, return -1.
5) ll-rel-pos-init: the relative distance between the left-rear vehicle and the ego vehicle at the beginning. If there is no left-rear vehicle at that time, return -1.
6) pl-rel-pos-init: the relative distance between the left-preceding vehicle and the ego vehicle at the beginning. If there is no left-preceding vehicle at that time, return -1.
7) lr-rel-pos-init: the relative distance between the right-rear vehicle and the ego vehicle at the beginning. If there is no right-rear vehicle at that time, return -1.
8) pr-rel-pos-init: the relative distance between the right-preceding vehicle and the ego vehicle at the beginning. If there is no right-preceding vehicle at that time, return -1.
9) surr-veh-count-init: counting the number of surrounding vehicles at the beginning. If there is no surrounding vehicle at that time, return 0.
10) ego-acc-min: the minimal acceleration of the ego vehicle during the whole timespan.
11) ego-braketime-max: the total duration of brake.
12) ego-v-end: the absolute velocity at the end.
13) l-rel-pos-end: the relative distance between the rear vehicle and the ego vehicle at the end. If there is no rear vehicle at that time, return -1.
14) p-rel-pos-end: the relative distance between the preceding vehicle and the ego vehicle at the end. If there is no preceding vehicle at that time, return -1.
15) ll-rel-pos-end: the relative distance between the left-rear vehicle and the ego vehicle at the end. If there is no left-rear vehicle at that time, return -1.
16) pl-rel-pos-end: the relative distance between the left-preceding vehicle and the ego vehicle at the end. If there is no left-preceding vehicle at that time, return -1.
17) lr-rel-pos-end: the relative distance between the right-rear vehicle and the ego vehicle at the end. If there is no right-rear vehicle at that time, return -1.
18) pr-rel-pos-end: the relative distance between the right-preceding vehicle and the ego vehicle at the end. If there is no right-preceding vehicle at that time, return -1.
19) surr-veh-count-end: counting the number of surrounding vehicles at the end. If there is no surrounding vehicle at that time, return 0.
20) ego-lane-change-ts: when the *lane change*maneuver of ego vehicle occurs. If there is no *lane change*, return -1.
21) ego-lane-change: whether the *lane change* maneuver of ego vehicle occurs. The value of 0/+1/-1 means the EGO has no lane change, turns right and turns left respectively.
22) cut-in-ts: when the *cut-in*maneuver of ego vehicle occurs. If there is no *cut-in*, return -1.
23) cut-in-dir: whether the *cut-in* maneuver of ego vehicle occurs. The value of 0/+1/-1 means the EGO has no cut-in, cuts in to left side and cuts in to right side respectively.
24) cut-in-dist-reduced: if *cut-in* occurs, how many relative distance between the EGO (cutting-in vehicle) and targeted vehicle (the vehicle being cut-in) is reduced. If no *cut-in* occurs, return -1.
25) min-dhw: the minimal DHW of the scenario.
26) ego-v-min-dhw: the absolute velocity at the minimal DHW.
27) ego-acc-min-dhw: the acceleration at the minimal DHW.
28) l-rel-pos-min-dhw: the relative distance between the rear vehicle and the ego vehicle at the minimal DHW. If there

is no rear vehicle at that time, return -1.

29) p-rel-pos-min-dhw: the relative distance between the preceding vehicle and the ego vehicle at the minimal DHW. If there is no preceding vehicle at that time, return -1.
30) ll-rel-pos-min-dhw: the relative distance between the left-rear vehicle and the ego vehicle at the minimal DHW. If there is no left-rear vehicle at that time, return -1.
31) pl-rel-pos-min-dhw: the relative distance between the left-preceding vehicle and the ego vehicle at the minimal DHW. If there is no left-preceding vehicle at that time, return -1.
32) lr-rel-pos-min-dhw: the relative distance between the right-rear vehicle and the ego vehicle at the minimal DHW. If there is no right-rear vehicle at that time, return -1.
33) pr-rel-pos-min-dhw: the relative distance between the right-preceding vehicle and the ego vehicle at the minimal DHW. If there is no right-preceding vehicle at that time, return -1.
34) surr-veh-count-min-dhw: counting the number of surrounding vehicles at the minimal DHW. If there is no surrounding vehicle at that time, return 0.
35) ego-braketime-until-min-dhw: until the minimal DHW, how long the ego vehicle has braked.
36) min-thw: the minimal THW of the scenario.
37) ego-v-min-thw: the absolute velocity at the minimal THW.
38) ego-acc-min-thw: the acceleration at the minimal THW.
39) l-rel-pos-min-thw: the relative distance between the rear vehicle and the ego vehicle at the minimal THW. If there is no rear vehicle at that time, return -1.
40) p-rel-pos-min-thw: the relative distance between the preceding vehicle and the ego vehicle at the minimal THW. If there is no preceding vehicle at that time, return -1.
41) ll-rel-pos-min-thw: the relative distance between the left-rear vehicle and the ego vehicle at the minimal THW. If there is no left-rear vehicle at that time, return -1.
42) pl-rel-pos-min-thw: the relative distance between the left-preceding vehicle and the ego vehicle at the minimal THW. If there is no left-preceding vehicle at that time, return -1.
43) lr-rel-pos-min-thw: the relative distance between the right-rear vehicle and the ego vehicle at the minimal THW. If there is no right-rear vehicle at that time, return -1.
44) pr-rel-pos-min-thw: the relative distance between the right-preceding vehicle and the ego vehicle at the minimal THW. If there is no right-preceding vehicle at that time, return -1.
45) surr-veh-count-min-thw: counting the number of surrounding vehicles at the minimal THW. If there is no surrounding vehicle at that time, return 0.
46) ego-braketime-until-min-thw: until minimal THW, how long the ego vehicle has braked.
47) min-ttc: the minimal TTC of the scenario.
48) ego-v-min-ttc: the absolute velocity at the minimal TTC.
49) ego-acc-min-ttc: the acceleration at the minimal TTC.
50) l-rel-pos-min-ttc: the relative distance between the rear vehicle and the ego vehicle at the minimal TTC. If there is no rear vehicle at that time, return -1.
51) p-rel-pos-min-ttc: the relative distance between the preceding vehicle and the ego vehicle at the minimal TTC. If there is no preceding vehicle at that time, return -1.
52) ll-rel-pos-min-ttc: the relative distance between the left-rear vehicle and the ego vehicle at the minimal TTC. If there is no left-rear vehicle at that time, return -1.
53) pl-rel-pos-min-ttc: the relative distance between the left-preceding vehicle and the ego vehicle at the minimal TTC. If there is no left-preceding vehicle at that time, return -1.
54) lr-rel-pos-min-ttc: the relative distance between the right-rear vehicle and the ego vehicle at the minimal TTC. If there is no right-rear vehicle at that time, return -1.
55) pr-rel-pos-min-ttc: the relative distance between the right-preceding vehicle and the ego vehicle at the minimal TTC. If there is no right-preceding vehicle at that time, return -1.
56) surr-veh-count-min-ttc: counting the number of surrounding vehicles at the minimal TTC. If there is no surrounding vehicle at that time, return 0.
57) ego-braketime-until-min-ttc: until the minial TTC, how long the ego vehicle has braked.