PRODUCING RESULTS FOR ADVANCED EMERGENCY BRAKING SYSTEMS

STEP 1: Install nnv from the link: https://github.com/verivital/nnv (follow the readme.md for the installation guide).

STEP 2: Add nnv to matlab path using Home \rightarrow Set Path \rightarrow Add with Subfolders

STEP 3: Go to folder: nnv0.1/examples/Submission/EMSOFT2019/EmergencyBraking

STEP 4: Produce reachable sets from the exact methods.

Run the script : *reach_exact.m* Change the initial condition: lb = [97; 25.2; 0] and ub = [97.5; 25.5; 0].

STEP 5: Produce reachable sets from the over-approximate method

Run the script: *reach_approx.m* Change the initial condition: lb = [97; 25.2; 0] and ub = [97.5; 25.5; 0]

STEP 6: Produce reachable sets of inverse TTC.

After produce the reachable set of the AEBS using STEP 4 or STEP 5 run *computed_inversed_TTC.m*

STEP 7: Searching safe initial condition for AEBS

Currently we do it manually. We set the new initial condition for distance, for example, d = [10, 20]. Then, we search v max that the system is safe with the reinforcement controller.

Let $v_{max} = 4 \rightarrow \text{set lb} = [10; 4; 0], ub = [20; 4; 0]$

run *reach_approx.m* with new lb and ub

run computed_inverse_TTC after getting the reachable set

check intuitively if the AEBS is safe. If not, reduce v_{max} and do it again. If safe, increase v_{max} and do it again.

We are going to automate this searching later.

STEP 8: For any question please contact: trhoangdung@gmail.com