Truck Platooning

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Contents

Abstract: This lab report presents how the UPPAAL model checker is employed in developing and validating a timed automata model for the truck platooning joining movement. There is a valid interaction identified between the vehicle trying to join a platoon and the response of other vehicles forming the platoon; they are time bound. For as safety and liveness properties that we need to check: that the joining truck maintains the proper distance from the front car and successfully enters into the platoon, we employ UPPAAL to simulate many cases. The analysis of the work behind platooning movements illustrates how well timed automata may capture and analyze complex platooning communications establishing the cornerstone of designing reliable and efficient platooning control systems.

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1   Motivation

[oSE00]

2   • Milestone 1: May 10th

Tasks 1

I have identified requirements by using UML use case diagram for truck platooning
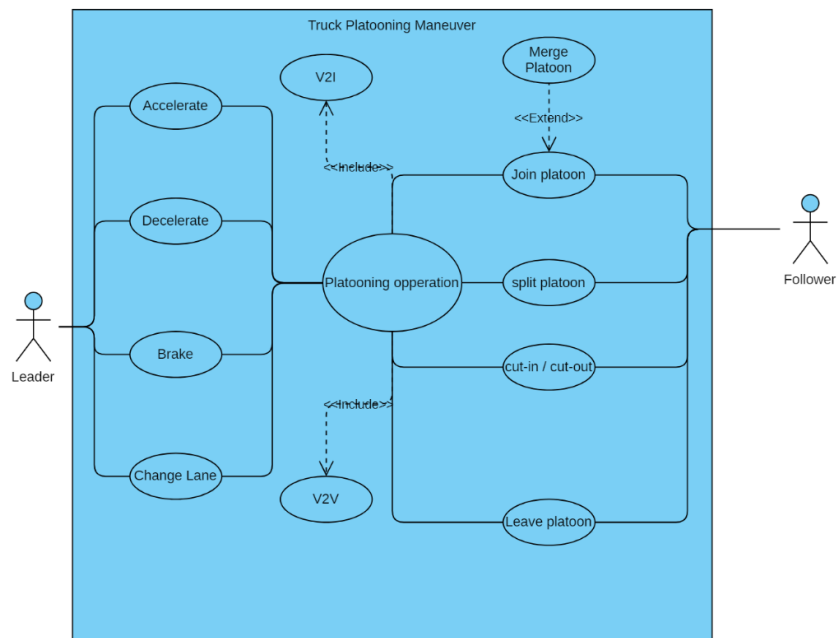

Fig. 1: Truck Platooning use case

3 Milestone 2: May 17th

In task two, we are asked to identify data, signal and events which are required for the interaction and communication between the trucks. i have used Uppaal Model to show this.
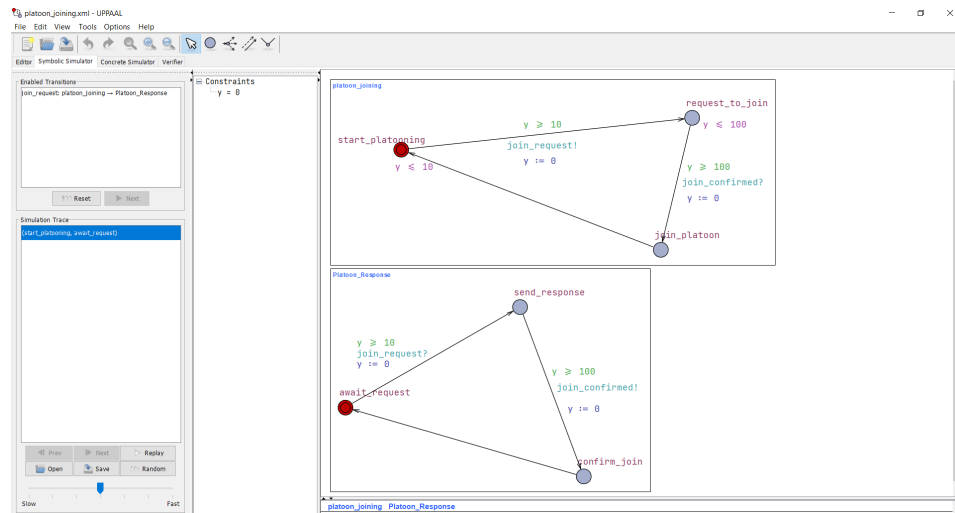

Fig. 2: joining platoon

4 Milestone 3: May 31st

4.1 Milestone 4: 7Th

Tasks 4: To determining the leader vehicle, i have applied Hierarchical Clustering. this is the 4 trucks platoon's leader identifying result.

	distance_from_previous
0	34.474116
1	15.579754
2	21.685786
3	24.654474

Fig. 3: distance from previous

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Leader Truck:
 fuel_consumption            34.639879
size                         10.580836
weight                       10.205845
engine_power                354.547490
aerodynamics                  0.386389
distance_from_previous       21.685786
```

Fig. 4: Leader Truck

4.2

5   Conclusion

6   Declaration of Originality

Date&Place - Maria Cron

Bibliography

[oSE00] on Systems Engineering, International Council, ed. INCOSE Systems Engineering Hand-
book, volume 2.0. 2000.