

Truck Platooning

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Platooning of trucks is the combination of more than one truck, utilizing technology means for connection between them and systems supporting the autonomous movement. Therefore vehicles tend to keep the distance stable when they are linked.

The leading truck in the first position is driven by a driver, while other trucks move just according to signals without any interaction by the driver. So the platoon is under control by only one person and other vehicles just move autonomously.

Task 1:

The detection system consists of 2 kinds of sensors: Ultrasonic and gyroscope. The reason why these sensors are candidates goes as follows.

The gyroscope will return angle of each truck made with its pre-defined axis.

And the ultrasonic will output the distance, after some lines of calculation. Ultrasonics basically works with waves, with known speed. So, the distance is calculable, assuming that no other obstacle exists between 2 trucks for simplification.

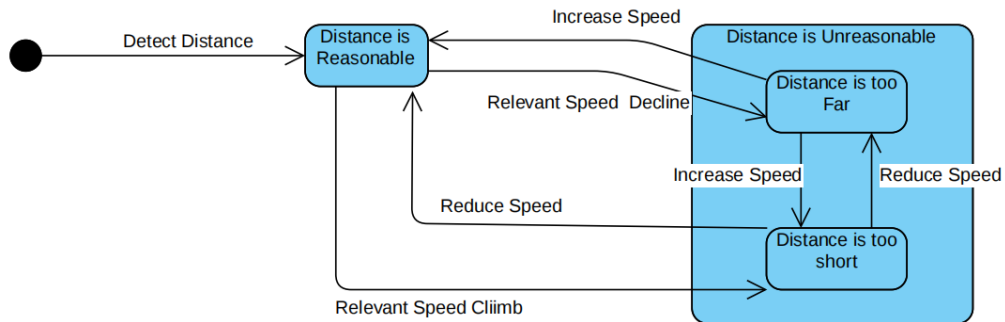
If the type of obstacle needs to be defined, we have to add a camera and video processing toolbox to the [https://en.wikipedia.org/wiki/Lost_Horizon_\(1937_film\)](https://en.wikipedia.org/wiki/Lost_Horizon_(1937_film)) system.

Interrupt

Protocol:

| Protocol | | | | |
|---------------------------------------|-------|------|-------------|---------------|
| Field | Type | Unit | Valid Range | Invalid Value |
| Velocity(From Gyrosecopse) | float | m/s | 0~100 | 101 |
| Azimuth(From Gyrosecopse) | float | ° | 0~360 | 361 |
| Mileage(From Gyrosecopse) | float | Km | 0~1000000 | -1 |
| distance with front truck(Ultrasonic) | float | m | 0~100 | -1 |
| Has Obstacle(Camera) | bool | - | 0.1 | - |
| distance with front truck(Camera) | float | m | 0~100 | -1 |

State Machine:



Task 2:

So in this example, the general procedure starts after starting the engine and the next processes are to determine the distance to the desired position for the truck in case of any interruptions to the system. And speed adjustment is regulated according to position f.i. in case of the desired position speed is slowed down otherwise the previous step is executed in order to determine the required distance and it happens for each truck. Besides the distance determination happens according to the signals of the sensors set up in the truck as mentioned above.

Activity diagram:

