Universiteit Antwerpen

Title: HOW DOES THE SPEED OF THE CAR CHANGE IN TIME?

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Intro

In this part of the project we would like to know how our project cars react when approaching an obstacle on the road. It can be another car, a wall or any other object.

Materials

- One of our project car
- Long flat plank
- Speed breaker object
- Ubuntu server

Methods

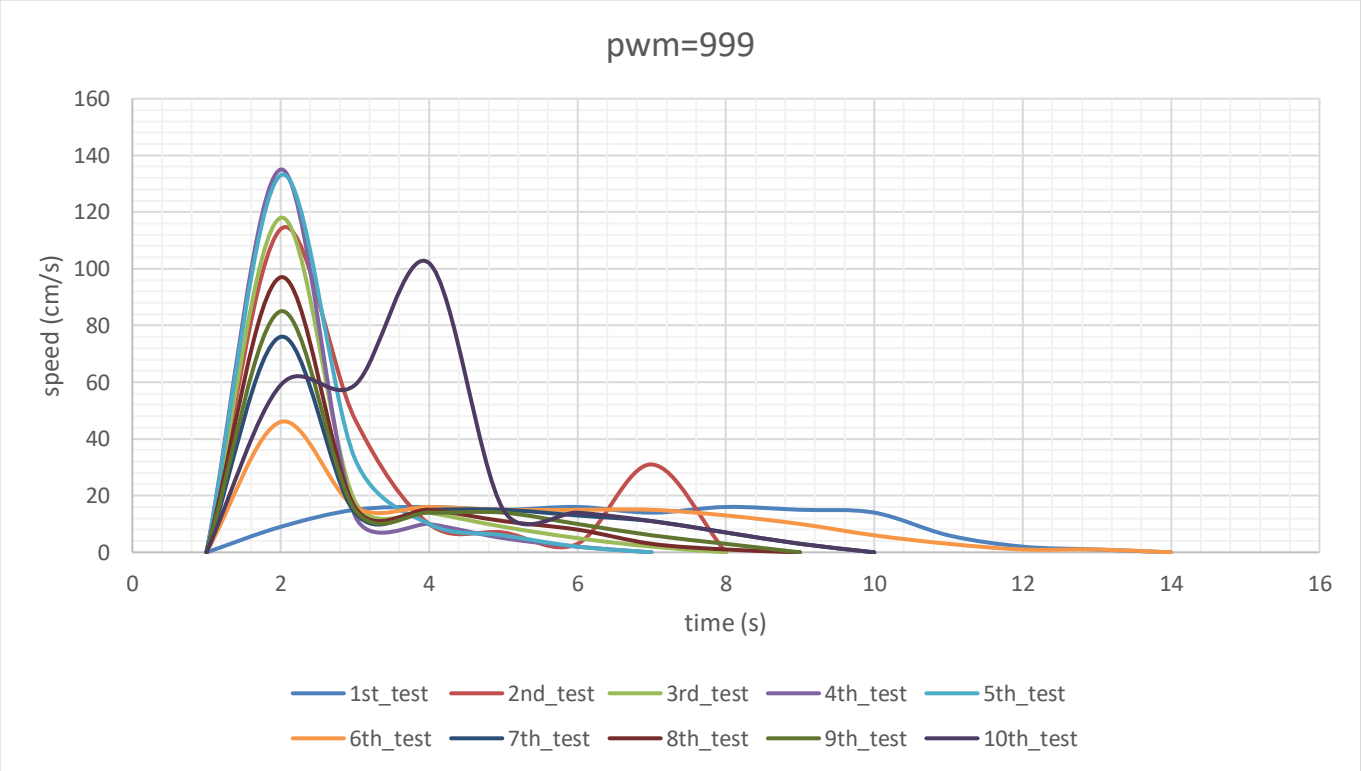
In this part of the project we would like to put one of our project cars on a long flat surface. On the other end there is a speed breaker object which would make the car stop when there is a particular distance between the car sensor and the obstacle. After starting the car the distance and the pwm will be sent to our server every second. The speed of the car would be determined by the distance difference in each second.
The server needs to execute the following command to listen to the incoming packets on port 2000 from the car and save them in a temporary text file.
"**nc –l –u 2000 > input.txt**"
This data input is then translated into understandable numbers. This is explained in my java code of previous week. A sample output looks like the following:

999
145
999
129
999
115
960
…

The first line is the pwm and the second is distance in centimeters. The distance change after every second gives us the speed of the car.

In this experiment we would like to collect 10 samples of every input and try to make a speed time graph.

Results



Information & conclusion

In the graph above we can see that 8 of the tests show similar pattern which means they are highly likely to be a correct graph of speed in regards to the time. After the 1st second the car speeds up exponentially reaching speeds up to 140 cm/s. Then it slows down exponentially to around 10 cm/s. Finally it decelerates gradually to zero speed.
Based on our knowledge of the project the distance sensor only has a range up to 200 cm. At the peak in the graph above is the moment when the distance sensor meets the speed breaker and the car begins to decelerate exponentially.