FreiCar Exercise 4 Team ROStars

2.5.1 Report your Findings

The performance of the filter seems satisfactory. It is able to localize the position of the car in every run. The time required for localization is different in each run and is also dependent on the type of resampling used. The Low-Variance sampling is computationally faster than Roulette sampling but Roulette sampling provides more reliable and faster localization as compared to Low-Variance sampling. Also, Low-Variance sampling seems to be affected by the effect of symmetry of the track more than Roulette sampling.

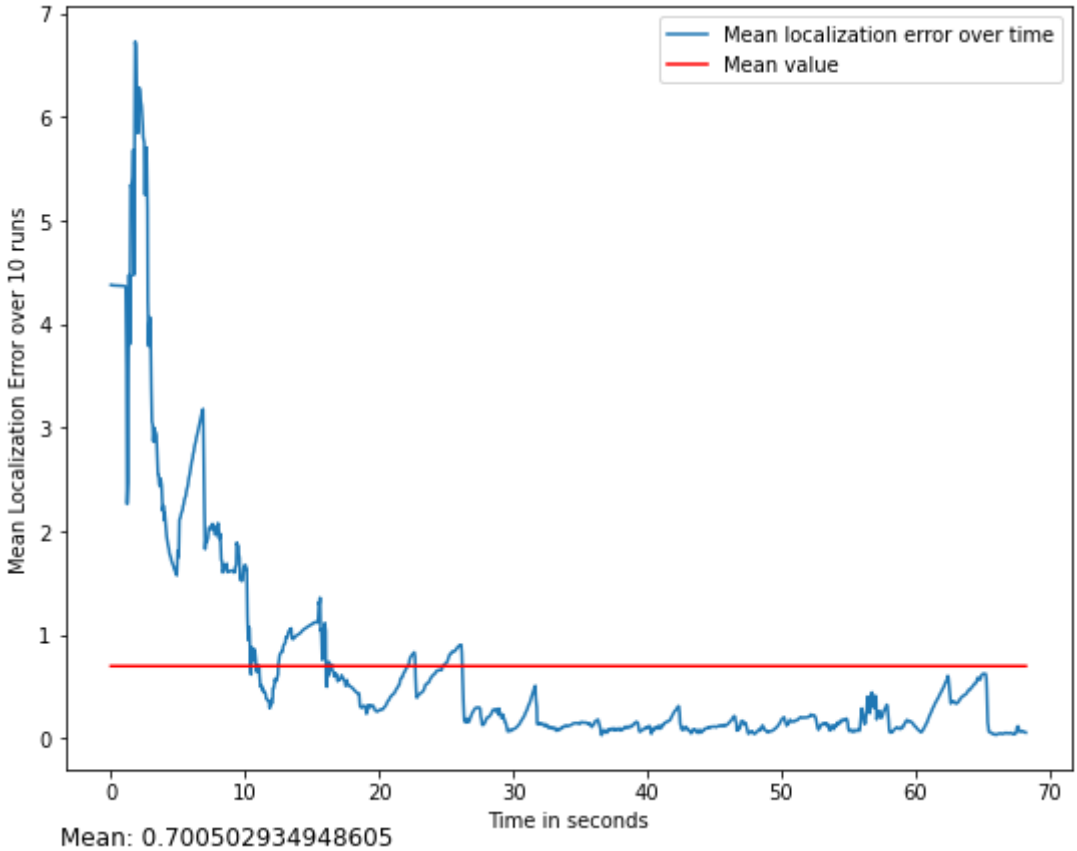
The biggest issue we were and still are facing is caused by the symmetry of the track. This makes it easier for the sensor model to get thrown off, continuing in an inverted way, which leads to a high error over a long time. To solve this problem a prior which helps to filter for the correct directions would be needed. Here, the angle between observations and ground truth could be used, but we still have to implement that.

Another big issue we were confronted with was the variation and apparent randomness between different runs, which made it hard to debug. This may be related to the symmetry issue. d

In the beginning we faced some lagging when using a high number of particles. By now we have solved this problem and are not sure if it was due to the build type debug / release error or because of some computational inefficient code.

2.5.2 & 2.5.3

Low variance sampling



Roulette sampling