

## PROJECT

## Kidnapped Vehicle

A part of the Self Driving Car Engineer Nanodegree Program

## PROJECT REVIEW

## CODE REVIEW 3

## NOTES

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## Meets Specifications

Dear Udacian,

A very good work was done on this project and I commend the strategic implementation of the Particle filter algorithm and the supporting comments which made the work much easier to review. Congratulations on completing this project which is a very essential part of Self Driving Car Engineering. I wish you the best in the rest of this Nanodegree program. 🙌

## Accuracy



This criteria is checked automatically when you do `./run.sh` in the terminal. If the output says "Success! Your particle filter passed!" then it means you've met this criteria.

Excellent work implementing an efficient particle filter for the tracking of a kidnapped vehicle. This is a very essential part of the Self Driving Car Engineering and the submission passed this rubric with flying colors. 🙌

## Performance



This criteria is checked automatically when you do `./run.sh` in the terminal. If the output says "Success! Your particle filter passed!" then it means you've met this criteria.

The submission aced this rubric with an exceptional run-time of 1.99423 seconds. This shows an efficient implementation of the particle filter algorithm. Great work!

```
Time step: 2435
Cumulative mean weighted error: x 0.121278 y 0.117323 yaw 0.0039871
Time step: 2436
Cumulative mean weighted error: x 0.12131 y 0.117342 yaw 0.00398646
Time step: 2437
Cumulative mean weighted error: x 0.121418 y 0.117305 yaw 0.00398916
Time step: 2438
Cumulative mean weighted error: x 0.121508 y 0.117347 yaw 0.00398836
Time step: 2439
Cumulative mean weighted error: x 0.121495 y 0.117324 yaw 0.003993
Time step: 2440
Cumulative mean weighted error: x 0.121557 y 0.117361 yaw 0.00399597
Time step: 2441
Cumulative mean weighted error: x 0.121568 y 0.117326 yaw 0.00399834
Time step: 2442
Cumulative mean weighted error: x 0.1216 y 0.117292 yaw 0.00400001
Time step: 2443
Cumulative mean weighted error: x 0.121674 y 0.117368 yaw 0.00400512
Runtime (sec): 1.99423
Success! Your particle filter passed!
```

## General



There may be ways to "beat" the automatic grader without actually implementing the full particle filter. You will meet this criteria if the methods you write in `particle_filter.cpp` behave as expected.

The submission followed the algorithm described in the lessons to implement a particle filter for vehicle tracking. All the functions written in the `particle_filter.cpp` file behave as expected producing great cumulative mean weighted errors with a small run-time. Great work!

## Suggestions and Comments

Please see code review section for more comments.

Some extra material for particle filters

- [Particle Filter in Robotics.](#)
- [Vehicle tracking using projective particle filter.](#)
- [Overlapped Vehicle Tracking via Enhancement of Particle Filter with Adaptive Resampling Algorithm.](#)

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[CODE REVIEW COMMENTS](#)



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