

Answers for reviews

Uncertain estimation-based motion planning algorithms for mobile robots

Zoltán Gyenes, Emese Gincsiné Szádeczky-Kardoss

Review B:

Thank you very much for every comment. From the comments we could get also ideas to our further research plans! We tried to develop every part of the paper that was requested. We hope positive responses to the revised paper.

Our answers for the suggestions for revisions:

1) The main problem with the paper, is that in no way the impact of the presented methodology is showcased:

- The prior work section just lists some state of the art methods, without comparing these (advantages / disadvantages) to the presented method

The prior work section was extended, showing the impact of the introduced method comparing with the previous methods:

„All of the presented reactive motion planning algorithms assume perfect information of the position and the velocity vectors of the obstacles that occur in the workspace of the robot. The main advantage of our introduced method is that the uncertainty of the measured sensor information can be taken into consideration, and the novel motion planning algorithm can generate collision-free target reaching for the agent even in case of inaccurate data.”

- The results section does in no way compare the performance of the presented approach to the baseline approaches, whereas this would have been easily possible (as it is run inside a simulation environment).

The result section was extended, the original VO method was compared with the introduced motion planning algorithm. Section 5.4 shows the final paths and the distances between the robot and the obstacles that are also compared. The motion of the agent was also presented using videos [27, 28].

2) Other remarks:

- The conclusions should be developed better. E.g., how do the authors intend to port this to real robotic systems (which doesn't seem easy, as the algorithm relies on perfect knowledge about the static obstacles)

The conclusions was developed:

„The introduced algorithm could be ported to a real robotic system using an omnidirectional mobile robot. The state estimation of the obstacles that occur in the workspace of the robot could be solved using an extended Particle filter algorithm. In that case, the position and the velocity vectors of the obstacles could be estimated in every sampling time. For that task, a LiDAR sensor can be used.”

- The captions of the illustrations should better illustrate what is shown

The captions of the illustrations were extended. In that case, they illustrate better what it is shown (Figures 6, 10, 12, 17, 18)

- Why does the x-axis cover more than 4 seconds on Figures 5 and 7 if the data only covers 1.5 seconds???

The uncertainties were presented in the whole motion of the robot but after a while using the precheck algorithm, the different obstacles should not have been considered in the calculation that is why the uncertainties were zero from that time moment. Figures 6, 10, 12 of the final version were changed so the uncertainties are presented only if they have a nonzero value!