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## **Real-time path planning for high speed UGVs**

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### **Abstract**

The application of a modified A-star (A\*) global search algorithm and trajectory planner based on the tentacles algorithm approach are investigated for real-time path and trajectory planning on an unmanned ground vehicle operating at a speed of 40 km/h. The fundamental assumption made is that for high speed applications, the requirement for an optimal path is secondary to the requirement for short processing times, provided that a solution, if it exists, is found. The proposed solution is benchmarked against the original A\* algorithm and shows a reduction in search space of up to 84% and a reduction in processing time of up to 97%. Results for the trajectory planner are also presented, though no direct comparative evaluation against the original tentacles algorithm was executed. The combined path and trajectory processing time of the proposed solution translates to less than 2 mm of travel distance before a reaction to a change in the environment can be processed.