

INTELLIGENT VEHICLE PATH PLANNING AND PATH FOLLOWING RESEARCH

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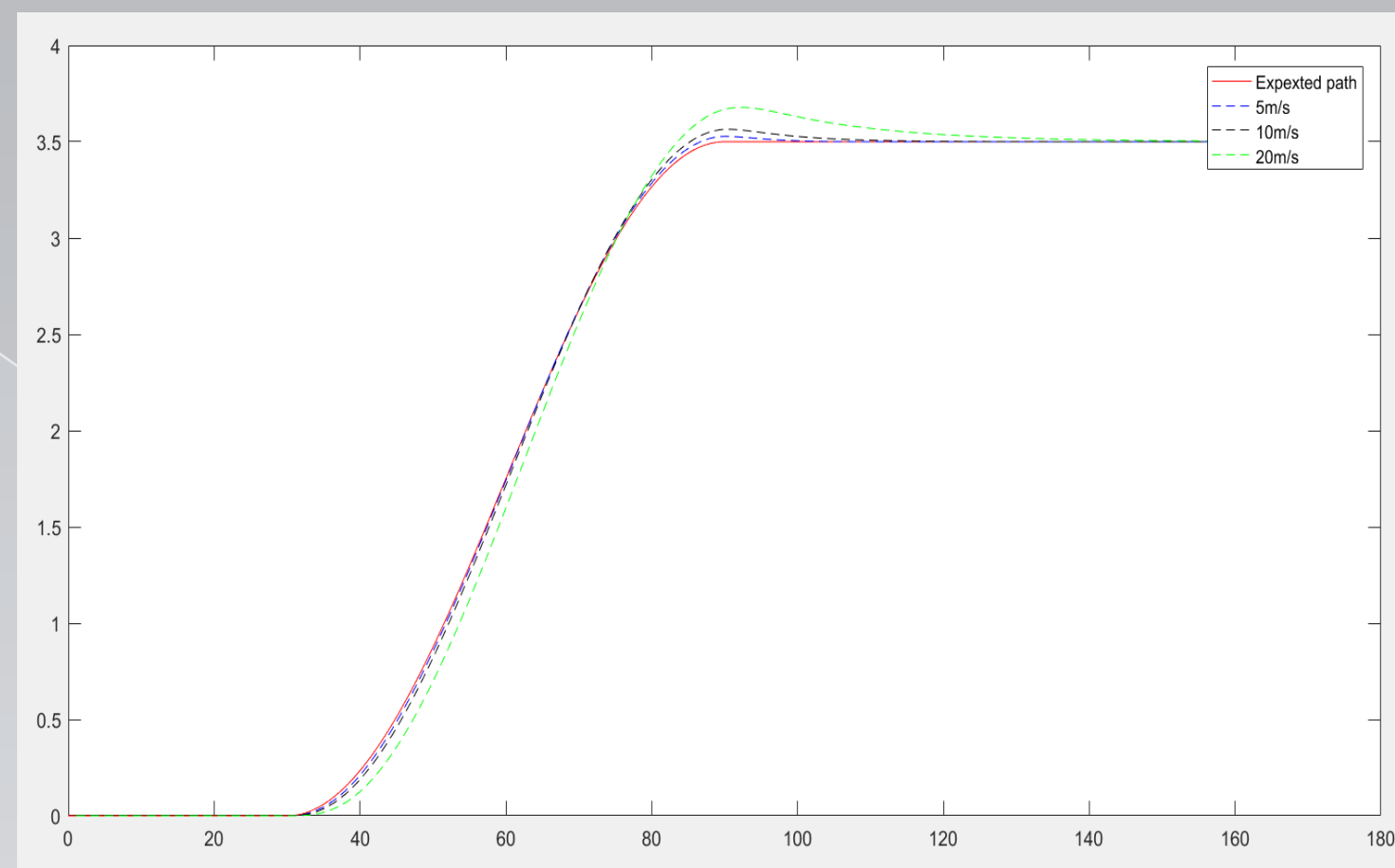
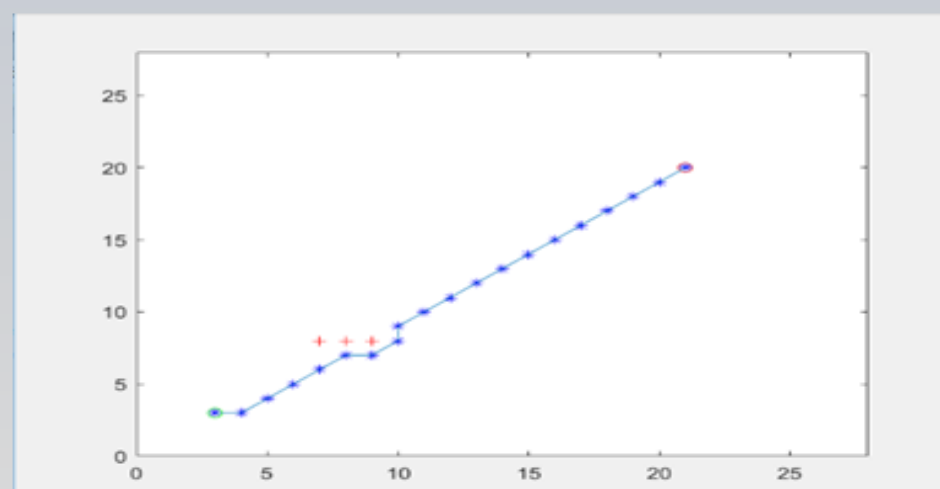
Abstract

Intelligent vehicle is the future development direction of automotive technology. It can alleviate traffic congestion and reduce traffic accidents. To this end, this research will research on its path planning and path following control technology.

A* path planning algorithm

Traditional A* algorithm has the problem that cannot avoid dynamic obstacles, poor real-time performance as the number of grids increases and the planned path is not smooth.

This paper optimizes the traditional A* algorithm by recording the historical trajectory of the obstacle to predict the next possible motion point, adding search direction constraints and extending the search neighborhood. The experiment result shows that the optimized A* algorithm has better real-time performance and reliability.



Pure pursuit path following algorithm

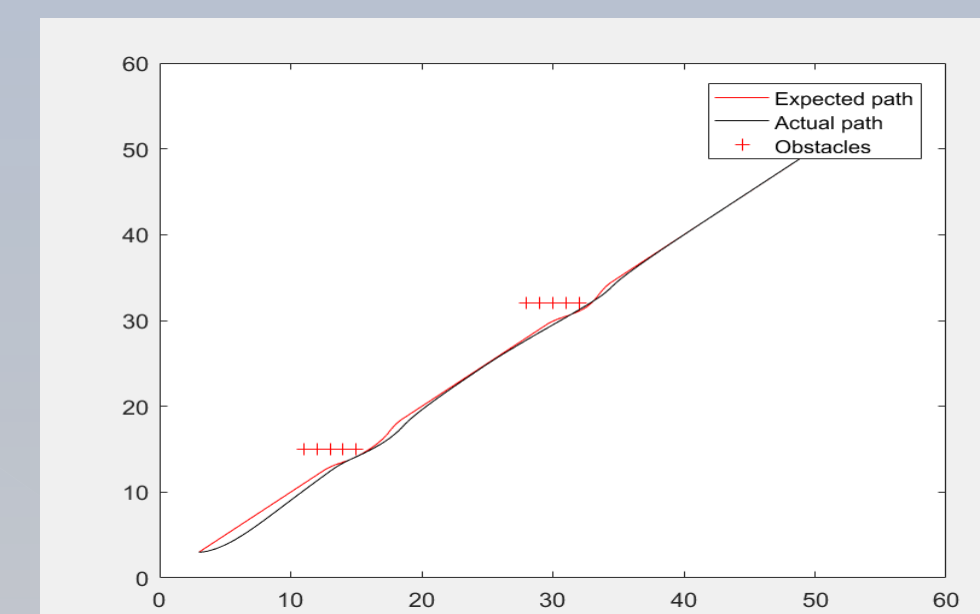
In order to ensure the vehicle can follow the path accurately and stably, this paper proposes a compensation type following algorithm. A vehicle kinematics model with longitudinal and yaw is established, and the pure pursuit algorithm is compensated by distance deviation and heading angle deviation. Then the effectiveness of the optimized pure pursuit algorithm under different vehicle speeds is verified in Matlab.

As can be seen from the above figure, the experiment result shows that the optimized pure pursuit algorithm has better robustness, better path following control effect, smaller vehicle slip and stable driving.

Joint simulation experiment

In order to verify whether these optimization algorithms are suitable for the application scenario of intelligent vehicles, this paper conducts a joint simulation experiment on the optimized path planning algorithm and the optimized path following algorithm.

The experimental result shows that these two algorithms can achieve driverless driving in a simple environment.



Conclusion

The optimized A* algorithm and the optimized pure pursuit algorithm can be used for path planning correctly and can follow the planned path accurately and stably.