

INTELLIGENT VEHICLE PATH PLANNING AND PATH FOLLOWING RESEARCH

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Abstract

As an essential part of the intelligent transportation system, the intelligent vehicle can effectively alleviate traffic congestion, improve driving safety and avoid traffic accidents. It has a high research value and market application prospects.

To this end, this research will take the intelligent vehicle as the research object, and research on its path planning and path following control technology.

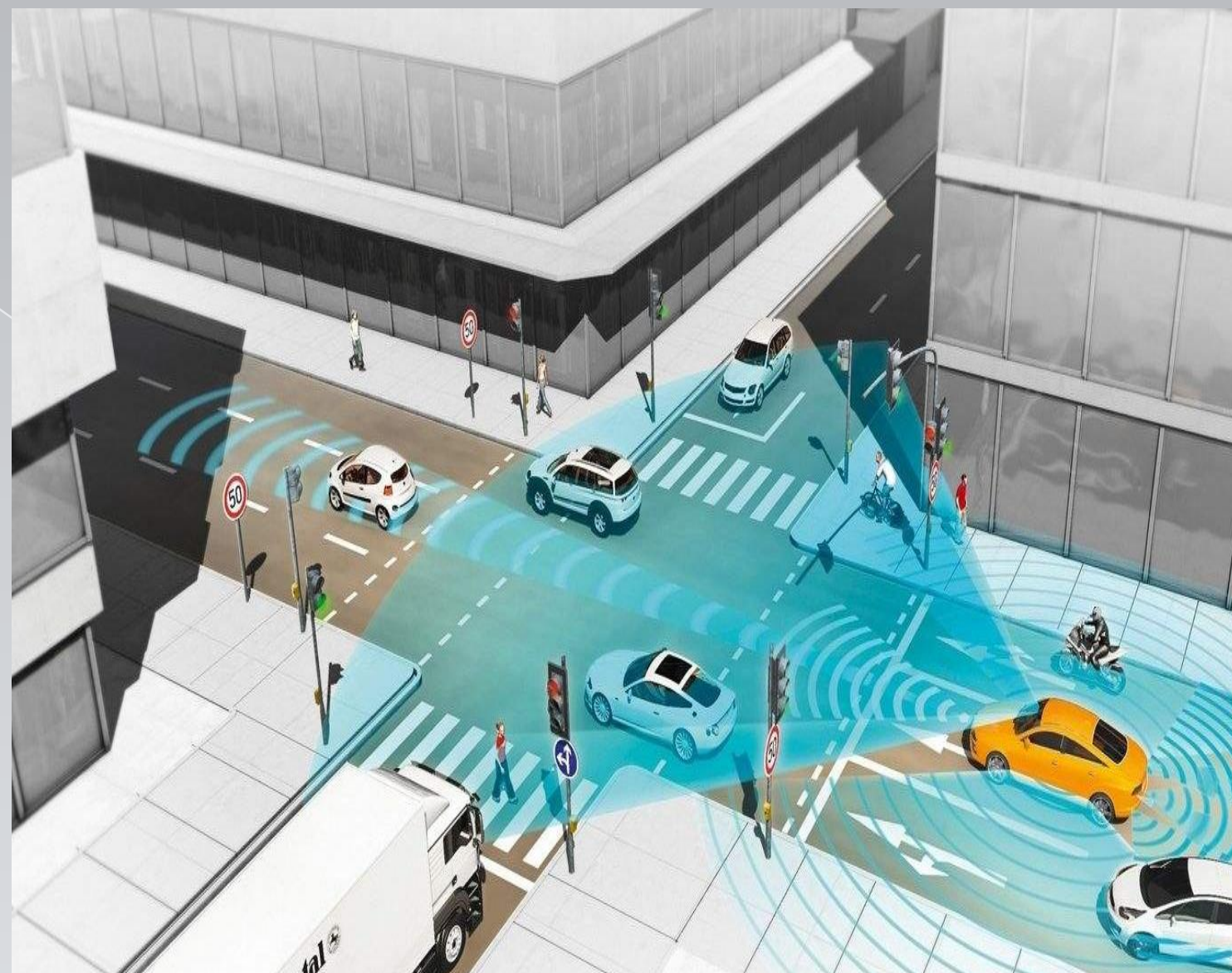
Background

The intelligent vehicle can sense the road environment through the onboard sensing system, automatically plan the driving path to send people to the destination.

In the critical technologies of intelligent vehicles, path planning and the path following control have always been essential and challenging points in the field of intelligent driving.

Aim

Optimize the accuracy and reliability of local path planning algorithm and path following algorithm.



Algorithm

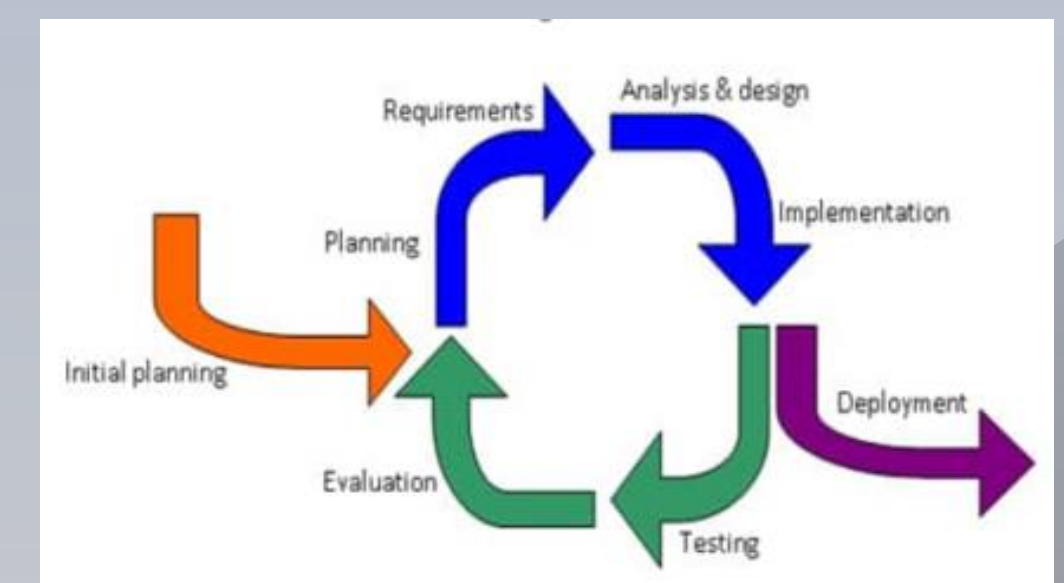
Path planning algorithms mainly include Dijkstra, A*, Fast Search Random Tree, Ant Colony Optimization and Artificial Potential Field method. These algorithms will be run by Matlab. According to the running effect of these algorithms, the suitable path following algorithm will be selected and optimized.

This research will also establish a vehicle dynamics model and design a path following controller based on model predictive control theory (MPC).

Methodology

This research will use literature review method, experimental research method, positivist philosophy method and deductive method to verify that the optimized path planning algorithm and path following algorithm are more accurate and reliable than before optimization.

Besides, this research will divide the task into several subtasks, and the techniques used for each subtask includes requirements analysis, design, implementation, testing, and evaluation. Therefore, the iterative model will be used for development method.



Expected outcomes

Completed the optimization of the path planning algorithm and the path following algorithm that meet the requirements of real-time, accuracy and reliability.