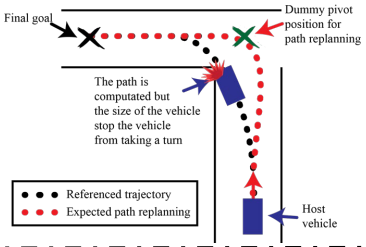
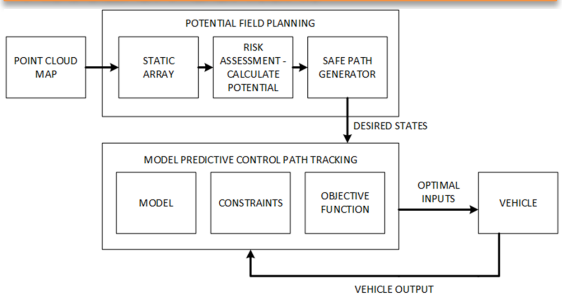
Study on Feasible Planner for Automated Driving Personal Vehicle

研究の概要と特徴 Research Overview



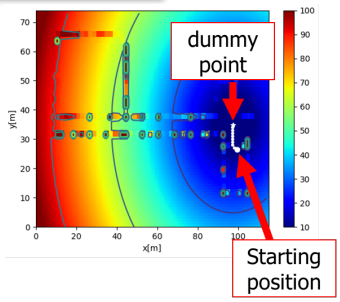
- For indoor navigation, the size, dimension and mechanism of vehicle affects deployment.
- Especially the vehicle might crash the corner of the wall when taking a turn.
- Adding dummy pivot point at each junction may help solve this issue.

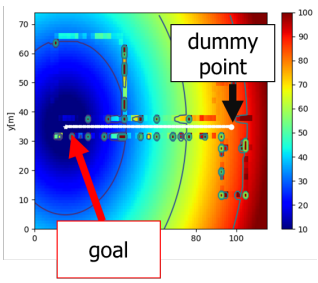
Research Content



- Point cloud map is converted into potential map for potential field path planning.
- Dummy point is manually added at the intersection of the potential map.
- Model Predictive Control (MPC) based controller constraint steering angle for passenger's comfort.
- Steering angle constraint value is sampled from actual human manual drive.

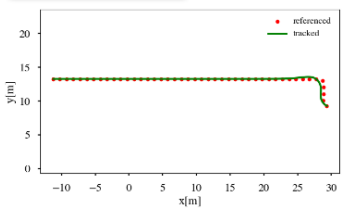
Result 1

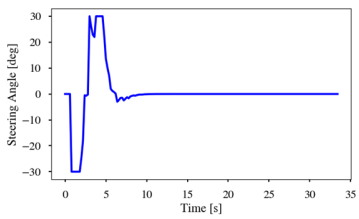




- Adding the dummy point ensures the vehicle to avoid crashing with corner.
- However, the system calculate the potential map twice, as it computes the potential risk of the dummy goal first before calculates the goal potential.

Result





- The tracked trajectory shows a slight deviation from the referenced trajectory.
- The result is caused by the dynamic and controller design constraints.
- There is not much oscillation for the steering angle data

結論 Conclusion

By using dummy point during global planning, a collision free path can be obtained.
However, the method still unable to cope with door with entry situation due to the narrow hall way. Future work will automate the dummy goal search process.

技術応用分野・企業との連携要望 Technology application and cooperation with companies

Company that developed autonomous vehicle or mobile robot on the tactical level.

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