ÉCOLE CENTRALE DE NANTES

MASTER CORO-IMARO
"CONTROL AND ROBOTICS"

2019 / 2020

Master Thesis Report

Presented by

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January 2019

One strategy for implementing EM planner with limited computing capability

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Abstract

An Internet company - Baidu is working on the autonomous driving, they have introduced a local path planning algorithm - expectation maximum planner(EM planner), this is a sampling-based algorithm. We hope to apply this algorithm to logistics robots to achieve the purpose of automatic delivery.

Compared with logistics robots, autonomous vehicles have higher requirements for various algorithms. Autonomous vehicles need to face more complex road environments, and they must be able to respond quickly when driving at high speeds. We can apply the algorithm to the logistics robots, but considering the cost of logistics robots, their motherboards have lower computing capability, if we use the exhaustive search approach (brute-forced search), the EM planner can always make an ideal choice based on the cost function. However, due to the limited computing capability of the motherboard, we need to adopt appropriate strategies to make the right behavior quickly and well.

The objective of this bibliography report is to present the state-of-the-art work on EM planner, with focus on details of algorithm implementation.

Acknowledgements

First of al, I would like to thank Prof. Olivier Kermorgant agreed to my request to return to China for internship.

I am thankful to the Meituan can give me a great opportunity to work on a topic of my interest.

Notations

Abbreviations

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Introduction

Chapter 1

State of the art

1.1 First topic

1.2 Second topic

Chapter 2

Actual work

When dealing with rectangled triangles (see Figure **??**) I sometimes used this theorem from [1]:

$$a^2 + b^2 = c^2 \tag{2.1}$$

The demonstration is in Appendix A.

Chapter 3

Experiments

When trying to draw a rectangled triangle, my program comes up with Figure **??** that is neither rectangled nor a triangle.

Unless there is a bug in my program, which is unlikely, this research indicates that the whole theory on triangles having 3 sides has been wrong for years, maybe decades.

Conclusion

Appendix A

Proof of theorem 2.1

Bibliography

[1] O. S. Pythagoras, "Theorem," *Some old journal*, vol. 1, no. 1, Feb. -580.