

**I. IDENTIFICATION DATA**

<b>Thesis title:</b>	Improving Path Planning Methods Using Machine Learning
<b>Author's name:</b>	Tsoy Artyom
<b>Type of thesis :</b>	bachelor
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Department of Cybernetics
<b>Thesis reviewer:</b>	Ing. Karel Košnar Ph.D.
<b>Reviewer's department:</b>	CIIRC, ČVUT

**II. EVALUATION OF INDIVIDUAL CRITERIA**

<b>Assignment</b>	<b>ordinarily challenging</b>
<i>How demanding was the assigned project?</i>	
The topic of estimating configuration space using of machine learning (ML) techniques is up-to-date.	

<b>Fulfilment of assignment</b>	<b>fulfilled</b>
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
All goals of the thesis are fulfilled.	

<b>Methodology</b>	<b>partially applicable</b>
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The selected method of kernel functions seems to be working. As a weak point I see, that there is not shown, how much the ML-based estimation decreases the number of full collision query. Also, I see possible degenerated estimator, that completely blocked some narrow passage due to not verifying when the estimator returns the sample as obstacle.	

<b>Technical level</b>	<b>C - good.</b>
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
The description of the sampling based methods is sound. Unfortunately, student use the words "optimal" and "optimality" in very general and often confusing way. I am missing detailed description of what the main advantage of the proposed method is. It can be deduced from the algorithm itself, but it should be described better. The description of the experiments lacks details, most important one is how many runs are made to get the data. As the method is randomized, it is really important to get significantly large number of samples to make any conclusions.	

**Formal and language level, scope of thesis****C - good.**

*Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?*

The thesis is written in good language, the structure of the thesis is standard. Sometime, the description of used symbols is missing e.g. in algorithm 4. the `b_free` and `b_obst` is not explained. More important, function `RandomConfiguration()` is not explained. Is the random sample drawn from estimated distribution of free space? Or is it drawn from uniform distribution?

**Selection of sources, citation correctness****A - excellent.**

*Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?*

The sources are selected and cited correctly.

**Additional commentary and evaluation (optional)**

*Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.*

**III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE**

*Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.*

Even the idea of proposed method is interesting, the provided experiments doesn't support the claims presented in the conclusion. The proposed method doesn't converge significantly faster but is significantly slower, even when compared to implementation of RRT\* in python.

Here are my questions:

- Can you define "optimal solution"?
- Is RRT\* method returning optimal solution?
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The grade that I award for the thesis is **C - good**.

Date: 3.6.2024

Signature: