

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	<b>Enhancing transport network graphs using GPS tracking data</b>
<b>Author's name:</b>	<b>Margarita Argirova</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Department of Computer Science
<b>Thesis supervisor:</b>	Doc. Ing. Michal Jakob, Ph.D.
<b>Supervisor's department:</b>	Doc. Ing. Michal Jakob, Ph.D.

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>challenging</b>
<i>Evaluation of thesis difficulty of assignment.</i>	
I rate the assignment as challenging given the necessity to combine algorithmic techniques, integrate them with map-processing libraries and apply to real-world data.	

<b>Satisfaction of assignment</b>	<b>fulfilled with minor objections</b>
<i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	
Although the student carried out all four tasks in the assignment, she focused almost exclusively on the detection of missing edges in the map data. The subsequent task of proposing correction to the map data based on the results of the detection was handled only very superficially. That said, the student studied the problem of detecting missing map data to a greater depth than anticipated in the assignment and this fact partially compensates for the superficial treatment of map correction.	

<b>Activity and independence when creating final thesis</b>	<b>C - good.</b>
<i>Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.</i>	
The student was <i>too</i> independent during the work on the thesis. In particular, during the winter semester, the student did not meet with the supervisor for several months and then – surprisingly – handed in a draft of the thesis just before the Christmas break (which made providing feedback difficult). That said, when the students did consult with the supervisor (primarily in earlier months), was able to come up with her own ideas and then follow them through to their implementation. In fact, the whole text of the thesis was written with minimum input / feedback from the supervisor.	

<b>Technical level</b>	<b>D - satisfactory.</b>
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
The student applied knowledge obtained in her MSc study and from studying relevant literature, in particular in the area of graph search algorithms and statistical data processing. Her overall approach to the problem is sound and broadly follows the applied research methodology suitable for the problem. However, the thesis suffers from a rather vague of style of writing which leaves many important details unclear. I particularly miss a clear, formal definition of the problem tackled. The pseudocode of the core algorithm contains references to undefined methods - e.g. what is backtrack()? I also miss an overview of the software architecture of the implemented system. The evaluation section, on the other hand, is probably the strongest part of the thesis, combining numerous visualizations with summary evaluation metrics to give a good insight in the performance of the proposed method (except for the evaluation of processing time– this is missing).	

<b>Formal and language level, scope of thesis</b>	<b>C - good.</b>
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
Overall, the thesis is written in good-quality English. Although typos, missing articles and incorrectly structured sentences are not uncommon, the thesis reads well overall on a sentence level. The is unfortunately not the case when it comes to	

the text as a whole. Although the top-level structure of the thesis broadly follows the standard, the division into subchapters and the content of the subchapters sometimes feels a bit arbitrary (e.g. the nine subsection of Chapter 5). The typographical quality of the thesis is mediocre. On the positive side, the numerous map-based visualizations of problem instances and processing results help to better understand the problem and the proposed solution, somewhat compensating for the lack of technical rigour mentioned above.

## Selection of sources, citation correctness

**D - satisfactory.**

*Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.*

The thesis contains around 20 references to relevant scientific articles, which is broadly adequate for this type of a master thesis. However, the Related work chapter suffers from serious issues: much of its content is taken almost verbatim from external sources and this is *not* clearly acknowledged in the text. The formal quality of references and citations is rather low – some references are incomplete and the thesis also contains several missing references (i.e. [ ]). Because of the missing description of the software architecture, it is also not clear how many external libraries and for which purpose were used in the implementation of the system.

## Additional commentary and evaluation

*Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.*

The thesis was submitted without attached source code. This was provided by the student later on request.

### III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

This is not an easy thesis to assess. The problem stems primarily from the fact that the student was not in a regular contact with the supervisor during most of the semester. Consequently, the supervisor only had a minimum influence over the content of the thesis.

On the negative side: the assignment was not fulfilled completely, and the presentation of the results in the thesis text is mediocre. There are also rather serious issues with correctly acknowledging external sources although these, fortunately do not concern the core contribution of the thesis, which is original. On the positive side: the student proceeded independently and managed to design and implement a solution for a non-trivial technical problem.

With more guidance and discipline, this could have been a very good thesis. Even in its current form, however, the thesis proves the capability of the student to independently carry out an applied research-oriented project, which is an essential requirement to qualify for MSc degree.

I evaluate the handed thesis with classification grade **D - satisfactory**.

Date: **30.1.2019**

Signature: