

# Supervisor's statement of a final thesis

Czech Technical University in Prague

Faculty of Information Technology

**Student:** Bc. Tomáš Horák  
**Supervisor:** Mgr. Petr Daněček, Ph.D.  
**Thesis title:** DNA base-calling from Nanopore sequencing data  
**Branch of the study:** Knowledge Engineering

**Date:** 21. 12. 2017

<p><i>Evaluation criterion:</i></p> <p><b>1. Difficulty and other comments on the assignment</b></p> <p><i>Criteria description:</i> Characterize this final thesis in detail and its relationships to previous or current projects. Comment what is difficult about this thesis (in case of a more difficult thesis, you may overlook some shortcomings that you would not in case of an easy assignment, and on the contrary, with an easy assignment those shortcomings should be evaluated more strictly.)</p> <p><i>Comments:</i> The task of accurately determining DNA sequence from Nanopore data is extremely challenging and is currently an area of active research.</p>	<p><i>The evaluation scale: 1 to 5.</i></p> <p><b>1 = extremely challenging assignment,</b> <b>2 = rather difficult assignment,</b> 3 = assignment of average difficulty, 4 = easier, but still sufficient assignment, 5 = insufficient assignment</p>
<p><i>Evaluation criterion:</i></p> <p><b>2. Fulfilment of the assignment</b></p> <p><i>Criteria description:</i> Assess whether the thesis meets the assignment statement. In Comments indicate parts of the assignment that have not been fulfilled, completely or partially, or extensions of the thesis beyond the original assignment. If the assignment was not completely fulfilled, try to assess the importance, impact, and possibly also the reason of the insufficiencies.</p> <p><i>Comments:</i> The assignment was completed according to expectations. The resulting software package is comparable to existing HMM-based programs in terms of both running time and accuracy.</p>	<p><i>The evaluation scale: 1 to 4.</i></p> <p><b>1 = assignment fulfilled,</b> 2 = assignment fulfilled with minor objections, 3 = assignment fulfilled with major objections, 4 = assignment not fulfilled</p>
<p><i>Evaluation criterion:</i></p> <p><b>3. Size of the main written part</b></p> <p><i>Criteria description:</i> Evaluate the adequacy of the extent of the final thesis, considering its content and the size of the written part, i.e. that all parts of the thesis are rich on information and the text does not contain unnecessary parts.</p> <p><i>Comments:</i> The text is well structured and contains all facts necessary for understanding the problem, even without prior biological knowledge, and it provides enough information to independently reproduce the results. At the same time it is factual and does not contain unnecessary parts.</p>	<p><i>The evaluation scale: 1 to 4.</i></p> <p><b>1 = meets the criteria,</b> 2 = meets the criteria with minor objections, 3 = meets the criteria with major objections, 4 = does not meet the criteria</p>
<p><i>Evaluation criterion:</i></p> <p><b>4. Factual and logical level of the thesis</b></p> <p><i>Criteria description:</i> Assess whether the thesis is correct as to the facts or if there are factual errors and inaccuracies. Evaluate further the logical structure of the thesis, links among the chapters, and the comprehensibility of the text for a reader.</p> <p><i>Comments:</i> The thesis is comprehensible, logically well structured and factually correct.</p>	<p><i>The evaluation scale: 0 to 100 points (grade A to F).</i></p> <p>90 (A)</p>
<p><i>Evaluation criterion:</i></p> <p><b>5. Formal level of the thesis</b></p> <p><i>Criteria description:</i> Assess the correctness of formalisms used in the thesis, the typographical and linguistic aspects, see Dean's Directive No. 14/2015, Article 3.</p> <p><i>Comments:</i> The formal level of the thesis is excellent and although the English of the thesis is not perfect, writing is understandable.</p>	<p><i>The evaluation scale: 0 to 100 points (grade A to F).</i></p> <p>90 (A)</p>
<p><i>Evaluation criterion:</i></p> <p><b>6. Bibliography</b></p> <p><i>Criteria description:</i> Evaluate the student's activity in acquisition and use of studying materials in his thesis. Characterize the choice of the sources. Discuss whether the student used all relevant sources, or whether he tried to solve problems that were already solved. Verify that all elements taken from other sources are properly differentiated from his own results and contributions. Comment if there was a possible violation of the citation ethics and if the bibliographical references are complete and in compliance with citation standards.</p>	<p><i>The evaluation scale: 0 to 100 points (grade A to F).</i></p> <p>100 (A)</p>

*Comments:*

The research papers referenced by the student are relevant and well chosen.

*Evaluation criterion:*

*The evaluation scale: 0 to 100 points (grade A to F).*

**7. Evaluation of results, publication outputs and awards**

90 (A)

*Criteria description:*

Comment on the achieved level of major results of the thesis and indicate whether the main results of the thesis extend published state-of-the-art results and/or bring completely new findings. Assess the quality and functionality of hardware or software solutions. Alternatively, evaluate whether the software or source code that was not created by the student himself was used in accordance with the license terms and copyright. Comment on possible publication output or awards related to the thesis.

*Comments:*

DNA base calling from Nanopore data is an area of active research. In a relatively short time a viable software package was written. It does not outperform existing base callers published in the meantime while the student was working on the project. However, the aim of the thesis was not to compete with software packages developed in world's leading labs.

*Evaluation criterion:*

*No evaluation scale.*

**8. Applicability of the results**

*Criteria description:*

Indicate the potential of using the results of the thesis in practice.

*Comments:*

The package will be tested on real patient's data, in collaboration with the Faculty of Medicine at Charles University.

*Evaluation criterion:*

*The evaluation scale: 1 to 5.*

**9. Activity and self-reliance of the student**

9a:

1 = excellent activity,

**2 = very good activity,**

3 = average activity,

4 = weaker, but still sufficient activity,

5 = insufficient activity

9b:

**1 = excellent self-reliance,**

2 = very good self-reliance,

3 = average self-reliance,

4 = weaker, but still sufficient self-reliance,

5 = insufficient self-reliance.

*Criteria description:*

Review student's activity while working on this final thesis, student's punctuality when meeting the deadlines and consulting continuously and also, student's preparedness for these consultations. Furthermore, review student's independency.

*Comments:*

The student worked actively and independently, and responded well to comments and suggestions.

*Evaluation criterion:*

*The evaluation scale: 0 to 100 points (grade A to F).*

**10. The overall evaluation**

100 (A)

*Criteria description:*

Summarize the parts of the thesis that had major impact on your evaluation. The overall evaluation **does not** have to be the arithmetic mean or any other formula with the values from the previous evaluation criteria 1 to 9.

*Comments:*

A significant amount of work was put in and the results meet the expectations.

Signature of the supervisor: