I. PERSONAL AND STUDY DETAILS

Student's name: Hassan Dana Tayser
Personal ID number: 473055
Faculty: Faculty of Biomedical Engineering
Study program: Biomedical and Clinical Technology
Branch of study: Biomedical Engineering

II. EVALUATION OF THE MASTER THESIS

Masters’s thesis title in English:
Methods for evaluation of gait of children with Cerebral Palsy

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>N. of points</th>
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<tbody>
<tr>
<td>1. Fulfillment of the aim of the thesis and suitability of the structure of the thesis with respect to the topic (compliance with the assignment). (0 – 30)*</td>
<td>23</td>
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<td>2. Theoretical level and application of accessible sources. (0 – 30)*</td>
<td>25</td>
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<td>3. Scope of experimental work (SW, HW) and applied knowledge, quality of the methodology and conclusions of the thesis. (0 – 30)*</td>
<td>20</td>
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<td>4. Formal requisites and layout of the thesis (writing mastery, structuring, graphs, tables, citations in the text, list of references etc.). (0 – 10)*</td>
<td>3</td>
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<td>5. Total points</td>
<td>71</td>
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* Verbal evaluation should be part of the Comments
III. PROPOSED QUESTIONS FOR THE DEFENSE (OPTIONAL)

1. Which parameters do you find the most important for further studies of the topic and why? If possible, discuss briefly the clinical importance of the parameters.

2. How long did the robot-assisted gait training of the examined patients last?

3. 

IV. THE OVERALL ASSESSMENT OF THE LEVEL OF THE MASTER THESIS

<table>
<thead>
<tr>
<th>Grade**:</th>
<th>A (excellent)</th>
<th>B (very good)</th>
<th>C (good)</th>
<th>D (satisfactory)</th>
<th>E (sufficient)</th>
<th>F (failed)</th>
</tr>
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<tbody>
<tr>
<td>Number of points:</td>
<td>100 - 90</td>
<td>89 - 80</td>
<td>79 - 70</td>
<td>69 - 60</td>
<td>59 - 50</td>
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** in case of F (failed) please explain in detail

I give the above grade to the master thesis and I recommend(do not recommend) it for the defence.

V. COMMENTS

The topic of the diploma thesis is the motion analysis of children with cerebral palsy. The thesis investigates the influence of robot-assisted gait training on selected parameters in order to define the parameters suitable for the description of improvement in gait pattern. The core of the thesis deals with the statistical difference in the parameter values before and after the gait training.

The Introduction is reasonably structured and deals accordingly with both the clinical and technical part of the problem. There is, nevertheless, a gap between the state of the art and the aims of the thesis: The objectives of the work (or research questions) do not arise clearly from the state of the art, although the overall meaning of the work and its clinical context are rather apparent.

The section of the Methods that describes study preparation, experimental protocol, and data collection is well described and organized. On the other hand, in section 2.4 (Gait Data Analysis) I did not find focused and comprehensive definitions and descriptions of methods and parameters selected for further evaluation. Merely their listing is presented, although, admittedly, some typical parameters and indexes are presented in the Introduction and in the Discussion, including equations. Statistical tests that were used (Jarque-Bera test of normality and Wilcoxon sign-rank test) are appropriate. Given the non-significant results in some parameters and relatively low number of participants, it might have been interesting to examine the power of tests.

The Discussion is detailed and the relation between statistical and clinical significance is presented; however, the practical applicability of outcomes of the thesis is not apparent. Conclusions of the work are vague and do not clearly summarize which parameters should be utilized in further studies or clinical practice. Limitation of the study should have been presented in the Discussion rather than in the Conclusions.

Formal issues:
A reference to Appendix 1 (Ethical board review) is missing in the Methods. Many figures are not referenced from the text or there is a mismatch in their numbering. Resolution of many images is poor and it is difficult to read them. The list of bibliographical references is wrongly formatted: A year of publication is usually missing as well as the type of document, therefore it is difficult to evaluate the novelty of the sources. There are Czech words, most likely as a result of Czech software or online service used for formatting. Matlab source code was available to the reviewer, but not the data files, so the reproduction of the calculations was difficult.

Summary:
In this thesis, the student demonstrated a good ability to process biomedical data, draw conclusions based on the processing, and set them into a wider clinical context. Although the presented report has many shortcomings, it fulfills its guidelines to the extent that I recommend the thesis for defense.
Name and surname incl. degrees: Ing. Jakub Ráfl, Ph.D.
Institution: ČVUT v Praze, Fakulta biomedicinského inženýrství
Contact address: Nám. Sítná 3105, 272 01 Kladno

Signature: .............................................
Date: ....................................................