

I. IDENTIFICATION DATA

Thesis title:	Actigraphy Data Analysis in Bipolar Disorder Patients
Author's name:	Václav Hlaváč
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	Jakub Schneider
Reviewer's department:	Department of Cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>How demanding was the assigned project?</i>	
The goal of the thesis was to build a classifier of a bipolar patient state using an actigraphy measurement. In order to do that the student had to go through the whole machine learning process, including preprocessing, feature parameters estimation (using artificial and real data), setting the validation process. I evaluate this thesis as standardly challenging.	

Fulfilment of assignment	fulfilled
<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>	
The assignment was fulfilled achieving all the primary goals.	

Activity and independence when creating final thesis	A - excellent.
<i>Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.</i>	
The student was highly active throughout the whole semester consulting every 7-14 days. He was usually well prepared for the consultations. The student was highly independent, suggesting his own ideas on how to continue with the work based on literature he read and methods he studied.	

Technical level	A - excellent.
<i>Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?</i>	
The technical level of the thesis is very good. Student soundly used both the suggested literature and the literature found by himself. The student got an overview of the problematic of actigraphy and bipolar disorder and used skills acquired during his study to cope with the task.	

Formal level and language level, scope of thesis	B - very good.
<i>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?</i>	
The work fulfils all formalities required for a bachelor thesis. The work is well organized, though the source of data mentioned in chapter 9 should already be included in chapter 4. The conclusions section could be longer and should include more of the important results obtained in previous chapters. In some of the figures, I would prefer more detailed description so the figure and description would be self-explaining without reading the text. The level of English is very satisfactory and the text itself is clear and understandable.	

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 student has been active in finding own literature sources. In total 35 relevant sources are cited throughout the work. The citations are correct according to the suggested norms.

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.

The topic of the thesis is connected with still ongoing research in psychiatry. Some parts of the work are focusing on a topic that was not explored previously and are, therefore, enriching our knowledge in the problematic of physical activity in bipolar patients.

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

The student worked well throughout the whole period. He was active and interested in the topic. He thoroughly explored the data and the features, providing self-engineered visualizations in each step. The results obtained from the classification are not uncommon for such noisy biological data-series.

Questions:

- 1. In the text, there is repeatedly said that the Spearman's correlation coefficient was used because the relationship is not expected to be linear. May you explain the main differences between Pearson's and Spearman's correlation coefficients?*
- 2. In chapter 8.2.2, there are boxplots for different bipolar episodes and M10 and L5 features, but the RA is missing. Could you include this visualization in the presentation and discuss these findings a bit more, especially how they correspond to globally accepted differences between states?*
- 3. In the evaluation of classifier results you use Precision and Recall, these are not as commonly used in the medical literature. May you please present what is their relation to sensitivity and specificity?*

The grade that I award for the thesis is **A - excellent**.

Date: **8.6.2020**

Signature: Jakub Schneider