THESIS SUPERVISOR'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Actigraphic Data Processing of Patients with Bipolar Disorder**
Author's name:	**Březík Miroslav**
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**

How demanding was the assigned project?

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, setting the validation process. I evaluate this thesis as standardly challenging.

Fulfilment of assignment	**fulfilled**

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.

The assignment was mostly fulfilled, though the effect of missing data on the cosine analysis is not mentioned in the thesis.

Activity and independence when creating final thesis	**A - excellent.**

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.

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. Unfortunately, the student wasn't, as it seems, present all his solutions (or presenting written reports).

Technical level	**C - good.**

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?

The technical level of the thesis is acceptable. Some of the decisions and results are not well explained in the text. The examples are 1) meaning of average value in tables 2.1 and 2.2. 2) statistical comparisons and visualizations reasoning in chapter 3. 3) presenting results in tables 3.1 – 3.5 is misleading 4) figures 4.12 and 4.13. are not well explained. Also, the validation process in chapter 4 (page 26 last paragraph) is not well presented. Otherwise, the student presented that he got good 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.**

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 work fulfils all formalities required for a bachelor thesis. The work is logically structured. The language used is not very technical and contains many long, hard to follow, sentences. In many figures, I would prefer more detailed description so the figure and description would be self-explaining without reading the text. Especially for the figures 4.8 – 4.10 that are each presented on an individual page. Except issues mentioned above the level of English is satisfactory and the text itself is 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 41 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 was very interested in exploring and analyzing the data. The student was also very interested and successful in finding relevant literature on subject of optimization calculation of permutation entropy for specifics of actigraphy recordings. Unfortunately, the thorough exploration left him with only a short time to write all the results down in time to fine-tune the details and visualizations. The unconvincing results obtained from the classification are not uncommon for such noisy biological data-series.

Questions:
1. *The one-side ANOVA was used as optimization criterion for the permutation entropy parameters. What does a significance in the test mean?*
2. *In the chapter 3 there is a comparison of features based on cosinor analysis between working days and weekends. These are compared in windows either containing a free day or not. I don't think that the reasons for this are well stated in the text, may you present it here? What would be appropriate statistical test to compare these groups?*
3. *In evaluation of classifier results you use Precision and Recall, these are not as commonly used in medical literature. May you please present what are their relation to sensitivity and specificity?*

The grade that I award for the thesis is **B - very good.**

Date: **8.6.2020**   Signature: Jakub Schneider