

I. IDENTIFICATION DATA

Thesis title:	Actigraphic Data Processing of Patients with Bipolar Disorder
Author's name:	Miroslav Brezík
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	David Cuesta Frau
Reviewer's department:	External

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
The task of processing actigraphy data is, by itself, very challenging, since there are usually a lot of samples, and there is no visual clue about the information provided by them, just a plain dichotomy between activity/no activity. On top of that, if these actigraphy data are used to extract information about a mental disorder (not a physical or movement disorder as usual with these records), the task becomes even more challenging. I think the approach followed by the student and his supervisor is very innovative and interesting.	

Fulfilment of assignment	fulfilled with minor objections
<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 study assesses the performance achieved using Cosinor analysis and Permutation entropy, and also introduces a classifier to quantify the discriminating power that can be obtained. I think this is the primary goal of any similar work of this kind, and therefore the structure and approach followed can be considered suitable for the scope of the work. Probably the Chapter 5 section, Classifier, should have been worked a little bit more, and in more detail.	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The approach for the classification of biomedical records is quite straightforward, and it has been followed by the student, demonstrating that it is also a valid approach for actigraphy records in the context of mental diseases. This is the greatest novelty of this work from my point of view.	

Technical level	A - excellent.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
Yes, the thesis is technically sound. The student uses advanced scientific concepts and methods from the realm of pattern recognition and non-linear signal analysis, and he was able to export them to a new domain.	

Formal and language level, scope of thesis	A - excellent.
<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>	
Yes, the thesis is written scientifically, following the logical steps of a pattern recognition method, with the analysis of features and the classification results. Easy to follow and understand, with a very high level of English. I also have to say that I have enjoyed reading this thesis very much because, as stated before, it is very well written, and the topic is of great interest for me. No doubt other researchers will find it very much enjoyable and professional as well.	

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?

Yes, the background knowledge applied in this thesis is properly referenced and the contributions clearly distinguished.

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.

This is a work whose scientific and technical level is well beyond the level expected for a bachelor student. I recommend both the student and the supervisor to carry on with this research beyond the present work because, if the student plans to achieve a PhD, this work has the potential to become a PhD thesis provided some additional research is conducted.

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

Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.

Questions:

- 1.** *The classification of time records is the ultimate goal of any similar method, and in this work this stage has been given minor consideration, a mere couple of pages. Why is this so?*
- 2.** *Permutation Entropy is a classical method, with an already "big family" of improved derived methods, Why did not the student consider one of these "better" methods, despite the good performance that PE can yield?*
- 3.** *I miss some more "real life" aspects of the work. For example, some source code, some images of the device worn by the patients, some more plots of the records used in the analysis,...Is this the usual way bachelor thesis are presented or is there any reason why it is like that, overlooking the information I mentioned?*

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

Date: 12/06/2020

Signature: