Habilitation Thesis Reviewer's Report

Masaryk University Faculty	Faculty of Informatics
Procedure field	Informatics
Applicant	Ing. Vlad Popovici, , Ph.D
Applicant's home unit, institution	Faculty of Science, Masaryk University
Habilitation thesis	Computational biomarker discovery: methods and practice
Reviewer	Prof. Oswaldo Trelles Salazar
Reviewer's home unit, institution	Computer Architecture Department, University of Malaga, Spain

[Review text]

Reviewer's questions for the habilitation thesis defence (number of questions up to the reviewer).

Opinion. The presented thesis is a compendium of several high-quality published articles centered around biomarker discovery, data normalization and validation. It is clear that the author had a determinant and valuable participation in the making of these, and also with fruitful results. However, I believe the commentary part of the thesis could be improved through the addition of some clarifications.

Major concerns: There is a lack of a general state of the art. This is, although a brief introduction to DNA and microarray usage is presented, I believe the inclusion of a section regarding the state of the art (although the span of time of all the articles is around 10 years) would result in great benefit for the thesis. In particular, I fail to see explained concisely what were the existing open questions that motivated the research, and furthermore what was the impact of the performed research in the initial context. As the author states in the abstract, the thesis deals with several aspects of biomarker discovery, namely:

- Development of methods for gene expression data normalization with applications.
- Classifiers for biomarker design and their applications.
- General methodological aspects for biomarker discovery and validation applied to problems in breast and colon cancers.
- Methods for histopathology image analysis in the context of molecular data for proxy biomarker discovery.

Such natural division of the work performed by the author could be used as well for the state of the art, reminding of open questions and provided solutions. To facilitate the inclusion of this extended state of the art section, it could be attached as an Annex if necessary

The conclusions section. I do not think that 11 lines of narrow-margin text honors 12 articles throughout 10 years. I believe the conclusions should be extended with a summary of what the research of the author has contributed to science. In my opinion the absence of a more extended section demerit the full content of the thesis. Such section should not only content a summary of the "conclusion" from the published articles, but what IU suggest are general comments in the full scope of the thesis.

Small concerns:
Page 9, missing space at "...the DNA (micro)array..."
Page 9-10, the http link "affymetrix" is cut in the middle and produces format errors, i.e. the heading of page 10 also includes the reference link.
Page 25, there is a section link without section number.
Page 27 to 29, there are two figure breaking up the last line of text, i.e. it becomes difficult to tell what the last line stands for after being broken up by two figures. Please try to reformat this.
Page 37, concluding remarks. The sentence "...clearly show that having the right data and a modern computational infrastructure allows one novel ways of exploring..." does not sound right to me. Please rephrase.

Conclusion

The habilitation thesis entitled *"Computational biomarker discovery: methods and practice"* by Vlad Popovici *fulfils* requirements expected of a habilitation thesis in the field of Informatics.

In Malaga on 07 March 2018

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