



Habilitation Thesis Reviewer's Report

Masaryk University	
Faculty	Faculty of Informatics
Procedure field	Informatics
Applicant	Dr. rer.nat. RNDr. Mgr. Bc. Jan Křetínský, Ph.D.
Applicant's home unit, institution	Technical University of Munich, Germany
Habilitation thesis	<i>Modern Probabilistic Verification</i>
Reviewer	Dr. Richard Mayr
Reviewer's home unit, institution	School of Informatics, University of Edinburgh, UK

Review:

1. Research output:

The candidate has published a significant number (≥ 60) of research papers, and most of these have appeared in the framework of high standard international conferences on formal verification and related fields in theoretical computer science, like CONCUR, CAV, LICS, TACAS, etc. There are also several journal papers.

Most of these publications are from research work done after the PhD. Even though most of his papers are joint work with several co-authors, it is clear that the applicant has made significant contributions to these publications.

The scope of the candidate's research is not particularly broad. Almost all papers deal with temporal logics and (algorithms for) formal verification problems. However, it is not very narrow either. It considers both temporal logic and automata in a classic setting, as well as the analysis of stochastic systems like Markov decision processes and stochastic games.

In most publications, the depth of the contribution and the size of the step is significant. Though his works in different fields are presented with equal weight in the habilitation thesis, I consider the results on stochastic systems (Markov decision processes and stochastic games) to be the best and most important. In particular, the better analysis algorithms for MDPs and SSGs based on machine learning techniques and better strategy representation are a very good and significant contribution to the field.

To summarize, his works demonstrate a sustained stream of independent high quality research outputs of international standard.

2. Citations, Impact, Recognition:

As detailed by the citation records from Scopus and Google Scholar, the papers of the candidate have attracted significant interest in the community and have been cited by several other researchers (not just immediate or former collaborators). Although the number of citations is generally a very poor measure of the quality of a paper, it is still a good sign that the results of the candidate are used and appreciated by the community.

The candidate maintains many national and international collaborations with other researchers in the field, and has obtained some research grants and minor prizes. He has also given several invited talks, and served on the program committee of some high quality conferences. He is thus regarded as very competent by his peers.

I consider his application of machine learning techniques to obtain better algorithms for the analysis of stochastic systems as his most interesting work so far, but this may be a matter of taste.

3. Teaching qualifications:

The candidate has independently taught several courses on theoretical computer science and mathematics at the MU and at the TUM, and thus already clearly satisfies the requirements on teaching qualifications.

Though he has not yet completed the (independent) supervision of a PhD student, 4 are currently in the pipeline, which is more than what anyone could expect.

4. Final remarks

In every respect, the candidate clearly more than satisfies the requirements for the award of a habilitation for Informatics (see items above).

In fact, he has been doing the job of a professor at the TUM already for several years (and with considerable success).

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

Not actually a question for the candidate, but about the format of the thesis defence.

The proposed topics for the public lecture are very close to the candidate's field of research (in fact they mostly are about the candidate's work).

I don't know if that is standard at MU.

If yes, then everything is fine (and the topics are certainly interesting).

However, for habilitations in Germany, normally the topic of the lecture must be strictly outside the candidate's own field of research.

Conclusion

The habilitation thesis entitled “*Modern Probabilistic Verification*” by Jan Křetínský *fulfils* the requirements expected of a habilitation thesis in the field of Informatics.

In Edinburgh on

27. Feb. 2019

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