Habilitation Thesis Reviewer's Report

Masaryk University Faculty	Faculty of Informatics
Procedure field	Informatics
Applicant	RNDr. Radek Ošlejšek, Ph.D.
Applicant's home unit, institution	Faculty informatics, Masaryk University
Habilitation thesis	Data-Driven Exploratory Interactions and Visual Analysis
Reviewer	doc. RNDr. **Andrej Ferko**, PhD.
Reviewer's home unit, institution	Faculty of Mathematics, Physics and Informatics, Comenius University in Bratislava

Habilitation thesis review

Radek OŠLEJŠEK

Data-Driven Exploratory Interactions and Visual Analysis

Habilitation Thesis (Collection of Articles)

Brno: Masaryk University 2018, 10+170 pages + CD

Author of the thesis serves as a university teacher at Masaryk University and he presents the habilitation thesis in a form of a well organized collection of eleven referred papers from international conferences in the years 2006-2018.

The goal of the habilitation thesis is to summarize author's *"contributions to the progress within the field of developing exploratory techniques for gaining insight into complex, unstructured data. The text is structured… to two mutually connected research areas: interactive exploration of images and exploratory visual analysis in cyber security"*, p. **4.**

In visual computing, there are many problems open. Among them, there is an information analysis coping both with tremendous data volumes and critically increasing complexity. To achieve acceptable methods, we have to prune&search (or hierarchize or adaptively filter the data/metadata/paradata in a goal-oriented

manner). The approach of the author to deal with given issues is based on requirements analysis for particular application domain, using two „*exploratory concepts, dialogues and visual interaction*", p. 3, in two main application domains: image and security data.

Both research lines belong to important „data science" topics. This hot research is targeting the everyday communication experience, filtering the information pollution, both enriching and saving the time of human life for each user. In other words, this research line os of crucial importance.

Thesis identification. The contents is structured into two major parts, **I Commentary** (pp 1-35) and **II Collection of Selected Publications** (37-170, 11 papers A-K). The Commentary consists from **1 Introduction** (3-4), **2 Interactive Exploration of Images** (5-12), **3 Visual Exploration and Analysis in Cybersecurity** (13-20), **4 Conclusion** (21-22), and **Bibliography (**23-36, 170 items).

The Collection of Selected Publications offers two appendices: **A List of Publications** (38-40, 11 CORE ranked items, named Article A… Article K here) and **B Collection of Articles** (41-170). The collected papers include Paper A (42-49), Paper B (50-58), Paper C (59-66), Paper D (67-77), Paper E (78-84), Paper F (85-93), Paper G.(94-103), Paper H (104-123), Paper I (124-138), Paper J (139-151), Paper K (152-169). The full versions of the papers are not included into the thesis to respect the copyright, p. 38. An attached CD offers the thesis in a PDF file, about 16,5 MB.

Evaluation. The thesis introduces, describes and documents original publications and research conducted with multiple coauthors. Author's personal contributions (theory, algorithm design, paper writing...) are indicated in pages 9 (50%, 60%, 25%), 10 (50%), 11 (50%, 33%), 17 (35%, 20%), and 19 (20%, 55%, 30%), about 39% in average. The commented articles collection approach is legal, among others, in Czech Republic. The work is done and written in a professional quality. All 11 papers were accepted by the international scientific community and published with global publishers (like Springer or IEEE). In mid October 2018, the author was aware about 41 unique scholarly citations, including 14 WoS and 9 Scopus ones (for 13 out of all 25 his papers). This level of citation feedback for habilitation is usual at universities in Central Europe. There is no doubt concerning the originality of the contribution.

The author has an excellent orientation in the field, he masters the recent methodology and original interdisciplinarity. The most valuable ideas I see in exploratory strategies for pictorial and security data. Namely, the interaction with image semantics using natural language may become useful/popular in long perspective, especially for visually impaired users. In security applications, KYPO, deriving the focused visualizations driven by carefully analyzed specific (educational) requirements for given target group. This achievement was awarded even by the Czech Ministry of Interior in the year 2016. KYPO serves as training and educational platform, which increases its practical value.

Correspondence and Recognition. The submitted thesis corresponds to **Computer Science** branch of study (obor habilitace Informatika), which is not explicitly

indicated in the thesis wording. It is both highly actual and relevant. The citation count gives an evidence that his ideas deserve attention and inspire another authors and research teams. At an excellent level can be seen his project, outreach and educational activities. RNDr. Radek OŠLEJŠEK, PhD. is an internationally recognized creative personality with rich academic experience.

Conclusion

To conclude, based on the above evaluation, the present work of RNDr. Radek OŠLEJŠEK, PhD., representing his contributions within the studied research field Computer Science, in my opinion fulfils all requirements for habilitation thesis at international level. Therefore, I recommend to the habilitation committee at Masaryk University Brno to accept the work, according to the respective law in Czech Republic, and to honor the author by the Docent degree.

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

How can be summarized the methodologic contribution of the thesis?

Conclusion

The habilitation thesis entitled "*Data-Driven Exploratory Interactions and Visual Analysis*" by Radek Ošlejšek *fulfils* — *does not fulfil* requirements expected of a habilitation thesis in the field of Informatics.

In Bratislava on April 10, 2019