

Annex 7: Habilitation thesis reviewer's report

Masaryk University

Faculty

Faculty of Informatics, MU

Habilitation field

Informatics

Applicant

Fotios Liarokapis Ph.D.

Unit

Faculty of Informatics Masaryk University, Brno

Habilitation thesis

Interactive Virtual and Augmented Reality Environments

Reviewer

Assoc. Prof. Robert Sablatnig

Unit

Institute of Computer Aided Automation and Computer Vision
Lab, Vienna University of Technology, Austria

Reviewer's report (extent of text up to the reviewer)

see attachment

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

1. see attachment
- 2.

Conclusion

The habilitation thesis submitted by Fotios Liarokapis entitled "*Interactive Virtual and Augmented Reality Environments*" **meets** – ~~does not meet~~ the requirements applicable to habilitation theses in the field of Informatics.

In Vienna on 22.7.15

Robert Sablatnig

To
Prof. Dr. Vaclav Matyas
Habilitation Committee Chairperson
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Habilitation Thesis Review

Dr. Fotios Liarokapis

Interactive Virtual and Augmented Reality Environments

This is my review on the habilitation thesis “Interactive Virtual and Augmented Reality Environments”, submitted by Dr. Fotios Liarokapis. In general, Dr. Liarokapis has provided strong material included in his habilitation thesis. The introduction to the habilitation material however gives a general overview on the three general research topics covered in the thesis: Procedural Modelling, Virtual and Augmented Reality Interfaces and Interactive Environments, the main parts of the collective habilitation thesis. The habilitation thesis consists of a collection of 16 publications, 10 peer-reviewed journal papers and 6 peer-reviewed conference papers, where 6 papers are first author papers. As mentioned in the preface, the average personal contribution to these 16 selected papers is 40%, which is also in line with the first author rate.

The overview section gives a very general introduction to the topic and the sub-topics, however it does not clearly outlines the author’s research motivation, because the main research questions in the research field and the relation to the authors work is not shown. The author does not show how his research output is connected to the underlying research motivation. From my point of view, it is a collection of important publications of the author without having a common theory behind. It seems to be a random selection of papers in the field, somehow grouped together without commenting on the theory that is underlying for the grouping of the papers. In the introduction, the papers are described and the author’s contribution to the paper, however, the general picture and why these papers are grouped together is completely missing. So the introduction of each chapter should have presented how the papers are connected, which concept is applied etc. which is completely missing. Therefore, for me the grouping is somehow just at the level of the general topic without any link to one another, a selection of topics that the author was working on without a general framework. However, the work presented in the paper

shows the significance of Dr. Liarokapis's work. Based on the work presented in the attached original papers, Dr. Liarokapis has made significant research contributions in the following areas:

- Creating detailed but also randomised terrain environments
- Shape grammar for buildings and cities
- Intelligent crowd simulation and features of behaviour of crowds
- VR and AR indoor and mobile interfaces
- Tangible AR gaming environments
- Wireless Sensor Network based interaction
- Non-invasive EEG-based Brain-computer interfaces with serious games

These techniques developed are applied in the area of Virtual Archaeology, Urban Navigation, Higher Education, and Serious Games and Virtual Environments in order to show their applicability. However, the distinction between basic and applied research in this thesis is also not very clear. It stays also unclear what the author considers as the most important contribution covered in his publications. From my point of view, they lie in the application area of virtual museums, in designing learning experiences and the brain-computer interface for serious games. Therefore, the research focus is very application oriented. Again, there is no clear methodical development visible, the papers are not built on each other and therefore they do not reflect a clear development in research methods that might be inherently given by addressing similar topics in each of the three sub-research-topics. The general introduction of the thesis should have shown the connection of the individual papers in a general framework. However, each of the paper itself has a good motivation for the work and situate the work in the context of previous research in the field (which is not true for the introduction).

Furthermore, the percentage of contribution of the authors in the paper selected is quite low, a general contribution of 40% means, that the major part of the habilitation thesis itself is not written by the author of the thesis – which is unusual. Therefore, I will comment not only on the submitted thesis, but also on the other achievements of Dr. Liarokapis that I judge to be relevant for the habilitation.

- Research: After studying the papers and the CV as well as looking into Scopus, Google Research, and ResearchGate I have an impression of his research life. Within these 14 years he has published 76 papers, not all of them are also found in Scopus (47) but in ResearchGate and Google Scholar lists. Therefore, in average this means a publication rate of 5 papers per year which is reasonable. Numbers of citations are also of importance, they are of course measured differently, so h-index and RG-index may give some general impression of the impact of Dr. Liarokapis work. He has a Scopus h-index of 8, a RG-index of 14.9 and a Google Scholar h-index of 19 all of 07/22/2015, which is also quite impressive. Impact is measured on citations too, 236 citations by others are listed in Scopus (without self-citations), ResearchGate lists 538, and Google Scholar 1253. This shows, that he is very active in research and his work has a reasonable impact, even though most of the citations are generated by papers where he is not the first author.
- Teaching and supervision: Dr. Liarokapis has developed and taught a number of courses both on graduate and undergraduate level. The courses are in areas like graphics programming, serious games, pervasive computing, multimedia and scientific methods. Dr. Liarokapis has supervised 20 M.Sc. theses, and 30 B.Sc. theses. He supervised three Ph.D. theses and was on one doctoral committee and seven master and undergraduate

committees. So his teaching capabilities can be regarded as good, which is also an important issue for a habilitation.

- Project management and research funding: Dr. Liarokapis has acquired funding for six projects as principal investigator, 260 kEuro in total. This shows, that he is able to write successful proposals and has some ability to manage projects.
- Network, collaborations, and academic tasks: Dr. Liarokapis seems to have a good network in academia, nationally and internationally. He has given 14 invited talks at research institutions abroad, and at workshops. He has been involved in the organization (3) and program committee work of several international conferences and workshops, and he has reviewed for numerous journals and conferences.

In all, I find that the skills and achievements of Dr. Liarokapis are clearly sufficient for the habilitation. The submitted habilitation thesis however, could have a better introduction chapter, where the relations between the papers and their connections could have been worked out in more detail. The publications demonstrate his ability to perform independent research using a sound scientific methodology. This will allow him to continue to make important contributions in the area of Interactive Virtual and Augmented Reality for education. I am certain that his research will have a significant impact on the field. The results achieved so far are original, and interesting to the concerned research community, which is demonstrated by the number of citations. It is clear, that Dr. Liarokapis has the ability to contribute to the further development of the field and that he is a respected member of the international research community in his field. I furthermore find that Dr. Liarokapis experience of teaching and supervision is fully adequate for the level of habilitation. His experience of project management, and in particular securing research funding, is something he could work on more in the future, the general ability however is given and documented by the projects already completed. As already mentioned, the introduction of the thesis could be improved, however this should be sufficient for him to be granted his habilitation degree.

a.o. Univ.-Prof. Dipl.-Ing. Dr.techn. Robert Sablatnig
Head of the Institute for Computer Aided Automation

22 July 2015

To
Prof. Dr. Vaclav Matyas
Habilitation Committee Chairperson
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Habilitation Thesis Questions

Dr. Fotios Liarokapis

Interactive Virtual and Augmented Reality Environments

The thesis is a collection of papers grouped into four different categories: Procedural Modelling, Virtual and Augmented Reality Interfaces, Interactive Environments, and applications. Please comment for the first three categories:

1. How are the papers connected and what is the theoretical approach connecting them?
2. What is the general framework behind the papers selected for the category?
3. Which general research questions are important in the category, how are they answered and how is the answer connected to related work?
4. What will be the next big research topic to work on in each category?