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Lausanne, May 19. 2019

Object: Thesis manuscript submitted by Ondřej Kanich

Dear Madam,

Prof. Pavel Zemčík kindly asked me to review the manuscript of the thesis by Ondřej Kanich entitled « *Research in Fingerprint Damage Simulations* ». I attach hereinafter the elements of my determination.

It is with a lot of interest that I read the manuscript of 148 pages. The candidate presents 8 chapters summarizing his work carried out in relation to fingerprint damages and biometric systems. It is well-written and soundly constructed. I also had the opportunity to review the main published papers put forward in the manuscript. I was also one of the editors of the book "Handbook of Biometrics for Forensic Science" in which the candidate published a chapter.

The candidate took great care at presenting his research at international conferences and publishing its outcome in peer-reviewed journals. The candidate took also great care at identifying the percentage of his contribution to these papers. The number of the papers published, and their quality is impressive for a PhD candidate. The papers have been published in appropriate journals and forums. In fact, such a production would rarely be met to our PhD students. It is fair to say that in this niche research area, the candidate with the research group in Brno will be identified as reference researcher in the area.

There are two main elements of the candidate's contribution that I would like to highlight:

- (a) The contribution of the candidate is original in the sense that the body of research dealing with fingerprint damages (by skin disease) is limited. Even more limited is the incorporation of such data in a synthetic fingerprint generator. The work proposed is an important further development of the well-known SFinGe developed in Bologna and can be used for different sensors. I note however that it was built on the basis of the MSc project of the candidate obtained in 2014.

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- (b) The multidisciplinary nature of the research on fingerprint damages due to skin disease, involving forensic experts, medical experts and biometric experts, needs to be highlighted. Such research effort is very difficult, and the candidate managed to acquire a significant corpus of data that is simply not known or available to the biometric and forensic community. The 2019 chapter entitled "Influence of Skin Diseases on Fingerprints" in Biometrics under Biomedical Considerations is a key contribution. This research also encourages developers of biometric systems to give due consideration to segments of the population that may be discriminated by fingerprint biometric technology due to illness, age or damages.

The research presented is up-to-date and based on a sound corpus of scientific contributions. The work is highly original and has not been explored with such a thoroughness by other researcher. The multidisciplinary strategy adopted to address the issue of damages fingerprints is to me commended.

I have a series of questions to put to the candidate during his viva, and I look forward to discussing them with the candidates.

To conclude, it is my opinion the manuscript entitled « *Research in Fingerprint Damage Simulations* » submitted by Ondřej Kanich meets the requirements of the proceedings leading to the PhD title conferment.

I thank you again for the opportunity given to me to review this work and I look forward to joining the assessment committee in Brno. In the meantime, I remain available should you have any further question.

Sincerely yours,

Prof. C. Champod