

Expert Committee –Assessment of Doctor of Philosophy (PhD) Dissertation- Ing. Josef Hájek

DATE: January 03, 2017

TO: Mgr. Sylva Sadovská, Head of PhD Study Affairs, BUT FIT, Czech Republic

FR: Prof. Dr. Mohammad Derawi, Committee member, NTNU, Norway

RE: Assessment of PhD Dissertation of Ing. Josef Hájek

Ing. Josef Hájek — hereinafter referred to as the Candidate — has submitted his doctoral dissertation entitled:

“BIOMETRIC SYSTEM FOR RETINA AND IRIS RECOGNITION”

conducted under the supervision of Prof. Martin Drahanský.

I have completed the assessment of competence as a PhD for the candidate. Please find below the detailed assessment. Feel free to contact me if you should need further information

Summary of the thesis:

The doctoral thesis deals with a biometric and medical device for simultaneous scanning of the eye's iris and retina in one step. In the case of biometric use, the work is extended by mutual fusion of both biometrics into one template proving that multimodal system evinces better parameters than unimodal mainly in improved uniqueness, universality and difficulty feasible attack (almost impossible) on the sensor. In the case of medical use, the work is developing detection and classification of diseases as the basis of an expert system for ophthalmology purposes which can help medical doctors to make a reliable and quick eye disease diagnosis of pathological finding in the retinal (or iris) image.

Preamble

The review is for a PhD evaluation within the domain biometric systems. The assessment and in particular comparison with international peers, is made within the specific scope of the review. The assessment is based on the emailed documentation (from Mgr. Sadovská – dated December 09, 2016) about the professional record of the applicant, and follows the criteria for appointment as a PhD.

State-of-the-art dissertation

The topic of the candidate's thesis is appropriate to the particular area of dissertation and is it up-to-date from the viewpoint of the present level of knowledge.

The dissertation is clearly formatted as a monograph and is divided into five chapters, whereas the second chapter sums up the theory and current state of knowledge in the field of retina and iris recognition. This chapter clearly shows that the candidate has included the updated scientific research work into account of the thesis. Chapter 3, 4 and 5 is based on the state-of-the-art information whereas the candidate shows the development of an optical design for iris/retina recognition, both in a single and as a multimodal biometric system, where also diagnosis of diseases is automatically detected. Taken into consideration the equipment that we have in the market today, this thesis work is clearly an up-to-date work and is appropriate to the particular area of dissertation.

Originality of the work

The work of the candidates' thesis is original and has a great impact contribution to the biometrics area within the topic of iris and retina recognition.

The work done in this PhD is both innovative and of high quality, particularly considering that the biometric modality chosen for the main path of the PhD (i.e. retina and iris recognition) is currently not yet developed worldwide, with still open research topics. The contributions made in this PhD are of high interest to the scientific community in order to improve the performance and viability of retina and iris recognition for medical purposes as well. Thus, the thesis has a great impact contribution of the biometrics area within the research topic.

Publication level and personal research erudition?

The core work of candidates' thesis is published at an appropriate level and the list of candidates' publications shows that the candidate is a person with an outstanding research erudition.

The candidates research areas evolve around the area of biometric systems within iris and retina. These two areas are among the hot spots in computer science and biometric research today along with the fusion of fingerprint and finger vein.

Most of the candidates' papers were published at specialized workshops (as is common for biometric systems). The number of publications is appropriate for someone doing research

that requires development work and thus typically takes more time than more theory-focused research. The aforementioned research work has been disseminated in the research literature through 17 technical papers (two papers under review), mostly authored and co-authored; the candidate being the primary author in 7 of the papers and 12 papers being the primary and secondary author. Thus the core work of the candidates' thesis is published at an appropriate level. Thus, the thesis core work is published at several good places and in addition the candidate shows and outstanding research erudition

Pedagogical qualification, teaching and counselling

The candidate has taught 4 courses in his PhD period. He has established a track record in developing teaching materials and teaching. The candidate has also established a track record in supervising and mentoring undergraduate and master students.

Scientific management, projects and patents

The candidate has served as a member/project leader in 16 different projects, some are still running whilst others are completed. The candidate has also (with others) developed 11 products under his doctoral period. The candidate is also sub-authoring 5 patents, which is not usual in an international profile for PhD students. Thus, these extra work mentioned above shows the high creativity and deep knowledge of the candidate.

Overall recommendation

Considering the record and professional achievements of the candidate, I agree that the candidate has met the threshold for defending the Doctor of Philosophy (PhD) title and meets the requirements of the proceedings leading to a PhD conferment.



Prof. Dr. Mohammad Derawi
Gjøvik, January 3, 2017