

Opponent review of the doctoral thesis

I. Identification data

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| Title of dissertation: | Fast Bayesian Algorithms for FPGA Platforms |
| Author's name: | Raissa Likhonina |
| Training workplace: | K611 |
| Opponent of the thesis: | dr. Dip Goswami |
| Opponent's workplace: | Assistant Professor, Eindhoven University of Technology |

II. Evaluation based on individual criteria

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| Actuality of the dissertation topic | |
| The thesis deals with the problem of (i) developing fast hand detection algorithms capable running in real-time (ii) verification and implementation of the algorithms in Matlab and Xilinx Zynq Ultrascale+ FPGA. The solution focuses on adaptive Recursive Least Square (RLS) algorithms for identification of hand model. Based on the state-of-the-art regression models (QRD RLS Lattice Algorithm), the thesis reported two hand models - one with higher order and one with lower order. The models are validated in Matlab and in FPGA including the framework to collect real experimental data. The models are then deployed in various parallel and pipeline configurations in Matlab (using parallel computing toolbox) and in FPGA. | |
| evaluation | Above average |

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| Fulfillment of the goals of the doctoral thesis | |
| The work mainly focusses on hand detection/tracking algorithms and it efficient implementation. The title of the thesis is way more general. Either the title should be modified along this or there should be a section explaining how the proposed method can be applied to other applications. | |
| evaluation | Above average |

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| Methods and procedures of solution | |
| Some comments | |
| * The models in Chapter 2 should be clearly explained. E.g., Fig. 2.1, 2.3, 2.16, 2.21. What are the input and the output in physical world. Units are missing in some figures, e.g., 2.25. | |

* In Chapter 3, there are 5 parallel configurations considered. It is not clearly why these configurations are chosen while there can many other configurations. As the number of cores goes up, the combinations can be many. There should be a section explaining why these choices are meaningful.
 *What is the significance of time steps in table 3.2, 3.3 and so on? Why 60S is considered as bad? They are no explaine anywhere. Output = 6s means it is available after 6s? what are the other numbers? 2FP1, 2FP2 etc. are introduced. So it is hard to interpret the results.

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| evaluation | Average |
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Výsledky disertace – konkrétní přínosy disertanta

The specific positive side the applicability of the work in real-life problem and addressing the real-life scientific challenges.

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| evaluation | Excellent |
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Significance for practice and for the development of the scientific field

The work is practice-oriented with specific focus on developing efficient implementation of RLS based hand detection/tracking. It has extensive experimental results to support the claim. With respect to scientific literature, the contribution is sufficiently clear. It would be nice though to provide some argument in the related work why AI-based algorithms are not considered and suitable for the given application.

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| evaluation | Above average |
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Formal arrangement of the doctoral thesis and its language level

Thesis has a clear organization. English language is good. One point is to be consistent in referring to the authors of related work in the introduction section. Sometime "et al" is used, or first two authors are mentioned, or only the first author is mentioned.

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| evaluation | Above average |
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Reminders:

I have inserted comments in the above categories which should be taken into account, if possible.

III. Final evaluation

Final evaluation of the doctoral thesis:

The thesis has sufficient sceintific contributions and involves extensive engineering effort in terms verification and validation which makes the claims convincing. The specific positive side

the applicability of the work in real-life problem and addressing the real-life scientific challenges.

Ph.D. title award: **I recommend.**

In **23** day **September**



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Signature of the opponent