

## OPINION

**by Prof. Dr. Radoslav Dakov Yoshinov,  
of the dissertation of Krasimir Georgiev Markov,  
on the topic: "Intelligent Methods of Research and Implementation of  
Hardware Solutions",**

**submitted for the acquisition of the educational and scientific degree  
"Doctor of Philosophy"**

The dissertation of Krasimir Georgiev Markov, for acquiring the educational and scientific degree "Doctor of Philosophy" in scientific field 5. Technical Sciences, the professional area 5.3. Communication and Computer Techniques, the scientific PhD specialty "Computer Systems, Complexes and Networks", on the topic "Intelligent Methods of Research and Implementation of Hardware Solutions" was presented at a meeting of the Intelligent Systems Department of IICT-BAS on 30.10.2023, at which a decision was made to direct the dissertation for defense.

By order No 328-1 from 06.12.2023 of the Director of the Institute of Information and Communication Technologies - BAS, I am included in the Scientific Jury for the protection of this dissertation.

As a member of the scientific jury, I have received a dissertation, an abstract to it and all the necessary administrative documents under the procedure. At the first meeting of the scientific jury on 15.12.2023 I was selected to write an opinion.

When writing the opinion on the dissertation, I have adhered to the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and its Implementing Regulations.

Pursuant to Art. 6 (3) of the Development of Academic Staff Act in the Republic of Bulgaria, PhD thesis should contain scientific or scientific-applied results, which represent an original contribution in science. The PhD thesis must indicate that the candidate has in-depth theoretical knowledge of the relevant specialty and ability for independent research.

According to Art. 27 (2) of the specific requirements in the Act's Institutional Regulation, PhD thesis should be presented in a form and volume corresponding to the specific requirements of the primary unit. The PhD thesis should contain: a cover page; content; introduction; exhibition; conclusion - a summary of the results obtained with a declaration of originality; bibliography.

All requirements of Para 3 of the Regulation for the specific conditions for the acquisition of scientific degrees and holding academic positions in the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences are fulfilled concerning the minimal credits in the Professional Area 5.3 Communications and Computer Engineering for awarding the educational and scientific degree "Doctor of Philosophy". In the group of indicators A, the PhD student has the required number of 50 points and in the group of indicators G, the required points are 30 while the PhD student has 120 points.

The presented dissertation on "Intelligent Methods of Research and Implementation of Hardware Solutions" for acquiring the degree "Doctor of Philosophy" has a volume of 133 pages, includes 59 figures, 8 tables and a bibliography of 108 literary sources. The text is organized in an introduction, three chapters, a conclusion, a declaration of originality and a bibliography.

The PhD thesis aims to „research and implement hardware solutions using modern methods from the field of intelligent systems“.

To achieve this goal, the following tasks have been formulated:

1. To conduct a critical analysis of the possibility of applying intelligent methods for research and implementation of hardware solutions.

2. To analyze the possible connections and interactions between two key technologies - radio frequency identification and neural networks.

3. To explore ways to integrate these technologies to achieve intelligent and efficient solutions for collecting, processing and managing information flows.

4. To conduct an analysis of the opportunities and challenges that arise with the implementation of radio frequency identification and neural networks in distributed systems.

5. To analyze how the incorporation of wireless technologies can enhance the intelligence and functionality of a distributed system by adding additional capabilities for communication and data analysis.

6. To present original hardware solutions for collecting, processing and managing information flows.

I accept the formulated contributions of the dissertation, and I believe that they enrich the existing scientific field with new knowledge.

Six publications are included in the submitted list of publications on the PhD thesis. Five of the publications are independent published in the journals – “Problems of Engineering Cybernetics and Robotics” and “Engineering Sciences” and one is co-authored published in the proceedings of the international conference “10th IEEE International Conference on Intelligent Systems”. All presented publications are related to the PhD thesis theme.

I have the following remark: The PhD student should direct his efforts to increase his contributions to reputable international publications.

After getting acquainted with the dissertation paper presented and its publications and the contributions contained therein, I accept that the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and its Implementing Regulations, as well as the Regulations on the Specific Conditions for Acquiring Academic Degrees and Occupying Academic Positions at the Institute of Information and Communication Technologies - BAS. Expressing my positive assessment of the materials presented under the procedure, I

recommend to the honourable the Scientific Jury to award Krasimir Georgiev Markov the educational and scientific degree "Doctor of Philosophy" in the scientific field 5. Technical Sciences, the professional area 5.3. Communication and Computer Techniques, the scientific PhD specialty "Computer Systems, Complexes and Networks".

29.01.2024  
Sofia

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