OPINION

by: Assoc. Prof. Nikolay Stoimenov, Ph.D.,

on dissertation for obtaining educational and scientific degree "Doctor (Ph.D.)"

member of the scientific jury by Order No.25/31.01.2022. of the Director of IICT

Author of the Dissertation thesis:	eng. Rosen Simeonov Petrov
Thesis of the Dissertation:	„Information and communication technologies for smart homes“
Professional Field:	5.2. „Electrotechnics, Electronics and Automation“
Doctoral Program:	„Application of the principles and methods of cybernetics in various fields of science“
Scientific Supervisor:	Prof. Dimitar Karastoyanov, Ph.D.

1. **General characteristics of the dissertation.**

The dissertation thesis, presented to me for an opinion by eng. Rosen Simeonov Petrov has a volume of 109 pages, divided into 4 chapters, conclusions, and declaration of originality. In the literature review 70 sources were cited, including Internet addresses.

2. **Relevance of the problem developed in the dissertation in scientific and scientific-applied terms.**

The dissertation is in a topical and promising field for smart homes. The topic is widely discussed around the world, and various practical and theoretical solutions and concepts have been proposed and developed. Numerous studies are known worldwide. In our country this topic is rare discussed. Research in this field requires an interdisciplinary approach and knowledge of information and communication technologies, building automation, control systems and more.

3. **Degree of knowledge of the state of the problem and creative interpretation of the reference sources.**

In the dissertation were used 70 literary sources, which shows knowledge of the subject by the author. The literature review, the researched problems and modern solutions for building smart homes have been developed with precision and detail, which shows a good knowledge of the problem by the author. European practices and perspectives are considered.

The aims and the tasks of the dissertation are formulated with arguments after analysis and research of the progress and integration of new technologies in modern constructions aiming to reduce operating costs.

4. Correspondence of the chosen research methodology and the set goal and tasks of the dissertation with the achieved contributions.

In the dissertation, in addition to a theoretically researched approach to the integration of technologies for smart homes, innovative models and solutions for improving and integrating smart technologies for residential buildings and creating a smart home are proposed and substantiated. The Ph.D. student got acquainted in detail with the principle of operation of modules needed for full automation of the processes used to build a smart home.

5. Scientific and scientific-applied contributions of the dissertation.

I accept the formulated by the author contributions, which are mainly oriented to scientific-applied nature. It is possible to make some unification and concretization of some of them.

In the dissertation are described as follows:

1. After a detailed review, critical analysis, and systematization of methods and tools for integrating intelligent technologies in the creation of smart buildings.

2. Existing problems and solutions concerning the construction of smart homes are discussed.

3. Innovative solutions for the improvement and integration of smart technologies for residential buildings are proposed.

4. An innovative model has been developed to create a smart home equipped with intelligent technologies.

5. An experimental development of a single-family house with built-in intelligent control systems has been made.

6. Innovative solutions for energy efficiency and multifunctional intelligent information and communication technologies have been embedded in experimental development.

7. The results were analyzed and tested in "Martmax" Ltd.

6. Evaluation of the dissertation publications.

In connection with the dissertation 6 publications were made by the Ph. D. student, in 1 of them, he is an independent author, in 3 of them, he is the first author. The materials have been published in conferences and journals as follows:

- 1 at a conference in world-indexed and referenced databases with SJR rank;
- 4 at international scientific and technical conferences in Bulgaria;
- 1 in a journal, referred in ERIHPLUS.

The publications reflect, present, and popularize parts of the dissertation. It can be concluded that the results have become known to the scientific community.

7. Opinions, recommendations, and remarks.

The dissertation is developed in detail. Comprehensive detailed research and critical analysis of methods and tools for the integration of smart homes has been carried out, and the Ph. D. student has become acquainted in-depth with the modules for building automation, Communication networks, standards, and systems are considered in their entirety.

My recommendation to the author for the future is the use of more modern reference sources and greater precision in publishing future results. Increasing the publishing activity abroad, in specialized publications, and protection of intellectual property.

As remarks in the materials provided to me can be noted the lack of reference to the met minimum requirements of ICT for the educational and scientific degree "Ph. D. ", which is met with the publications provided by the Ph. D. student. The dissertation contains spelling, stylistic and technical inaccuracies. Chapters 1, 2, and 4 show inaccuracies in the numbering of some figures. There are inaccuracies with the cited reference sources in the dissertation and the abstract. Some of the requirements for the layout of the abstract are not met.

The mistakes and inaccuracies do not belittle the dissertation thesis.

CONCLUSION

The author has made a precise and in-depth study in a new and promising area. All the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the regulations for its application, as well as the specific requirements for acquiring scientific and educational degrees in IICT-BAS in terms of scope, volume, and quality of the dissertation are met. My assessment is positive.

On the above grounds, I propose to the honorable Scientific Jury to award eng. Rosen Simeonov Petrov the educational and scientific degree **"Ph. D."** in the Professional Field 5. "Technical Sciences", professional field 5.2. "Electrotechnics, Electronics and Automation", doctoral program "Application of the principles and methods of cybernetics in various fields of science".

На основание

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