

О P I N I O N

by **Prof. Ivan Ganchev Garvanov, DSc**,
member of the Scientific Jury, appointed by the Director of the IICT-BAN
No 252/02.10.2023

SUBJECT: Dissertation by **Victor Kanchev Danev** on "DESIGN OF
"SMART HOUSES" UNDER OPEN SYSTEM OPENHAB", presented for
acquiring educational and scientific degree "DOCTOR" in professional field
4.6 "Informatics and Computer Science" in the Doctoral Program
"Informatics", with supervisor: prof. Daniela Borisova, DSc

1. Description

At the first meeting of the Scientific Jury I was selected to write an
opinion and received the following documents:

- thesis
- Autoreferate in Bulgarian and autoreferate in English
- List of printed scientific publications on the topic of the dissertation
- Publications on the topic of the dissertation in full text
- information on the fulfilment of the minimum requirements of the IICT
- information on the fulfillment of the minimum national proof requirements in NACID
- other documents related to the protection of the dissertation.

2. Actuality, purpose and tasks of PhD dissertation

The topic of the dissertation is extremely relevant given the rapid development of smart technologies and systems with IoT technology. The scientific and scientifically applied results obtained in the dissertation are of great practical orientation.

The aim of the dissertation is to create a smart home project using an open source software platform.

In order to achieve this objective, the following scientific tasks have been formulated:

Task 1: To analyze the IoT challenges of designing IoT systems.

Task 2: to propose a multicriteria decision model for the selection of an open source platform for smart home design.

Task 3: To propose a model for determining the competences of IoT specialists for the design and implementation of a smart home;

Task 4: To propose an approach for building a smart home environment using open source software systems.

Task 5: To validate the proposed models and approaches.

3. General characteristics of the dissertation

The dissertation paper provided consists of 130 pages framed in an introduction, three chapters, conclusion, contributions, directions for future research, a list of publications on the dissertation, a list of noted citations, a declaration of originality and a bibliography.

Chapter 1 analyzes the existing technological solutions, mathematical methods and software tools applicable in the field of smart home design

using IoT and open source home automation platforms and in conclusion formulates the purpose and tasks of the dissertation.

Chapter 2 discusses a multi-criteria approach to smart home design that allows the simultaneous consideration of a variety of criteria, providing a comprehensive assessment and prioritization of alternatives. MCDM models are analyzed and the advantages of using the multicriteria optimization are pointed out.

Chapter 3 describes the results of the numerical experiments conducted with the proposed ranking model for open source home automation software platforms and a model for determining IoT competences. Numerical simulation of the proposed in the dissertation project of intelligent heating through open source home automation software OpenHAB was used, numerical testing of the proposed model for determining IoT competences based on groups of key indicators was conducted. In conclusion, the results obtained are summarized and the contributions obtained are indicated.

The results are illustrated in 25 figures and 9 tables. 177 literary sources were used.

4. Contributions

I accept all the contributions of the doctoral student and I believe that they are of a scientific and scientifically applied nature. In his research, the PhD student confirms some known facts, enriches the existing knowledge with new facts and proposes that some of the newly obtained scientific results be applied in practice.

5. Abstracts

The presented two versions of the abstracts in Bulgarian and English faithfully reflect the content of the dissertation and comply with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria. From the attached declaration of originality of the presented results, as well as from the submitted publications on the dissertation, it can be judged that the described results are a personal work of the doctoral student.

6. Critical remarks and recommendations

PhD student **Victor Kanchev Danev** has probed parts of his dissertation into five scientific publications, four of which are indexed in Scopus and three have SJR. Four citations of two of his publications have been noted.

According to the minimum national requirements for obtaining of the educational and scientific degree „Doctor in the professional field 4.6 " Informatics and computer science ", the required scores are to be at least 30 for the group of indicators G. The same number of scores is required by the Regulations on the Conditions and Procedures for Acquisition of Academic Degrees and Occupation of Academic Positions in BAS and the Regulations on Specific Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions in IICT-BAS. The dissertation publications presented form a total of the points for the indicators from Group G equal to 108 points, which exceeds the required minimum of 30 points.

The protocol from the StrikePlagiarism antiplagiarism system showed conclusively that the dissertation was original and authentic.

7. Notes and recommendations

Some of the results presented in the dissertation have not been reflected in the dissertation publications and my recommendation is that they be published.

8. Conclusion

I believe that the submitted dissertation meets the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria. The results achieved give me reason to give a positive assessment and I recommend to the venerable Scientific Jury to award the educational and scientific degree "Doctor" to **Victor Kanchev Danev** in the professional field – 4.6. "Informatics and Computer Science", PhD Program – "Informatics"

Nov 12, 2023

Sofia

НА ОСНОВАНИЕ
ЗЗЛА