

OPINION

according to the procedure for the defense of a dissertation on a topic
Semantic Technologies in eHealth
*(Application of Machine Learning Technologies in Supporting Independent Living of the
Elderly and Disadvantaged)*
for acquiring the educational and science degree “Doctor”

Candidate: **Kristin Ilieva Aleksandrova**

Field of higher education: **4.6. Informatics and Computer Sciences,**

Professional field: **4.6. Informatics and Computer Science**

Doctoral Program: **"Information systems" - Knowledge-based systems**

Department: **Computer Informatics**

Faculty of Mathematics and Informatics (FMI), Sofia University “St. Kliment Ohridski”

The review has been prepared by: **Prof. Evdokia Nikolaeva Sotirova, PhD,**
as a member of the scientific jury for the defense of this PhD thesis according to Order №
PД 38-199/26.04.2024 г. of the Rector of the Sofia University (SU).

1. General characteristics of the dissertation thesis and the presented materials

The set of materials presented by Kristin Ilieva Aleksandrova is in accordance with the Regulations on the terms and conditions for acquiring scientific degrees and holding scientific positions at Sofia University “St. Kliment Ohridski”. The documents are complete and precisely arranged.

The dissertation is structured in 181 pages and contains an introduction, 5 chapters, a conclusion, a declaration of originality, the author's publications, a bibliography of 100 literary sources, lists of figures and tables, 3 appendices.

2. Short CV and personal impressions of the candidate

I do not know the candidate personally. According to the submitted documents, Kristin Ilieva Alexandrova was born on 07.10.1994 in Stara Zagora. In 2017, she graduated with a bachelor's degree in Computer Science from FMI at SU "St. Kliment Ohridski". In 2019, she graduated with a master's degree in Informatics, master's program in Artificial Intelligence, again at FMI. She conducted exercises on "Introduction to Programming", "Object Oriented Programming" and "Data Structures and Programming" at FMI.

From 10.02.2020 to 10.02.2024 she studied at FMI at SU as a part-time doctorate in professional direction 4.6. Informatics and Computer Science, Doctoral Program "Information Systems" - Knowledge-Based Systems with scientific advisor prof. Maria Nisheva-Pavlova, Ph.D. By Order RD 20-545/12.03.2024, she was dismissed with the right of defense.

3. Content analysis of the scientific and applied achievements of the candidate, contained in the presented PhD thesis and the publications to it, included in the procedure

Kristin Alexandrova's dissertation is an in-depth and original scientific study focused on an extremely topical topic - the aging population on a global scale with an emphasis on improving the quality of life. Ensuring a good physical environment through the use of smart means enabling support for the health and independence of the elderly is of particular importance for the health system. In recent years, these processes lead to an increase in the financial resource for technologies that could allow the autonomous life of elderly or disabled people. In this sense, the presented research on assisted living by the environment is of a high degree of usefulness.

I believe that the methodology chosen by Kristin Alexandrova is appropriate and well-motivated. The PhD student has competently presented the architecture and implementation of a system to support living in the environment, she has evaluated the usefulness of the system in the proposed use cases. In order to ensure data confidentiality, 15 requirements for the prototype were set at the system design stage. A common set of rules has been created to determine deviations in behavior by applying various machine learning algorithms to create behavioral models. By combining the prototype and the models, the doctoral student has proposed a reliable system for assisted living from the surrounding environment. I believe that the proposed methodology is successful and the set goal has been achieved.

4. Approbation of the results

According to the submitted documents, Kristin Ilieva Alexandrova has published the results of her research in 2 independent scientific publications reflected in Scopus with SJR index. The minimum national requirements and the requirements of SU “St. Kliment Ohridski” for the acquisition of the educational and scientific degree “doctor” - with the required 30 points under *Group of indicators G* Kristin Ilieva Alexandrova reports 60 points. Part of the doctoral student's research has been presented at 3 scientific conferences. Participation in 1 research project under the national scientific program, MIRACle, part of the “Science and Education for Intelligent Growth” program, is presented, which is a certificate of the significance of Kristin Alexandrova's work.

The results presented by Kristin Alexandrova in the dissertation and related research papers do not repeat those of previous academic position procedures. There is no proven plagiarism in the submitted dissertation and scientific works.

The inquiry I made in Scopus showed that the doctoral student has 3 publications.

5. Qualities of the abstract

The abstract has a volume of 45 pages. I believe that it correctly reflects the content of the dissertation, the main topics in the research, the obtained results and the drawn conclusions. It is structured correctly, it is well illustrated, and it is in accordance with the requirements of the Regulations for the terms and conditions for acquiring scientific degrees and for occupying scientific positions at SU “St. Kliment Ohridski”.

I think it would be good if the author's publications were included in the abstract.

6. Conclusion

My assessment of Kristin Ilieva Alexandrova's dissertation, abstract, scientific publications and the results obtained from her work is entirely positive. The obtained original results fully correspond to the goal set in the dissertation. I believe that the doctoral student has very good knowledge in the field in which she works and original scientific and scientific-applied results have been obtained, and I confirm that the presented dissertation work and the scientific publications to it, as well as the quality and originality of the results and achievements presented in them, meet the requirements of the Law on the development of the academic staff in the Republic of Bulgaria, the Regulations for its application and the relevant Regulations of the SU “St. Kliment Ohridski” for the candidate's acquisition of the educational and scientific

degree “doctor” in the scientific field 4. Natural sciences, mathematics and informatics, professional field 4.6. Informatics and Computer Science. In particular, the candidate satisfies the minimum national requirements in the professional field and no plagiarism has been found in the scientific works submitted for the competition.

Based on the above, I **recommend** the scientific jury to award Kristin Ilieva Alexandrova an educational and scientific degree "Doctor" in scientific field 4. Natural sciences, mathematics and informatics, professional direction 4.6. Informatics and Computer Science, Doctoral Program Doctoral Program "Information Systems" - Knowledge-Based Systems.

02.06.2024

Signature:

(Prof. Evdokia Sotirova, PhD)