

OPINION
by Dr Emil Nikolov Hadzhikolev
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on a dissertation submitted for the award of the educational and scientific degree “Doctor” (PhD)
Field of higher education: 4. Natural Sciences, Mathematics and Informatics
Professional field: 4.6. Informatics and Computer Science
Doctoral program: Informatics

Author: Emanuela Dimitrova Mitreva

Dissertation title: Methods and Algorithms for Personalisation and Adaptability in Content Management Systems

Scientific supervisor: Prof. Dr Desislava Paneva-Marinova

1. General Presentation of the Procedure and the Doctoral Candidate

Pursuant to Order No. 57/17.06.2026 of the Director of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences (IMI-BAS), I was appointed as a member of the Scientific Jury for the public defense of the dissertation entitled "Methods and Algorithms for Personalisation and Adaptability in Content Management Systems", submitted for the award of the educational and scientific degree of Doctor (PhD) in Field of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.6. Informatics and Computer Science, Doctoral Program: Informatics. The author of the dissertation is Emanuela Dimitrova Mitreva, a part-time PhD student at the Department of Mathematical Linguistics, under the supervision of Professor Dr Desislava Paneva-Marinova.

The set of materials submitted by Emanuela Mitreva complies with Appendix 4 to the Regulations on the Terms and Procedures for the Award of Academic Degrees and the Appointment to Academic Positions at the Institute of Mathematics and Informatics of the Bulgarian Academy of Sciences and includes the following documents:

1. Application to the Director of IMI-BAS for admission to the dissertation defense.
2. Curriculum Vitae.
3. Order for enrollment in the doctoral program.
4. Records of the examinations passed in accordance with the doctoral study plan.
5. Order for completion of the doctoral program.
6. Order of the Director of IMI for the discussion of the dissertation by the extended academic unit of the Department of Mathematical Linguistics.
7. Minutes of the discussion of the dissertation by the extended academic unit of the Department of Mathematical Linguistics.
8. NACID Information Card – Forms No. 1 and No. 3.
9. List of publications related to the dissertation.
10. List of citations of the publications related to the dissertation.
11. Copies of the publications related to the dissertation – five publications.
12. Dissertation.
13. Summary of the contributions of the dissertation and the related publications.
14. Dissertation abstract.

In 2009, the doctoral candidate Emanuela Mitreva obtained a Bachelor’s degree in Informatics from Sofia University “St. Kliment Ohridski”, and in 2011 she obtained a Master’s degree in IT Services from the same university. In 2022, she was enrolled as a part-time doctoral candidate at IMI-BAS, and as of 1 January 2026, she was deregistered from the doctoral program with the right to defend her dissertation.

2. Relevance of the Research Topic

The increasing volume and diversity of resources in digital libraries creates a need for more effective means of personalized and adaptive content presentation. The application of artificial

intelligence and machine learning methods makes it possible to take into account both the content-related characteristics of documents and users' interests. The development of hybrid models and software components for personalized and adaptive content recommendation in digital libraries is therefore a timely task of considerable scientific and practical significance.

3. Knowledge of the Research Problem

The literature review conducted, encompassing 202 references, together with the developed models and software implementations, demonstrates the candidate's thorough understanding of the research area and her solid knowledge and skills in the design and development of software applications.

4. Research Methodology

The research methodology follows an established approach in the field of Informatics and comprises the following successive stages: investigation of the research domain, design of models, software components and system architecture, software implementation, and experimental validation and analysis of the obtained results. The selected methodology is well aligned with the subject of the research and provides a sound basis for achieving the stated research objective and accomplishing the formulated research tasks.

5. Overview and Evaluation of the Dissertation and Its Contributions

The dissertation comprises 167 pages and consists of an Introduction and five chapters. It is accompanied by lists of the candidate's publications, citations, and conference presentations reporting the research results, as well as a declaration of originality. The bibliography contains 202 references, and the dissertation is illustrated with 15 tables and 26 figures.

In the Introduction, the doctoral candidate justifies the relevance of the research topic, presents the main research problem, and outlines the structure of the dissertation.

Chapter 1 defines the object, subject, objective, and research tasks of the study, focusing on the personalized presentation of content in digital libraries.

Chapter 2 presents the theoretical foundations of digital libraries and personalization. It analyses contemporary methods and algorithms, text representations and similarity measures, as well as current research in the field.

In Chapter 3, the doctoral candidate proposes a conceptual model and an architectural framework for personalized content presentation. The chapter presents the development of a service for extracting and structuring named entities, a method for multi-component similarity assessment, structures for representing user–document interactions, and functional modules for identifying similar documents and generating personalized recommendations.

Chapter 4 presents the practical implementation and experimental deployment of the proposed models and software components. It describes the technological environment, the system architecture, the experimental validation of the modules for document similarity analysis and personalized recommendations, as well as the limitations of the conducted research.

Chapter 5 (Conclusion) summarizes the results achieved and outlines directions for the future development of the proposed solutions. Three scientific contributions and six contributions of a scientific and applied nature are formulated. They relate to the development of a conceptual model and architectural framework, a method for multi-component similarity assessment, a hybrid algorithm for personalized recommendations, and the implementation and experimental validation of the corresponding software components.

The dissertation is logically structured and covers the main stages of the research: theoretical analysis, design of models and architecture, software implementation, and experimental evaluation of the proposed solutions. The formulated contributions correspond to the work carried out and have scientific and practical significance.

6. Assessment of the Publications and the Doctoral Candidate's Personal Contribution

The results of the dissertation research have been published in five scientific papers, all of which are indexed in Scopus, while three are also indexed in Web of Science. Four of the publications appear in journals with an SCImago Journal Rank (SJR) indicator, and two have been published in Web of Science journals ranked in the Q2 and Q4 quartiles. The total number of points calculated under the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria is 174, substantially exceeding the minimum national requirement of 30 points for this indicator.

One of the publications is single-authored, while in the remaining four the doctoral candidate is the first author. The close correspondence between the content of the publications and the principal results presented in the dissertation provides sufficient grounds to conclude that the doctoral candidate's personal contribution to the development, implementation, and experimental evaluation of the proposed solutions is substantial.

7. Dissertation Abstract

The dissertation abstract has been prepared in Bulgarian and English in accordance with the established requirements and adequately reflects the content, main results and contributions of the dissertation.

8. Recommendations for the Future Use of the Dissertation Contributions and Results

The results obtained may be used in the development and improvement of systems for personalized content presentation and recommendation in digital libraries and other information environments. It is recommended that the proposed models and software components be further evaluated on larger and more diverse datasets, and that they be extended with additional semantic analysis methods and mechanisms for incorporating user feedback.

CONCLUSION

The dissertation contains scientific and applied research results that constitute original contributions and comply with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, and the Regulations on the Terms and Procedures for the Award of Academic Degrees and the Appointment to Academic Positions at the Bulgarian Academy of Sciences. The submitted dissertation demonstrates that the doctoral candidate Emanuela Mitreva possesses in-depth theoretical knowledge and professional skills in the field of informatics and computer science, as well as the ability to conduct independent scientific research.

In view of the above, I confidently express my **positive evaluation** of the research conducted and of the results and contributions presented in the dissertation and its abstract. ***I propose that the esteemed Scientific Jury award the educational and scientific degree of Doctor (PhD) to Emanuela Dimitrova Mitreva in Field of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.6. Informatics and Computer Science, Doctoral Program: Informatics.***

5 August 2026

Opinion prepared by:
Prof. Dr Emil Hadzhikolev