

OPINION

by Prof. Dr. Vladimir Monov

member of the Scientific Jury according to Order No. 57/17.06.2026

of the Director of the Institute of Mathematics and Informatics-BAS

RELATING TO

dissertation for the acquisition of the educational and scientific degree "**Doctor**"

Author of the dissertation: **M.Sc. Emanuela Dimitrova Mitreva**

Topic of the dissertation: "**Methods and algorithms for personalization and adaptability in content management environments**"

Field of higher education: **4. "Natural sciences, mathematics and informatics"**

Professional field: **4.6. Informatics and computer sciences,**

Doctoral program: "**Informatics**"

Scientific supervisor: **Prof. Dr. Desislava Paneva-Marinova**

General characteristics of the dissertation work

The dissertation is 167 pages long and consists of an Introduction and 5 chapters, with the last chapter 5 being a Conclusion-summary of the results obtained. Lists of publications, citations and reported results on the topic of the dissertation are presented, as well as lists of figures, tables and a glossary of terms and abbreviations. The list of literary sources contains 202 titles, including sources from Bulgarian and foreign authors and Internet sites. The list of publications on the topic of the dissertation consists of 5 publications, data on 4 noted citations are presented. The reported results on the topic of the dissertation are contained in 6 scientific reports presented at our and international scientific forums. 3 scientific and 6 scientific-applied contributions have been formulated. According to the requirements, a Declaration of originality of the results obtained is attached to the dissertation.

The abstract is 42 pages long, it is formatted according to the requirements and essentially reflects the goals set, the results obtained and the contributions in the dissertation. An abstract of the dissertation in English is presented in 39 pages.

Relevance of the topic and appropriateness of the set goals and tasks

The topic of the dissertation refers to the current and promising field of informatics, related to the development of a modern technological environment for personalized presentation of content in digital libraries. The dissertation studies and systematizes methods and approaches for adaptation and personalization in the provision of information resources in digital libraries using artificial intelligence and machine learning methods, outlining the main problems and challenges in their implementation. The main goal of the dissertation is the development of architecture and software components of a model for presenting the content characteristics of information resources and data, taking into account the personal requirements of the user and the features of the digital library environment. The goal set and the problem developed in the dissertation are in accordance with modern trends in digitalization and technological transition, which undoubtedly determines the topical nature of the conducted research and the usefulness of the obtained scientific and applied scientific results.

Knowledge of the problem

The dissertation outlines the main characteristics of digital libraries, their differences from traditional libraries, and analyzes the need for personalization in the presentation of information content. Static and adaptive personalization methods are examined, as well as algorithms for filtering, knowledge extraction, and generation of personalized recommendations. An in-depth analysis and comparison of the personalization approaches studied in the literature for the period 2018-2025 is made, outlining their key advantages, limitations, and typical areas of application. Existing gaps and challenges in the studied approaches are noted, and directions for future research are outlined. The analytical review conducted in the problem area of the dissertation shows a thorough knowledge of the subject and current problems, as well as the potential opportunities for finding new solutions with scientific and scientifically applied contributions.

Research Methodology

The methodology of the conducted research includes identification of the object and subject of the research, analytical review and analysis of existing methods and algorithms for personalization and adaptability, development of new models, methods and tools for personalized presentation of data and information content. Within the framework of this approach, the methodological basis and architecture of a system for personalized presentation of content in a digital library has been developed, experimental verification of the system and individual functional modules has been carried out. The results obtained show that the methodological approach and research apparatus used have been successfully applied to achieve the set goal and objectives of the dissertation.

Contributions of the dissertation

I accept and positively evaluate the contributions noted in the dissertation and the abstract. I believe that they can be defined as scientific and applied scientific, as the following results can be distinguished from them:

Scientific contributions.

- A concept, architecture and functional modules of a model for personalized content presentation in a digital library have been developed.
- A method for multi-component similarity assessment between multi-thematic documents has been proposed, using indicators of global semantic proximity, local coincidences of fragments, thematic profiles and named entities.

Scientific and applied contributions.

- A hybrid algorithm for generating and providing content according to the needs of users in a digital library has been developed. The algorithm uses a pre-calculated similarity matrix between the content of candidate documents and the individual history of the user.
- A service for extracting and structuring named entities from texts in Bulgarian has been implemented.
- An element-oriented hybrid algorithm for generating recommendations for "similar documents" using a sparse "user - document" matrix has been developed.
- Experimental validation of the developed algorithms and functional modules has been performed.

Assessment of the publications on the dissertation work

Five publications on the dissertation work are presented, in English, co-authored with the first author Emanuela Mitreva. All publications are in issues indexed in the Scopus and/or Web of Science databases, four of them are with SJR in Scopus. Data for four noted citations are presented. The publications on the dissertation and the scientific reports presented reflect the essential parts and main results of the research conducted. They also testify to the high level of the results obtained, which have become known to our and the international scientific community. In terms of their content and volume, the presented publications meet and significantly exceed the regulatory requirements for acquiring the educational and scientific degree "doctor".

Opinion, recommendations and remarks

The dissertation is developed thoroughly and precisely and represents a complete scientific research work. The problem area of the dissertation research is competently presented, the results

obtained in the individual chapters are convincingly presented and analyzed. Original results and modern technological solutions for personalized and adaptive presentation of content in digital libraries are proposed. The developed methods, algorithms and system architecture have been tested and validated in an experimental environment, which has confirmed their practical applicability. In general, the obtained results contain contributions of a scientific and scientifically applied nature and fully meet the set goal and tasks of the dissertation.

I have no critical remarks on the substance of the presented dissertation work. My recommendation to the doctoral student is to continue the research activity in accordance with the guidelines for future work outlined in the dissertation, as well as the preparation and publication of independent publications in prestigious international journals.

CONCLUSION

I positively assess the work done and the results obtained in the dissertation. The dissertation work meets all the requirements of the Law on the development of the academic staff in the Republic of Bulgaria, the Regulations for its implementation, as well as the Regulations on the terms and procedure for acquiring scientific degrees and occupying academic positions at the Institute of Mathematics and Informatics - BAS. I strongly propose to the esteemed Scientific Jury to award M.Sc. Emanuela Dimitrova Mitreva the educational and scientific degree "doctor" in the field of higher education: 4. "Natural Sciences, Mathematics and Informatics", professional field: 4.6. Informatics and Computer Sciences.

Sofia,
15.07.2026

Compiled by:
/ Prof. Dr. V. Monov/