# Opinion

of Prof. Dr. Maria Nisheva – FMI, Sofia University St. Kliment Ohridski

on Doctoral Thesis in Professional Area 4.6 Informatics and Computer Science

Thesis Title: "The Open Biodiversity Knowledge Management System in Scholarly Publishing"

Professional Area: 4.6 Informatics and Computer Science

Author: Viktor Senderov

Viktor Senderov has Bachelor's degree in Computational Mathematics from Otto von Guericke University – Magdeburg, Germany, and Master's degree in Biostatistics from Ludwig Maximilians University – Munich, Germany.

He has worked and continues to work as a software engineer and a specialist in mathematical statistics and information retrieval. He has also some teaching experience and good experience in working on international research projects.

Viktor Senderov has strong research results in the fields of bioinformatics, information retrieval, semantic technologies.

**Doctoral Thesis: Content**

The doctoral thesis of Viktor Senderov is devoted to research in the field of modern knowledge-based systems. Its main goal is to create a formal semantic model of the domain of biodiversity publishing and to apply this model for the creation of a system for linked open biodiversity data.

The dissertation consists of 123 pages of English text, including an introduction, eight chapters, conclusion, list abbreviations and list of references.

The introduction presents in brief the field of research. The objectives of the dissertation and the used research methodology are formulated and argued.

The first chapter discusses the main solutions related to the design of OpenBiodiv as a specific type of knowledge-based system.

The second chapter presents a conceptualization of the domain of scientific taxonomic publishing and formalizes it by introducing the main result of the thesis – the OpenBiodiv-O ontology.

The third chapter contains a description of the linked open dataset OpenBiodiv-LOD that has been generated on the base of OpenBiodiv-O, using an appropriate number of periodicals and the Plazi database.

Chapter 4 discusses the functionalities of the RDF4R software package – an R package for working with RDF, which was developed by the author and used to create OpenBiodiv-LOD.

Chapter 5 presents two case studies for importing data into OpenBiodiv from significant international repositories.

The sixth chapter discusses some issues related to the website that has been created to provide access to the resources of OpenBiodiv-LOD.

Chapters 7 and 8 have the form and contend of appendixes and should be shaped as such.

The conclusion summarizes the results of the author's research on the topic of his doctoral thesis.

**Doctoral Thesis: Results**

The main scientific and applied scientific contributions of the doctoral thesis of Viktor Senderov may be summarized as follows:

- A conceptualization of the field of biodiversity knowledge publication has been proposed and a corresponding subject ontology called OpenBiodiv-O has been developed;
- A linked open dataset containing information on biodiversity has been generated from appropriately selected sources of knowledge and data;
- A knowledge management system for biodiversity has been designed and implemented.

The dissertation makes a very good impression with the scope and the argumentation of its presentation. The field of research is actual and complex and the achievement of significant results in it requires excellent interdisciplinary knowledge, permanent and intensive work. The results achieved by the author are original and meaningful and correspond to the declared goals.

**Publications on the Doctoral Thesis. Reflection on the Works of Other Authors**

The author has worked on eight publications related to parts of his doctoral thesis. All publications are co-authored. I take into account the fact that serious studies in the chosen interdisciplinary area are, as a rule, a collective work, and I have no doubt about the personal contribution of Viktor Senderov in the publications related to his thesis, but I recommend him to aspire to a larger number of single-authored publications in his future work.

Information about 20 citations of publications on parts of the dissertation of Viktor Senderov is provided by the author, which is a proof of the significance of these results.

**Critical Remarks and Recommendations**

The introduction of the dissertation thesis suggests a very primitive idea of the concept of knowledge base which reflects to some extent to the other parts of the thesis. The description of the classes and properties of the OpenBiodiv-O ontology is insufficiently

detailed and does not allow one to get a good idea about the possible types of reasoning on this ontology. However, these deficiencies do not have a negative impact on the quality of the scientific and applied research results obtained by the author.

**Abstract**

The abstract corresponds to the content and the contributions of the dissertation, but its volume is too large and at the same time the presentation of some parts of it is too superficial. There are some terminological inaccuracies and multiple grammatical errors it the text of the abstract.

**Summary**

Summing up, I consider that the doctoral thesis of Viktor Senderov fully satisfies and exceeds the requirements of the national regulations and the specific conditions and requirements of the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences. Its author has achieved significant research results that make an original contribution to the chosen field of study. Therefore, **I strongly advise the honorable scientific jury to award to Viktor Senderov the educational and scientific degree "Doctor" in professional area 4.6 Informatics and Computer Science**.

Sofia, June 4, 2019

Prof. Dr. Maria Nisheva