SHORT REVIEW

by Prof. Dr. Stanimir Nedyalkov Stoyanov,

of the materials submitted for participation in the application

to hold the academic position of 'associate professor'

at Paisii Hilendarski University of Plovdiv

by field of higher education 4. Natural sciences, mathematics and informatics,

professional field professional field 4.6 Informatics

and Computer Science (Artificial Intelligence)

In the application for 'associate professor', announced in the State Gazette, no. 96 of 17.11. 2023 and on the Internet page of Plovdiv University "Paisiy Hilendarski" (PU) for the needs of the "Computer Systems" department at the Faculty of Mathematics and Informatics (FMI), as candidates participate Assistant Professor Veneta Veselinova Tabakova-Komsalova, PhD and Assistant Professor Asya Todorova Toskova, PhD from FMI.

1. General presentation of the received materials

By order No. PD-21-70 of 16.01.2024 of the Rector of the PU, I have been designated as a member of the scientific jury of a competition for the academic position of 'associate professor' at the PU in the field of higher education 4. Natural sciences, mathematics and informatics , professional field 4.6 Informatics and computer sciences (Artificial Intelligence), announced for the needs of the Faculty of Mathematics and Informatics.

The following documents have been submitted for participation in the announced application: Assistant Professor Veneta Veselinova Tabakova-Komsalova, PhD, and Assistant Professor Asya Todorova Toskova, PhD, from the Faculty of Mathematics and Informatics.

The sets of materials submitted by the candidates are in accordance with the Rules for the Development of the Academic Staff of the PU.

2. Brief biographical data of the candidates

In 1999 Veneta Tabakova-Komsalova graduated with a master's degree in mathematics and informatics at the FMI of the PU. In 2002, she graduated with a master's degree in macroeconomics from the FSIN of the PU. In 2018, she defended doctoral studies at the FMI of the PU. From 2020

until now, Assistant Professor in FMI of PU. She has worked as a teacher, senior expert and head of the APFSIO department in the RUO, the city of Plovdiv.

In 1991, Asya Toskova graduated as a master's degree - a teacher of physics and an engineer in solid state and optoelectronics at the FF of PU. In 2015, she graduated with a master's degree in informatics from the FMI of the PU. In 2019, she defended doctoral studies at the FMI of the PU. From 2020 to the present, Assistant Professor in FMI of PU. She worked as a physicist and administrative secretary in the FF of the PU.

3. General characteristics of the candidates' activities

Until now, Assistant Professor Veneta Tabakova-Komsalova leads the compulsory courses in the Department of Computer Systems, Artificial Intelligence, Intelligent Systems and Databases, as well as the optional course Introduction to Artificial Intelligence and Logical Programming of Prologue". Additionally, she leads classes in the Master's program "Software Technologies with a specialization in Artificial Intelligence Systems". Actively participates in the updating of lectures and exercises in the above-mentioned disciplines. He is the main author of the teaching aid on artificial intelligence (No. 4.1). Veneta Tabakova-Komsalova.PhD, is the only assistant who leads the mandatory disciplines in the field of artificial intelligence in the Department of Computer Systems. Regularly fulfills auditorium occupancy above the stipulated norm. In his lecturing activity Assistant Professor Veneta Tabakova-Komsalova, PhD, is a highly competent, demanding and extremely disciplined teacher, with a certain contribution to the introduction of new technologies in the education of students.

For the application, the candidate submitted a total of 48 publications and 1 teaching guide, of which: 15 are journal publications (of which 3 are referenced in SCOPUS and WoS), 28 conference publications (of which 15 are referenced in SCOPUS and WoS) , 2 are book chapters, 1 monograph, 2 books and 1 study guide.

Accepting the submissions in the author reference I would summarize the applicant's contributions into groups as presented below.

Systems with artificial intelligence. In this topic, the results of the researches of Veneta Tabakova-Komsalova, Ph.D., on the problems of formal presentation and processing of knowledge. The book (#3.3) presents knowledge representations such as rules, frames, and semantic networks, as well as the corresponding inference engines. An architecture of knowledge-based systems is given. Some of the examples in the book are implemented with tools based on the KSL (Knowledge Specification Language) specification. I have not come across the use of this medium in the specialized literature.

I want to emphasize the unity between the educational activity and the scientific research activity of Veneta Tabakova-Komsalova. This topic is mainly represented in the mandatory disciplines "Artificial Intelligence" and "Intelligent Systems", and the exercises in these two disciplines are conducted according to the manual No. 4.1., the main author of which is the candidate.

Introduction of artificial intelligence in secondary school. Regarding the results of Veneta Tabakova-Komsalova, in this topic, I want to emphasize two things. First, in the book (No. 3.2), in addition to the development of algorithmic thinking, attention is paid to declarative thinking. It is especially important when introducing the study of artificial intelligence in secondary school, because artificial intelligence systems are usually declarative in nature - for example, Prolog. In the Bulgarian specialized literature, attention is rarely paid to the synergy of these two ways of thinking - it is usually written about the algorithmic thinking of students. Second, interested in publications, the team to which ch. Veneta Tabakova-Komsalova, assistant professor, was invited by the creator of the Prolog language, Prof. Robert Kowalski, to join the global initiative "Prolog Education and Thinking". The purpose of this initiative is to familiarize, mainly students, with logical programming and artificial intelligence through the Prolog language and introduce their study in secondary school. Assistant Professor Veneta Tabakova-Komsalova is the leader of a national project, one of the goals of which is participation in the global initiative.

Application of artificial intelligence in smart agriculture. The contributions of Assistant Professor Veneta Tabakova-Komsalova in this topic are mainly related to the presentation of knowledge specialized for the problem area, using the KSL-based tools Flex and VisiRule. The candidate actively participates in the development of the architecture of the LAND platform and the construction of DEVS (Discrete Event System Specifications) modeling tools. Publications summarizing results in this topic are related to the National scientific programs "Intelligent Plant Breeding" and "Intelligent Animal Breeding".

The applicant has attached a list of 53 citations (27 in SCOPUS and WoS) in which I found no self-citations. Assistant Professor Veneta Tabakova-Komsalova, PhD, participated and participates in 2 national scientific programs, 1 international, 2 national and 3 university projects.

Summarizing, I want to emphasize that the publications present considerable originality, innovation and number of results, with a certain scientific and practical contribution. I believe that all presented scientific works are from the field of the competition. Publications in renowned publications and conference materials acquaint interested researchers with the information obtained from Assistant Professor Veneta Tabakova-Komsalova, PhD, results in the professional field "Informatics and Computer Sciences (Artificial Intelligence)".

Until now, Assistant Professor Asya Toskova leads the mandatory courses in the Department of Computer Systems, Software Technologies 1, Introduction to Software Engineering, Java Programming and software technology practicum, as well as the optional course "Cognitive Robotics". Additionally, she led a one-time short elective course "Machine Learning" in the Master's program "Software Technologies with specialization in Artificial Intelligence Systems". I have no direct observations of her handling of her academic duties. In the list of publications, I do not find a textbook or study guide, which is a faculty requirement. In the reference for the educational activity, one is given that is not in the subject of the competition and I do not accept it for review.

For the application, the candidate has submitted a total of 21 publications, of which: 4 are journal publications (only one referenced in SCOPUS or WoS), 15 conference publications (of which 12 are referenced in SCOPUS and WoS), 1 book chapter and 1 monograph . Most of the numbers in the list of publications do not correspond to the numbers of the texts of the publications themselves. In addition, in the reference of scientific activity, by virtue of the specific requirements of the FMI, 28 publications are indicated, and the monograph, for example, is equated to 6 publications. If I accept this equation then I should not accept that there is a monograph, and these 6 articles in their main part are analogous to others given in the list. I do not see the point of these comparisons, which, together with the above-mentioned inconsistencies, significantly complicate the preparation of this short review.

In the self-assessment of contributions Asya Toskova has referenced 10 publications, and I cannot find publication No. 6 in the list of publications. The contributions are summarized in the following three topics: detection of weeds in wheat, recognition of Bulgarian needlewomen and recommendation of serious games for children with special educational needs. In my opinion, the results of the publications referenced in the self-assessment are summarized in the monograph.

The main publication on the subject is the monograph (No. 1). In the first part, a classification of the basic and specific concepts of machine learning is made. I don't think recommender systems are a specific concept - rather a possible application of machine learning. In the second part, three applications of candidate data's results related to machine learning are presented. Stitch recognition is actually a summary of one post (#7). The results of the Inclusive Classroom 'Play and Know' project are summarized in the final chapter of 4 pages. The third chapter summarizes the results of publications (Nos. 2, 3, 4, 5). The research is related to the implementation of the National Scientific Program "Intelligent Plant Breeding", in RP 3.2 and RP 3.3, in which the candidate participates. As the main contribution of the author, I would point out the preparation of the dataset for training models for weed recognition, as well as the two-stage training of the network with the freely available V2 Plant Seedlings dataset and with a combined dataset (Wheat-Weed Dataset + V2 Plant Seedlings

Dataset). Data from both databases have been processed, removing useless artifacts. With the data from the two databases, 8 different algorithms were implemented and trained in order to investigate the capacity of the convolutional network to classify the different images of weeds and wheat. The informative features for each recognition object are extracted. The implemented models have been evaluated with many different analytical techniques, and the results obtained have a high recognition rate.

I think the data set would not give the same results for recognizing weeds growing in real wheat fields. For this reason, in RP 3.3. (of which I am head) uses a completely different approach. As a participant in RP 4 (where the candidate also participates) of the National Program "Intelligent Livestock Breeding", I am not aware of his results.

In the monograph, I find some redundant repetitions from the publications (e.g. meaningless pictures of empty pots).

The applicant has attached a list of 53 citations (27 in SCOPUS and WoS) in which I found no self-citations. Assistant Professor Asya Toskova, PhD, participated and participates in 3 national scientific programs, 1 international and 2 university projects.

Summarizing, I want to emphasize that the publications present results with specific scientific and applied contributions, and not all presented scientific works are from the field of the competition. I think publications in reputable publications are insufficient. In my opinion, the candidate deals with various topics in a piecemeal fashion without having any underlying theme in her research (e.g. a single article on embroidery recognition or articles on IoT and sensor networks that are not accounted for in the self-assessment).

4. Evaluation of the personal contribution of the candidates

From the documents submitted for participation in the application, my personal impressions and our joint work, I can assert the personal merit of the candidates in the contributions presented in the publications.

5. Personal impressions

I personally know Assistant Professor Veneta Tabakova-Komsalova, PhD, from our joint educational activity in the disciplines "Artificial Intelligence" and "Intelligent Systems", as well as from our joint participation in various projects. I want to note that I am impressed by the persistence of her scientific interests and the conduct of scientific research. Her active and effective teaching activity is also impressive. The candidate participates actively and effectively in research projects, being able to work very well in a team. I am convinced that Assistant Professor Veneta Tabakova-Komasalova, PhD, is an excellently prepared and highly competent teacher, as well as a

responsible and thorough scientist. The candidate participates actively and effectively in research projects.

I have no direct impressions of the educational activity of Assistant Professor Asya Toskova, Ph.D. From our joint work in various projects, I can say that she does not know how to work in a team. The results achieved are her independent research, which is reflected in the above finding of fragmentation of scientific research.

CONCLUSION

The documents and materials presented by the two candidates meet all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LAD), the Regulations for the Implementation of the LAD and the relevant Regulations of the PU "Paisiy Hilendarski" and the additional faculty requirements of the Faculty of Mathematics and Informatics to acquire the academic position "associate professor".

Comparing the results of the two candidates, in addition to the above, I would like to note that the points evaluating the scientific works in the minimum national requirements of Assistant Professor Veneta Tabakova-Komsalova, PhD, are 263 more than those of Assistant Professor Asya Toskova, Ph.D. The results of the research and educational activities of Assistant Professor Veneta Tabakova-Komsalova, Ph.D., fully correspond to the theme of the competition (total IF = 2.4). The application of Assistant Professor Asya Toskova's guidance does not correspond to the subject of the competition, and the course "Machine Learning" (short version) led by her only partially corresponds to the new elective course "Introduction to Machine Learning". Assistant Professor Asya Toskova, PhD, has relatively few publications in reputable publications (total IF = 0.343).

After getting acquainted with the materials and scientific works presented in the competition, analyzing their significance and the scientific, scientific-applied and applied contributions contained in them, as well as my personal impressions, I confidently give my positive assessment and recommend the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Mathematics and Informatics for the selection of the Assistant Professor Veneta Tabakova-Komsalova, PhD, in the academic position of "associate professor" at PU "Paisiy Hilendarski" in: field of higher education 4. Natural sciences, mathematics and informatics. professional direction 4.6. Informatics and Computer Science (Artificial Intelligence).

05.03. 2024 г., Plovdiv

Reviewer:

(Prof. Stanimir Stoyanov)