O P I N I O N

on the application of Assoc. Prof. Dr. Gennady Agre to participate in the competition

to occupy the academic position of "Professor" in the professional field

4.6. Informatics and computer science, topic Informatics

(Artificial Intelligence)

written by Prof. DrSc Galia Angelova, IICT-BAS

The competition for this position is announced in the State Gazette no. 41 (21.05.2019) for the needs of the Institute of Information and Communication Technologies (IICT-BAS), Department "Linguistic Modeling and Knowledge Processing". The only candidate is Assoc. Prof. Dr. Gennady Agre. In accordance with the requirements of the *Rules for the specific conditions for acquiring scientific degrees and occupying academic positions in IICT-BAS*, the candidates for "professorships" in area 4, professional field 4.6 Informatics and computer science, must have more than 100 points in group of indicators „В", more than 260 points in group of indicators „Г", at least 140 points in group of indicators „Д" and at least 150 points in group of indicators „Е". Dr. Agre presents a record on the fulfillment of the minimum requirements of the ZRASRB with the following number of points: 104 for the indicators „В", 458 for the indicators „Г", 1992 for the indicators „Д", and 343 for the indicators „Е". I accept the calculated points in each indicator as they are given in the application records. In this way the formal requirements of the Rules are met and even significantly exceeded, especially in the indicators „Д".

Short CV of the applicant

Dr. Agre graduated with a Master's Degree in Theoretical Mechanics from the Faculty of Mathematics and Mechanics of the State University of St. Petersburg in 1976. In 1992, after completing a doctorate in an individual training programme at the then Institute of Informatics at the Bulgarian Academy of Sciences, he defended his Ph.D. dissertation with scientific consultant acad. Vasil Sgurev. His scientific interests were focused on Artificial Intelligence and machine learning. Through several specialisations he worked at the Faculty of Mathematics and Informatics of the University of Aquila, Italy; at the Faculty of Social Psychology, University of Amsterdam and at the International Laboratory for Artificial Intelligence of the Institute of Technical Cybernetics in Bratislava, Slovakia. Since 1998 he is an Associate Professor at the Institute of Information Technology (IIT) of BAS - later IICT, BAS (where he has worked so far).

General description of the presented materials

A total of 29 publications were submitted for participation in the competition: 1 in a journal, which is indexed by Web of Science and is in the Q2 category of highly cited articles; 2 publications which are chapters in scientific books printed by prestigious international publishers (one with a single author Dr. Agre); 20 publications that are in Scopus-indexed journals or volumes of scientific series with SJR rank; and 6 publications which are in refereed Conference Proceedings indexed by Scopus or Web of

Science. These publications were not presented in the previous procedures for Associate Professor habilitation and for obtaining the educational and scientific degree "Doctor". In addition, a list of all scientific works of the candidate after his habilitation in 1997 is given (a total of 56, that is, 27 publications are not presented in the current competition). Dr. Agre is the editor of 8 Proceedings of Conferences, printed mainly by prestigious international publishers.

The total number of the candidate's citations in his Google profile is 1097. Although they include autocitations, their large numbers and the international citing sources show the importance of his best publications worldwide. The number of his citations in Scopus is currently 414.

Applicant's scientific results and contributions

Dr. Agre's scientific results over the past 20 years relate to three sub-areas of Artificial Intelligence: Semantic internet services, Technology Enhanced Learning (TEL) as well as Machine learning and data mining. The original results presented in the publications can be generally summarised as follows:

- In the area of Semantic Internet services: *(i)* integrating reasoning into the conceptual model of an environment for semantic engineering of Internet services, achieving interesting synergies between logic-based reasoning and precedent-based reasoning; *(ii)* developing an original approach for finding the right combination of real-time services by decomposing a given goal into sub-goals, with fully automated dynamic composition of semantic services; *(iii)* development of an ontology-based graphical environment for describing services and goals that supports the creation of objects by "naive" users (providers of semantic Internet services and applications);
- In the area of TEL: *(i)* designing and implementing of a multilayered approach for the application of semantic technologies in humanitarian-focused learning environments by separating a layer for storage of heterogeneous objects, an intermediate layer, and a layer of tools for processing different types of knowledge ; *(ii)* designing (in a team) a system of classification indicators to assess the degree of gamification in existing technology-enhanced learning applications;
- In the field of Machine learning and data mining: *(i)* development of a new approach for the selection of attributes applicable to memory-based classification methods; *(ii)* creating a new approach to word sense disambiguation through especially compressed data representation used to train different classifiers with high classification accuracy; *(iii)* development of machine learning applications in expert systems for the domain of nutrition.

The interdisciplinary achievements are presented in scientific articles where the applicant is co-author with experts in the relevant fields. I accept that the results described in the publications, presented for the current habilitation procedure, have been achieved with the equal contribution of the authors of the respective works. The co-authorship does not diminish the importance of Dr. Gennady Agre's achievements but rather emphasizes his position as a scholar with internationally recognised expertise in Artificial Intelligence. The large number of citations from various international sources is evidence of the significance and relevance of his research contributions described above.

Personal impressions

I know Dr. Agre since many years, almost from the emergence of Artificial Intelligence community in Bulgaria, when he participated in the scientific group, which laid the foundations of the Bulgarian Prologue and the Bulgarian textbooks on logical programming and machine learning at a time when the original sources were inaccessible.

Assoc. Prof. Agre participated regularly in the organisation of scientific events (Artificial Intelligence seminars and the well-known International conference AIMSA, which is now in his hands almost completely). He has been regularly invited as a member of the Program Committees of prestigious scientific forums and has participated in numerous scientific projects as a coordinator or key researcher. His long-term teaching activity is mainly related to the Master's programs "Artificial Intelligence" and "Information Extraction and Knowledge Processing" at the Faculty of Mathematics and Informatics at Sofia University "St. Kl. Ohridski", where he successfully supervises numerous M.Sc. students.

Conclusion

The Regulations of IICT-BAS for occupation of academic positions in the Institute set the condition that the "measurable" contributions of the candidates for the "professor" position have to exceed a fixed threshold of points. Although the IICT requirements are higher than the minimal national threshold, point scoring does not allow us to measure the quality of the results and the overall contribution of the applicant to the field and the scientific community. For Dr. Agre, I can say that he is a leading researcher in the field of Artificial Intelligence, more especially machine learning, data mining and applications. In addition, the materials presented for this habilitation procedure prove that he has in-depth knowledge in various application fields, project management skills, ability to form teams, persistence in teaching and attracting graduates, all of which are qualities that are inherent for a "Professor" in the Institute of Information and Communication Technologies.
Therefore, I strongly support the selection of Dr. Gennady Agre as a Full Professor in the Linguistic Modeling and Knowledge Processing department of IICT-BAS, and I suggest that all the members of the Scientific Jury unanimously vote in favor of such a decision.

14 September 2019 г.

Sofia

Member of the Scientific Jury:

Prof. DrSc Galia Angelova