R E V I E W

Of the works submitted for the procedure for academic position "Professor"
in professional field 5.3. "Communications and Computer Technologies", specialty / teaching
course "Artificial Intelligence"

The competition is announced in State Gazette (SG) 38/10.05.2019
Candidate: Assoc. prof. Todor Dimitrov Ganchev, PhD
Member of the scientific jury: Prof. Chavdar Iliev Alexandrov, PhD

1. General characteristic and biographical data

The candidate for the academic position "Professor" in the Department of Computer Sciences and Technologies, Computing and Automation Faculty of Varna Technical University graduated as an electrical engineer in 1993. He successfully defended his PhD dissertation on "Speaker Recognition" in University of Patra, Greece, Faculty of Electrical Engineering and Computer Technologies. All scientific researches out of his PhD dissertation are also in the areas of digital signal processing, pattern recognition and artificial intelligence.

The competition for academic position "Professor" in higher education area 5. "Technical Sciences", professional field 5.3. "Communications and Computer Technologies", specialty / teaching course "Artificial Intelligence" is announced in State Gazette (SG) 38/10.05.2019 for the needs of Department of Computer Sciences and Technologies, Computing and Automation Faculty of Varna Technical University.

2. General descriptions of the materials presented for the competition

I accept for reviewing 50 publications out of a total number of 98 works submitted for the competition, as follows:

1. Scientific publications	50 pcs.
13 of them equal in value to a monographic work and 37 in addition to the above mentioned group	
Papers in journals with Impact factor, indexed in SCOPUS	7 pcs.
Publications, indexed in SCOPUS	28 pcs.
Publications, not indexed in SCOPUS	15 pcs.
2. PhD Thesis	1 pc.
3. Scientific Publications, related to the PhD Thesis	20 pcs.
4. Textbooks	1 pc.
5. Research projects	26 pcs.

Publications not to be reviewed are candidate's PhD thesis and related publications, as well as research projects and the textbook submitted for the competition.

Information about quoted citations of 7 publications of the candidate in 152 scientific publications, all referenced and indexed in SCOPUS is included. A quick ckeck-up in Google Scholar shows more than 2000 citations of his works and h-index of above 20.

All of the candidate's scientific works, representing his research and scientific applied activity are in the field of the competition and correspond to the requirements of the regulations as follows

А – Indicator 1	50pts.	
В – Indicator 3 or 4	239pts.	
Г – Sum of Indicators 5 – 11	338pts.	
Д – Sum of Indicators 12 – 15	1520pts.	
Е – Sum of Indicators 16 – 28	532.3pts.	
Ж – Indicator 29	444pts.	
Total	3073.3pts. (min. required 720pts.)	

3. General characteristic of the candidate's research activities

To participate in the competition for "Professor" the candidate submitted 13 papers, published in journals with Impact factor and conference proceedings, all indexed in SCOPUS and generalized by the title "New Methods for Emotional Perceptions of Machines", equal in value to a monographic work, as well as 37 publications out of the above mentioned group, 22 of which are indexed in SCOPUS. A textbook is included in the list where the candidate is a co-author. He also submitted a list of 152 citations of his publications, indexed in SCOPUS. Number of citations in GOOGLE SCHOLAR exceeds 2000 with h-index of 24. He has also participated in 26 research projects, funded by international, national and university sources.

Topics of candidate's scientific output could be classified in scientific and applied areas as follows:

Development of groups of methods for recognition of different emotional states and speech under different conditions, determined by the emotional state of the speaker;

Development of flexible dialog systems with voice control, based on recognition of negative emotional or stress states;

Creating of new resources for improving teaching facilities of the University for education in courses related to the topics of the competition.

4. Assessment of the candidate's pedagogical training and activities

Todor Ganchev begins his researches and teaching activities in 1994 as an assistant prof. in the Department of Electronics Technologies and Microelectronics, Varna Technical University. Two years later he moved to the University of Patra, Greece to do research works, supported by FP5 of ERC and some other funds and mostly related to digital signal processing of audio signals and speech recognition. At that time period he developed and defended a PhD dissertation in the same field. In 2012 he returned back to his assistant professor's position in Varna, where in 2014 he was promoted to associate professor. At the date of the announcement of this competition, he is an assoc. prof. in the Department of Computer Sciences and Technologies, Computing and Automation Faculty and Vice rector for "Scientific affairs" of the University.

Over the years assoc. prof. Ganchev taught different subjects included in the curricula of the Faculty on Bachelor degree. He also is a mentor of five PhD students. Two of them have already defended his dissertations successfully. The other two have completed their education and one of them has already presented his dissertation in the department. The fifth one is in the last year of education and still working on his PhD thesis. Teaching activities of the candidate are in the field of competition and include development and delivering of courses in microprocessors, digital signal processing and artificial intelligence. In the

reference list for the competition he has included information about teaching activities during last three years.

Along with teaching, assoc. prof. Ganchev is responsible for the development of the educational facilities necessary for the teaching process. The Applied Signal Processing Lab (ASPL) has been built and maintained under his supervision. He also has a leading role in acquisition of equipment and software within development of infrastructural projects. He is a co-author of a textbook as well as many syllabuses and teaching courses. All this convincingly shows that assoc. prof. T. Ganchev has very good pedagogical training and experience in teaching activities.

5. Main scientific and applied scientific contributions

Contributions of research and teaching activities of the candidate could be integrated in the following groups:

5.1. Scientific contributions

In publications from group "B", equal in value to a monographic work, scientific contributions can be specified as follows:
- development of new methods for recognition of different emotional states by using voice and/or physiological signals of patients, such as EEG or ECG, including detection of negative emotional and stress states (B4.1, B4.2, B4.3, B4.4, B4.6, B4.7, B4.11 and B4.13);
- development of new methods and improvement of existing methods for speech recognition and interpretation of emotional speech and speech, articulated in conditions of intensive physical workloads and/or stress (B4.8, B4.9 and B4.12).

Scientific contributions in publications from group „Г" are reduced to:
- development of new methods for extracting of biometric, linguistic and paralinguistic information (Г7.3, Г7.7, Г7.14, Г7.16, Г7.17, Г7.20, Г7.21, Г7.22, Г8.4, Г8.5 and Г8.13), for applications in recognition of stress and negative emotional states by using physiological signals (Г7.2, Г8.2, Г8.6, Г8.9, Г8.11, Г8.12 and Г8.15);
- development of new methods for speech synthesis and improvement of synthetic speech quality (Г7.5, Г7.6, Г7.9, Г7.11, Г7.12, Г7.13 and Г7.18).

5.2. Scientifically-applied contributions

In publications from the first group, equal in value to a monographic work, scientifically-applied and applied contributions can be specified as follows:
- development of flexible dialog systems to adapt the dialog during detection of negative emotional or stress states (B4.9, B4.10, B4.12 and B4.13);
- creation of new resources to improve the quality and effectiveness of scientific, scientific-applied and teaching activities (B4.5 and B4.8).

In publications from group „Г", intelligent human – machine interfaces are developed with improved noise resistance capabilities (Г7.4, Г7.8, Г7.10, Г7.15, Г7.19 and Г8.8) as well as hardware implementations of probabilistic and locally-recurrent probabilistic neural networks (PNN and LRPNN) (Г7.1, Г8.1, Г8.3, Г8.7, Г8.10 and Г8.14).

5.3. **Methodological studies, textbooks and guidelines**

A textbook is included in the list of publications (E24), while methodological studies are not included.

6. Significance of contributions to science and practice

Specific significance of candidate's contributions is expressed by publications in 7 foreign journals with Impact factor and indexed in SCOPUS, 28 publications in other issues, also indexed in SCOPUS as well as 15 publications in issues that are not indexed in world's scientific databases. All of the papers submitted by the candidate are written with two or more co-authors. For all cooperative publications, no documents have been submitted for claims of the co-authors, so I believe that the co-authors' participation is on an equal footing. The works are dominated by researches in the field of digital signal processing, speech recognition and applications of artificial intelligence in pattern recognition, etc., which are in the field of the candidate's scientific interests. This gives me a reason to believe that the main contributions to the works submitted for the competition are his work.

Candidate has submitted a list of 152 citations, all included in SCOPUS. These facts give me a reason to believe that his scientific output is well-known in academic society in the country and abroad.

Information about participation in 26 scientific and educational projects is also submitted, funded by international, national and university sources. This allows to conclude that most of the candidate's scientific achievements are implemented in practice.

7. Critical remarks and recommendations

The publication activity of the candidate corresponds and in some aspects significantly exceeds the regulations both quantitatively and as content. It is obvious however, that all publications including the textbook are written in cooperation with other co-authors. In time of expanding international cooperation, interdisciplinarity and wide-ranging of research in any scientific area it should not be considered as a dissadvantage but as far as the number of co-authors reduces some values of scientific indicators it would be a good idea for the candidate's future to do some individual researches.

It is also noteworthy that the textbook is described as a "handbook for educators", nevertheless it is actually a book for Master degree students. In this regard, I would recommend the candidate to publish more textbook for his students, but also works on methodology, approaches and technics improving teaching activities.

8. Personal impressions and opinions of the reviewer

Assoc. prof. Ganchev has been working in Varna Technical University since 1994, first as an assistant professor, then as a researcher and as an associate professor. During this time I had the opportunity to work with him mostly as a reviewer of projects, developed by his PhD students. My impressions are very positive both regarding his professional background and his personality. His experience in developing projects, supported by different European programs in international environment and working abroad, as well as his teaching activities in the area of computer sciences are also very impressive.

In addition, it is good to be mentioned that a creative environment has been built in the department, where assoc. prof. Ganchev works both for research, education and sharing professional experience with younger members. It is obvious that a school has already been developed in the area of computer science, information and communication technologies, as well as in the newest research areas such as machine learning and applications of artificial intelligence and neural networks for pattern recognition, speech recognition, etc., completely in the field of the competition. All PhD students of the candidate, successfully defended their

dissertations in the areas of speech analyzing and recognition of emotional states, processing and classification of images of water basins, etc., as well as the Applied Signal Processing Lab (ASPL) which has been built and maintained under his supervision and all Bachelor students educated there are the best evidences for availability of excellent creative environment and without a doubt this merit goes to the candidate for the academic position "Professor".

CONCLUSION

Assoc. prof. Todor Ganchev has presented for the purpose of the competition a considerable amount of scientific production aimed at solving real problems in the field of computer sciences, information and communication technologies. The presented works are of high theoretical level and citations in SCOPUS and WoS and meet all requirements of the national regulations. The candidate also has an impressive pedagogical experience, which gives me enough reason to recommend him for the academic position "Professor" in the Department of Computer Sciences and Technologies, Computing and Automation Faculty of Varna Technical University in the professional field 5.3. "Communications and Computer Technologies", specialty / teaching course "Artificial Intelligence".

26.09.2019 г.   **MEMBER OF THE JURY**: ....
                                              /Prof. Ch. Alexandrov, PhD /