SCIENTIFIC OPINION

Regarding a Competition for an Academic Position "PROFESSOR" in

Professional field 5.3 "Information and Communication Technology",

Specialty "Artificial Intelligence" at the Department of Computer Science and Technology at the Faculty of Information Technologies and Automation (FITA) of the Technical University of Varna (TU-Varna),

State Newspaper No. 38, 10th of May 2019,

with the candidate: Assoc. Prof. Dr. Eng. Todor Dimitrov Ganchev

Member of the Scientific Jury: Prof. Dr. Eng. Vencislav Cekov Valchev

1. General characteristics of the candidate's research and implementation activities.

The candidate graduated specialty "Electronics and Microelectronics" (EM) of HMEI-Varna in 07.1993. Since 02.1994 he works as a maintenance engineer, since 03.1995 he is a full-time postgraduate student, and since 11.1998 he is an assistant at the department "EM" at the TU-Varna. Since 09.2000 he works at the Cable Communications Laboratory at the Department of Telecommunications and Information Technology of the Faculty of Electrical Engineering and Computer Technologies, Patras University, Greece. In the period 2001-2005 he developed and defended a PhD thesis on automatic recognition of people by their voice.

The doctoral degree was awarded by decision of the Faculty of Electrical Engineering and Computer Science at the University of Patras. In the period 12.2005 - 09.2012 the candidate is a post-doctoral fellow in the Cable Communications Laboratory. Since 10.2012 Dr. Ganchev is appointed as an assistant Professor at the EM Department at TU-Varna. Since 02.2014 he is assistant professor in Digital Signal Processing. Since 04.2016 he is an associate professor at the Department of Computer Science and Technology at FITA of TU-Varna.

Assoc. Prof. Ganchev has significant scientific output (more than 160 publications), which are in the field of digital signal processing, machine learning methods and their applications in the field of intelligent human-machine interfaces and speech biometrics. In addition, there are numerous publications on computational bioacoustics and biomedical technology. There are 50 publications in the competition for the Academic Position "Professor" that do not duplicate those used in previous competitions.

In the period 2014-2019 year, Assoc. Prof. T. Ganchev took part in 8 scientific projects. In three of the projects he was the manager and for the other two he was the coordinator. In the last five years, assoc. Prof. T. Ganchev has participated in more than 25 program and scientific boards of scientific conferences and publishing boards of scientific journals and books.

He is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE). He is a Member of the European Association for Signal Processing (EURASIP). He is also a member of the Hellenic Artificial Intelligence Society (EETN).

He has been honored with the prestigious prize "2013 International Joachim Adis Prize for Interdisciplinary Tropical Ecology", for outstanding contributions to computational bioacoustics.

2. Assessment of the candidate's pedagogical preparation and activity.

I have direct impressions of the applicant's pedagogical activity since 2012. In the last 5 years, Assoc. Prof. Ganchev has lectured on Digital Signal Processing (4th year, specialty E and BME),

Microprocessor technology (2nd year, special CST), Microprocessor systems (3rd year specialty, CST) and Artificial Intelligence (4th year, special CST and SIT).

He supervised 5 PhD students, 3 of which are in the professional field 5.2. "Electrical Engineering, Electronics and Automation" and 2 in the professional field 5.3. ICT. Currently, two PhD students have successfully defended their thesis's, 2 are in preparation for defence, and one is in the last year of his study.

He has completed 2 academic courses at the invitation of Federal University Mato Grosso (UFMT), Brazil in 2018: (1) "Contemporary methods for audio parameterization", 16 hours of lectures and 16 hours of laboratory work, (2) "Machine Learning methods for automated detection and recognition of species, 4 hours lectures, and seminar on "Computational Bioacoustics methods: Scalability, Resources, Opportunities, and Limitations".

3. 3. Basic scientific and implementation contributions

The publications submitted by the applicant in the competition for AP "Professor" are grouped into 2 groups: (i) group "B4" publications equivalent to a monograph with 13 publications thematically grouped as "New Methods for Emotional Perceptions of Machines" and (ii) group "G7 + G8" with 35 publications, thematically grouped together as new methods and tools to support the creation of "Intelligent Human-Machine Interfaces with Enhanced Functionality".

The contributions consist in the developed groups of new methods for (1) recognition of emotions, detection of negative emotional conditions and stress conditions by voice or by physiological signals, (2) recognition and interpretation of emotional speech and speech, pronounced in the conditions of intense physical and cognitive stress, (3) flexible voice or multi-modal dial-log systems capable of adapting end-user dialogue, (4) retrieving biometric, linguistic and parlinguistic information, (5) improving the quality of the synthesized speech, (6) creating intelligent human-machine interfaces and improving their noise immunity, (7) hardware implementation of classifiers, and (8) 'biofeedback' methods and systems.

In order to participate in the competition for AP Professor, the applicant submitted 7 publications in the Impacted Factor Magazine's and a reference of 152 citations in publications of other authors indexed in the SCOPUS database. The HIRSCH index reference in SCOPUS with excluded selfcitations is h-index = 15.

4. Significance of contributions to science and practice.

For the importance of contributions to science and practice, I draw conclusions from the number of publications in scientific journals with an impact factor according to Thomson Reuters. The Hirsch's index in SCOPUS, and the total number of citations - over 1000 in the SCOPUS database. This gives reason to believe that the publications of Assoc. Prof. Ganchev contribute to the development of theory and practice in the subject of the competition.

The quantitative indicators of the criteria for occupation of AP Professor in the Technical Sciences are completely satisfied and even strongly exceeded.

5. Critical notes and recommendations

I have no significant comments on the material presented to me. My recommendation to Assoc. Prof. Eng. T. Ganchev is to continue his valuable scientific work in the direction of a dissertation work for the acquisition of the Doctor of Science.

CONCLUSION

The whole scientific output presented, additional achievements and forming of the documents are in full compliance with the Law on Professional Development of the Academic Staff of Bulgaria, the Rules for its implementation and the Rules for terms and conditions for occupying academic positions at the Technical University - Varna in the part for AD "Professor".

The candidate's participation in international and national projects and their successful development, implementation and management gives reasons to claim that Assoc. Prof. T. Ganchev is a known specialist in the Bulgaria and in Europe in the field of intelligent human-machine interfaces, extracting information from speech signals and automatic recognition of negative emotional and stressful conditions.

Conclusion: On the basis of acquaintance with the submitted scientific works, their importance, proven scientific and applied contributions, participation in international projects, citations of the applicant, I find it justifiable **to offer Assoc. Prof. Dr. Eng. Todor Dimitrov Ganchev to occupy the academic position "Professor"** in the professional field 5.3 "ICT", specialty "Artificial Intelligence" at the Department of Computer Science and Technology, the Technical University - Varna.

24.09.2019 г.

TU Varna

Member of the Scientific Jury:

/Prof. Dr. Eng. Vencislav Cekov Valchev/