

OPINION

of Assoc. Prof. Dr. Tatiana Atanasova,
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for the competition for occupation of the academic position “Professor” in the professional field 5.2 “Electrical engineering, electronics and automation”, scientific specialty “Automated information processing and management systems”, announced for the needs of the section “Information technologies for sensory data processing” at ИИСТ-БАН, in “Dyrjaven Vestnik” No.57 / 09.07.2021.

By Order No. 200/07.09.2021 of the Director of ИИСТ-БАН, Prof. DSc. Galya Angelova, issued on the basis of a decision of the Scientific Council (Record No. 8 of 03.09.2021), in accordance with Art. 4, para 2 of Law for the Development of the Academic Staff of the Republic of Bulgaria and Art. 2 (2) of the Regulations for the Implementation of the Law for the Development of the Academic Staff of the Republic of Bulgaria, I have been appointed a member of the Scientific Jury of the announced in the “Dyrjaven Vestnik” No. 57 / 09.07.2021 Competition for occupation of the academic position of „Professor” in the professional field 5.2 “Electrical engineering, electronics and automation”, scientific specialty “Automated information processing and management systems”, announced for the needs of the section “Information technologies for sensory data processing” at ИИСТ-БАН.

Only one candidate has applied for participation in the competition - Assoc. Prof. Dr. Kiril Metodiev Alexiev. I attended the first meeting of the Scientific Jury on 21.9.2021 and received the materials on the competition in electronic form.

1. General description of the presented materials

The conditions to be fulfilled by the candidates for the occupation of the academic position of “Professor” are set out in Article 29 (1) of the Law on the Development of the Academic Staff in the Republic of Bulgaria and Article 60 (1) of the Rules for the Implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria.

The submitted documents for participation in the competition for academic position “Professor” meet these conditions and contain:

- copy of the diploma No. 24920/28.08.1997 for the scientific degree “Doctor”, and Certificate for scientific title “Senior Research Fellow second degree” №23125 / 22.07.2005, issued by the Higher Attestation Commission (HAC) at the Council of Ministers of the Republic of Bulgaria;
- a note issued by IICT-BAS certifying 39 years of work experience, 16 years as Associate Professor;
- a list of 48 scientific publications;
- reference for Author's certificate for invention;
- list of citations of scientific publications of the candidate;
- list of abstracts in Bulgarian and English of the articles submitted for the competition;
- a reference for meeting the specific requirements of IICT-BAS;
- a declaration of non-plagiarism;
- a reference to the original scientific contributions to which the relevant evidences are attached.

The presented reference for fulfillment of the minimum requirements of IICT-BAS contains the stricter criteria than the national ones and is filled with overlap.

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

The candidate has experience in teaching in various universities in the country. I have very good immediate impressions of the candidate as a lecturer from our joint work at UTP-Sofia.

3. Main scientific and applied contributions

The documents on the competition include a list of 48 publications, which do not repeat the presented for obtaining a scientific degree doctor (1997) and Assoc. Prof. (2005) titles. The 48 titles submitted for participation in the competition can be systematized as follows:

- 18 (37.5%) publications indexed in Scopus/WoS (№№ 1, 2, 3, 4, 5, 6, 8, 9, 12, 14, 15, 17, 19, 20, 21, 22, 23, 26);
- 13 (27%) in scientific journals (№№ 2, 3, 7, 13, 16, 17, 20, 27, 33, 34, 35, 41, 47);
- 26 (54%) in conference proceedings (№№ 1, 4, 5, 6, 8, 10, 11, 12, 15, 18, 21, 23, 24, 25, 26, 28, 29, 30, 31, 32, 36, 37, 39, 42, 45, 48);

- 7 (14.6%) publications are standalone (№№3, 4, 7, 27, 28, 44, 47).

The main thematic areas that summarize the presented works are:

- signal processing;
- processing of images obtained from various technical devices;
- the combined processing of information from multiple sensors;
- tools for visualization of experimental data and simulation results.

The significant scientific and applied contributions of the candidate are in the field of mathematical methods for signal processing and sensory information, as well as intelligent data analysis (Data mining). The contributions in the publications submitted for participation in the competition can be briefly systematized as:

- an algorithm for self-similar decomposition of signals has been developed, which is applied to digital and biosignals;
- an algorithm for coding a signal based on its linear decomposition is proposed;
- a solution for simplified estimation of the nonlinearity of digital signals is presented;
- a method for increasing the accuracy and precision of the eye tracker by using gyroscope sensors is proposed;
- an approach is proposed for intelligent extraction of characteristics of large data sets in a new space of functions for improving the quality of data clustering and classification;
- solutions for processing of radar, ultrasound and 2D images from cameras have been created;
- techniques for processing and visualization of the propagation of sound waves over time are presented;
- a solution is proposed for combining the measurements obtained from gyroscopes and accelerometers through the use of fuzzy logic;
- the algorithms for estimating the orientation of the inertial navigation system on real and synthetic data are considered.

The various methods, approaches and solutions for modeling and analysis of sensor components and sensor networks, sensor data processing and digital image processing, as well as approaches for 3D scene reconstruction, are detailed in the published scientific papers submitted for participation in the competition. All of them represent significant and internationally recognized achievements in the work of the candidate.

As an associate professor at IICT-BAS, Dr. Kiril Alexiev participates and manages a number of national and international projects.

4. Significance of contributions to science and practice

The quantitative indicators of the criteria for holding the academic position defined in the respective legal provisions are observed. The number of points from scientific publications presented in the reference for fulfilment of the minimum requirements of IICT-BAS exceeds the mandatory number. This list of scientific productions shows the significant scientific contribution of the candidate in his professional field of signal and image processing in various systems and applications.

The impressive number of citations proves the necessary publicity of the achieved results and is an assessment of the recognition of the candidate among the scientific circles in Bulgaria and abroad.

5. Critical remarks and recommendations

The presented materials contain an extensive number of publications and found citations that exceed the required minimum. My remark refers to a recommendation for a more selective collection of materials for evaluation of the candidate's achievements. The desire for a more comprehensive presentation of the achieved results is understandable, but their careful selection would only confirm the undoubted qualities of the candidate.

6. Conclusion

My assessment of the scientific and scientific-applied activity of Assoc. Prof. Dr. Kiril Alexiev is convincingly positive. I believe that the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria have been met, as well as the relevant Regulations for the implementation of the Law on the Development of Academic Staff, the Bulgarian Academy of Sciences, and the IICT-BAS.

The above gives me grounds to suggest to the esteemed scientific jury to vote a proposal to the Scientific Council of IICT-BAS to elect Assoc. Prof. Dr. Kiril Metodiev Alexiev to the academic position "Professor" in professional field 5.2 "Electrical Engineering, Electronics and Automation", specialty "Automated information processing and management systems".

Sofia

01.11.2021 г.

Member of the jury:...

/Assoc. Prof. Dr. Tatiana Atanasova/

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