O P I N I O N

on the competition for the academic position "associate professor",
Area of higher education: 5. Technical Sciences
Professional Field: 5.2. Electrical engineering, electronics and automation
Application of the principles and methods of cybernetics in different fields of science
(biomedicine)
for the needs of the section "Processing and analysis of biomedical signals and data",
at IBPhBMI

announced in the State Gazette, issue 69 of 16.08.2024
with candidate(s): Todor Venkov Stoyanov, Senior Asst., Ph.D.

Member of the scientific jury: Ivaylo Ivanov Christov, Prof. Dr.

Activities in applied science and implementation

As a result of his participation in projects with Schiller Medical SA France, the following certificates were issued to Senior Asst. PhD Todor Venkov Stoyanov:

"**VF/VT detection algorithm**", implemented in the automated external defibrillators "Fred Easy" and "DG4000". The development consists of collecting and analyzing a new database with problematic out-of-hospital recorded interventions for low-amplitude and pediatric signals. The accuracy of the "VF/VT detection algorithm" has been improved, mainly for high T-waves and atrial tachycardia.

"**Algorithm for Detection of Chest Compression**" – detection of chest compression. The algorithm is implemented in the automated external defibrillator "Fred Easy". It refers to the correct analysis of the heart rhythm in the event of disturbances during chest compression.

"**Algorithm for Detection of Ventricular Fibrillation during Chest Compression**". It is implemented in external defibrillators PA-1, EADs, DEFIGARD, and in the Touch 7 monitor.

"**Analyze Whilst Compressing system**" – analysis and control of switching of different algorithms during CPR (cardiopulmonary resuscitation). It is implemented in external defibrillators DEFIGARD and in the Touch 7 monitor and is intended for the Paris Fire Brigade

"**Web-based ECG annotation tool**" – tool for Web annotation of electrocardiographic signals.

"**Adaptive low-pass filtering of electromyographic noise from electrocardiograms**" – adaptive low-pass filtering of electromyographic noise in electrocardiograms. Unlike the above 5 implementations, this one is published by Schiller Medical AG Switzerland. It is implemented in high-end CS-200 devices

Evaluation of habilitation work. Scientific publications in journals that are referenced and indexed in world-renowned databases of scientific information

The candidate presents 11 articles published in journals with SGR factor:
Resuscitation 03 and 08
Sensors 07 and 11
Mathematics 10

IEEE Conference Computing in Cardiology 02, 04, 05, 06
Physiological measurements 01
Bioautomation 09

The candidate's co-authors are prestigious Bulgarian and foreign scientists. For example, in article 01 there are 4 foreign co-authors, in article 06 there are 7 foreign co-authors, and in articles 02, 03, 04 and 08 there are 2 foreign co-authors.

Evaluation of publications in journals that are referenced and indexed in world-renowned databases of scientific information

The candidate submits 10 articles or reports published in journals with an SGR factor:

G7_01 IEEE Conference Intelligent Systems.
G7_02 IEEE Conference Computing in Cardiology.
G7_03 article in Medical and Biological Engineering and Computing.
G7_04 article in Springer Studies in Computational Intellegens.
G7_05 article in Springer Advances in Intelligent Systems and Computing.
G7_06 article in Int. J. of Bioautomation.
G7_07 article in Int. J. of Bioautomation
G7_08 article in Int. J. of Bioautomation
G7_09 article in MDPI, Mathematics
G7_10 article in Springer Contemporary Methods in Bioinformatics and Biomedicine and their Applications. (sole author).

Evaluation of scientific publications in non-refereed peer-reviewed journals or in edited collective volumes

G8_01 report at Conference of Electronics
G8_02 report at Conference of Electronics
G8_03 article in Int. J. of Bioautomation.
G8_04 article in Automation and Information
G8_05 article in Int. J. of Bioautomation.
G8_06 article in Int. J. of Bioautomation.
G8_07 article in Journal of Bulgarian Academy of Sciences
G8_08 report at Conference of Electronics
G8_09 report at Conference of Electronics
G8_10 report at Metrology and Metrology Assurance
G8_11 report at Conference of Electronics
G8_12 report at IFSs Notes on Intuitionistic Fussy Sets
G8_13 report at 8th European Symposium on Computational Intelligence and Mathematics
G8_14 article in Journal of Bulgarian Academy of Sciences
G8_15 article in an almanac of Union of Scientists in Bulgaria

Here, the three articles in Bioautomation have an SGR factor and could have been included in a higher-scoring index. This is valid also to the conferences under the auspices of IEEE: G8_1, G8_2, G8_8, G8_9 and G8_11,

Citation Rating

The report with the most citations is:

Stefanova-Pavlova M, Andonov V, Stoyanov T, Angelova M, Cook G, Klein B, Vassilev P, Stefanova E. (2017) Modeling telehealth services with generalized nets. Studies in Computational Intelligence, 657 pp. 279-290.
    Cited 11 times

A search in SONIX shows that Senior Assistant Professor Dr. Todor Venkov Stoyanov has been cited 380 times. H-index=8

Summarized scientific and applied scientific contributions.
I will focus only on the more important scientific and applied scientific contributions for which a certificate has been issued and for which there are a number of publications:
    "VF/VT detection algorithm"
    "Algorithm for Detection of Chest Compression"
    "Algorithm for Detection of Ventricular Fibrillation during Chest Compression"
    "Analyze Whilst Compressing system"
    "Web-based ECG annotation tool"
    "Adaptive low-pass filtering of electromyographic noise from electrocardiograms"

Analysis of quantitative indicators
The comparative analysis between the points of the "minimum requirements" for the academic position of "associate professor" adopted by the Bulgarian Academy of Sciences and the points submitted by the candidate show full fulfillment of all indicators.

Group of indicators	Indicator	Minimum required points for Associate Professor	Points of the candidate
А	1. Dissertation paper for awarding educational and scientific degree "Doctor"	50	50
Б	2. Dissertation paper for awarding scientific degree "Doctor of Science"	x	x
В	4. Habilitation work – science publications (not less than 10) in editions referenced and indexed in world renowned databases with scientific information 6	100	130.5
Г	7. Scientific publications that are refereed and indexed in world-renowned databases with scientific information 8. Scientific publication in non-refereed journals with scientific review or in edited collective volumes	200	244
Д	12. Citations or reviews in scientific publications, referenced and indexed in world-	50	100

	renowned databases of scientific information or in monographs and collective volumes		

Critical comments and recommendations

None

Conclusion

I believe that the presented works and materials of Senior Asst. Dr. Todor Venkov Stoyanov for the competition for "associate professor" have the necessary contributions. The implemented developments prove the applicability of the scientific contributions. The publications have gained international fame due to the fact that a large part has been published and cited abroad.

I believe that the presented materials fully meet the norms of the Academic Staff Development Act, the Regulations for its application and the Requirements of the Bulgarian Academy of Sciences.

I propose that Senior Asst. Dr. Todor Venkov Stoyanov take up the academic position of "associate professor" in the scientific direction 5.2. Electrical engineering, electronics and automation, (application of the principles and methods of cybernetics in various fields of science (biomedicine).

Date: 12.11.2024

Member of the jury