

## Referee report

for the academic position of "Professor" in the professional field 4.6 Informatics and Computer Science, announced in State newspaper No. 45/28.05.2021 with the sole candidate, namely, Assoc. Prof. D.Sc. Stoyan Milkov Mihov

Reviewer: Prof. Ivan Tomov Dimov -  
Institute of Information and Communication Technologies, Bulgarian Academy of Sciences

The following documents were submitted to the reviewer:

1. European CV
2. Copy of diploma for educational and scientific degree "doctor"
3. Copy of the diploma for educational and scientific degree "Doctor of Sciences".
4. Certificate of work experience in the specialty.
5. List of scientific publications with which Assoc. Stoyan Mihov participates in the competition.
6. Information on the fulfillment of the minimum requirements of ICT for the academic position "professor".
7. List of citations of publications of Assoc. Stoyan Mihov, for participation in the competition for the academic position of "professor".
8. Author's reference of the publications of Assoc. Stoyan Mihov, presented at the competition - in Bulgarian.
9. Summaries of the publications of Assoc. Stoyan Mihov, presented at the competition - in English and Bulgarian.
10. Copies of 18 scientific publications with which Assoc. Stoyan Mihov participates in the competition.
11. Author's reference for original scientific and scientific-applied contributions.
12. Declaration that there is no proven plagiarism in the scientific works of Assoc. Prof. Stoyan Mihov.
13. Recommendation from Prof. Dr. K. Schultz (in German and English).
14. Information for registration in NACID.

## **1. General characteristics of the scientific results**

The candidate Assoc. Prof. Dr. Stoyan Mihov participates in the competition for professor with publications, the list of which includes 18 scientific papers. Of the 18 publications submitted for competition, 16 are articles, 1 preprint and 1 patent. All 16 articles are in editions that are indexed by Scopus, and one of the articles is in print. It makes a very good impression that Assoc. Prof. Mihov has chosen a much smaller part of all his publications to participate in the competition and thus has achieved a good focus on his scientific contributions to the subject of the competition.

The candidate's materials document 213 citations of the publications submitted for the competition, as only his joint publication with Prof. Schultz: Schulz KU, Mihov S., Fast string correction with Levenshtein automata (2003) International Journal on Document Analysis and Recognition, 5 (1), pp. 67-85 has been cited at least 93 times. These data testify to a very good international recognition of the candidate.

In this sense, the considered scientific problems and the tasks solved by him, in the presented scientific publications, are within the professional field 4.6 Informatics and Computer Science, announced in State Newspaper No. 45/28.05.2021.

## **2. Contributions contained in submitted works for review**

The obtained results can be conditionally structured in the following three directions:

1. Theory of finite automata,
2. Natural language processing and speech recognition and
3. Approximate search, correction and normalization of texts.

In the first scientific field "Theory of finite automata" the main achievements are published in [1-4]. In [1] a construction is presented, which builds a subsequence converter according to a given final dictionary for rewriting. In [3] a methodology is presented, which allows composing probabilistic converters with transitions in case of failure with conditional probabilistic converters. In article [2] we see a continuation of the previous work of the candidate on efficient construction of a beam machine. Unlike the previous approach, here one specific successful path of the output converter is not tracked, but all successful paths of the converter are taken into account, displaying the maximum possible output for each of them. It is shown that the new construction is close to the optimal in some sense.

The results in the second scientific field "Natural language processing and speech recognition" are contained mainly in the works [5-8]. The patent [18] registers a methodology for analyzing the influence of individual subjects (influencers) in a given media coverage. This methodology allows to measure, analyze and plan the effectiveness of media communication.

I will also briefly mention the main achievements in the third area, namely "Approximate search, correction and normalization of texts". Here I want to note the task of spelling correction

of text. In article [15] the demand for proximity is considered as a special type of calculation. Work [13] is a specific implementation of an approximate search algorithm called WallBreaker. The works [9-12] are related to text correction. Some approaches use a universal Levenstein automaton. The results of normalization and modernization of historical texts were largely carried out within the CULTURA project. The main results are documented in the works [16,17].

In short, the main contributions can be formulated as follows:

- efficient construction of a sequential converter for copying text;
- construction for probabilistic models through a sub-sequential converter with transitions in case of failure;
- efficient algorithm for approximate search.

The scientific and applied contributions are:

- methodology for automatic creation of a corpus of Bulgarian speech;
- methodology and implementation of systems for automatic correction of orthographic errors in texts;
- methodology and implementation of a system for modernization of historical texts.

### **3. Publications and citations of publications participating in the competition**

The relevance and significance of the scientific and scientific-applied contributions are indisputable. They follow from the fact that most of the publications are in authoritative specialized publications with impact factor and SJR rank.

Stoyan Mihov has documented 213 citations of the publications presented for the competition in Scopus / WoS, which testifies to its international recognition. Of the publications submitted for the competition, all are collective. Let me note, however, that in the field in which the competition is, it is natural to work in teams. At the same time, the personal participation of the candidate in the joint publications does not arouse any doubt. In each of the joint works the candidate has the necessary significant contribution.

### **4. Educational activity and participation in projects**

The report submitted by the candidate states that he has supervised two successfully defended doctoral students. Participates in a national scientific or educational project. He has participated in an international scientific or educational project, namely, AComIn: Advanced Computing for Innovation FP7 Capacity Program, Research Potential of Convergence Regions, <https://cordis.europa.eu/project/id/316087>

He was the leader of the Bulgarian team in the international scientific project IMPACT: IMProving ACcess to Text FP7-ICT - Specific Program "Cooperation": Information and communication technologies <https://cordis.europa.eu/project/id/215064>. Assoc. Prof. Stoyan Mihov was also the head of successfully defended graduates.

## 5. Comments and recommendations

I have no comments or recommendations for Associate Professor Stoyan Mihov. It is worth noting his precise style and high criteria in the preparation of the competition documents.

6. **CONCLUSION.** Based on the aforementioned, it is clear that the candidate for the announced competition Assoc. Prof. D.Sc. Stoyan Milkov Mihov fully complies with the requirements of the ZRASRB, the Rules for the implementation of the ZRASRB, the Rules for the conditions and procedures for acquiring academic degrees and for occupying academic positions in BAS, as well as the Rules for the Specific Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences. The scientific results achieved give me reason to propose the selection of the candidate Assoc. Prof. D.Sc. Stoyan Milkov Mihov as a professor at IICT-BAS in the professional field 4.6 Informatics and Computer Sciences.

Therefore my conclusion for taking the academic position of the Professor "Prof." announced by Assoc. Prof. D.Sc. Stoyan Milkov Mihov is POSITIVE.

08/12/2021  
Sofia



/ Prof. Ivan Dimov /