

OPINION

according to the procedure for the defence of a dissertation on the topic:

"Intelligent Context-Aware Natural Language Dialogue Agent"

for the acquisition of an educational and scientific degree "Philosophy Doctor "

from

Candidate: Momchil Emilov Hardalov

Field of higher education: 4. Natural sciences, mathematics and informatics

Professional area: 4.6. Informatics and Computer Science

Doctoral program: "Software technologies - knowledge discovery", Department: "Software technologies", Faculty of Mathematics and Informatics (FMI), Sofia University "St. Kliment Ohridski" (SU).

The opinion was prepared by: Prof. PhD. Gennady Pavlovich Agre - Institute of Information and Communication Technologies at BAS in my capacity as a member of the scientific jury, according to Order No. RD 38-600/28.10.2022 of the Rector of Sofia University.

1. General characteristics of the dissertation and the presented materials

The dissertation (in English) and the abstract (in English and Bulgarian) were presented to me for review. In addition, I was given access to other documents related to the defense (the text of the applicant's publications, his CV, declarations of co-authorship, reference and protocol of the similarity check, etc.). The dissertation contains 164 pages, of which the last 9 are Appendices. It consists of 6 chapters (of which the first is "Introduction" and the 6th is "Conclusion and directions for future work"), a bibliography and two Appendices. 6 dissertation-related publications are presented, one of which (Momchil Hardalov, Ivan Koychev, and Preslav Nakov. 2020a. Enriched Pre-trained Transformers for Joint Slot Filling and Intent Detection. arXiv preprint arXiv:2004.14848.) was published on-line in the open access database <https://arxiv.org/> and the other (Momchil Hardalov, Anton Chernyavskiy, Ivan Koychev, Dmitry Ilvovsky, and Preslav Nakov. 2022b. CrowdChecked: Detecting Previously Fact-Checked Claims in Social Media. In Under Review for AACL '22, pre-print available) is declared in the dissertation as "under review"). I do not accept the first paper as a publication because it has not passed the peer review process and has neither an

ISBN nor an ISSN. I am accepting the second paper as my verification has shown that it has passed peer review and has been accepted for presentation at a prestigious scientific conference, The 12th International Joint Conference on Natural Language Processing, ACL-IJCNLP '22, and will be published in its proceedings.

2. Actuality of the subject of the dissertation and appropriateness of the set goals and objectives

The dissertation is related to the development of software systems (intelligent agents) capable of communicating with their users in natural language. The topic is very current and finds its application in the development of chatbots for automated customer service. From this point of view, the goals and objectives set in the dissertation for the development of algorithms for generating context-aware automatic responses are well-founded and expedient.

3. Content analysis of the candidate's scientific and scientific-applied achievements, contained in the presented dissertation and the corresponding publications presented to the procedure

The candidate's scientific and scientific-applied contributions are in two directions - the creation, implementation and verification of new models and algorithms for generating automatic responses to user requests, taking into account the context of the conversation, and creation of new language (including Bulgarian) corpora for answering questions from high school exams and for discovering already verified statements. I consider that the contributions are presented correctly and the results obtained are significant and have both theoretical and proven practical value.

4. Approbation of the results

The results described in the dissertation are presented in 5 publications (one (2022) is in print), of which 1 (2019a) is in a journal with SJR impact rank, 2 (2018 and 2019a) – in proceedings of prestigious conferences (also with impact rank) and 1 (2020b) – in international conference proceedings indexed in Scopus (without SJR). These publications carry a total of 108 points, out of the required 30, according to the minimum requirements (according to Art. 2b, paras. 2 and 3 of ZRASRB) and, accordingly, to the additional requirements of SU "St. Kliment Ohridski" for the acquisition of an educational and scientific degree "Doctor of Philosophy" in the scientific field and professional direction of

the procedure. Although all publications presented for review on the subject of the dissertation are collective, the individual contribution of the candidate does not raise doubts, which follows both from the submitted declarations of the co-authors of these publications, and from the fact that in all publications the candidate is placed first.

My check has shown that the mentioned above publications of the candidate have (up to now) 20 independent citations in Scopus, which is a convincing argument for the high quality of the results presented in these publications (and, accordingly, in the dissertation).

The presented similarity report and protocol for verifying the originality of Momchil Hardalov's dissertation have proved that there is no proven plagiarism in the submitted dissertation and scientific works submitted to this procedure, and the declaration submitted by the candidate confirms that the results in the dissertation and the corresponding publications do not repeat those from previous procedures for acquiring a scientific title and academic position.

5. Qualities of the dissertation's abstract

The abstract submitted for review (in English and Bulgarian languages) meets all the requirements for the preparation of such type of documents and correctly reflects the goals, tasks and results of the dissertation work.

6. Critical notes and recommendations

I have no significant critical comments on the reviewed dissertation and abstract.

7. Conclusion

Having familiarized myself with the dissertation work presented in the procedure and the scientific publications accompanying it and based on the analysis of their significance and the scientific and scientific-applied contributions contained in them, I **confirm** that the presented dissertation work and the corresponding scientific publications, as well as the quality and originality of the results and achievements presented in them meet the requirements of the ZRASRB, the Rules for its application and the relevant Rules of the SU "St. Kliment Ohridski" for the candidate's acquisition of the educational and scientific degree "Philosophy

Doctor" in the scientific field 4. "Natural sciences, mathematics and informatics" and professional area 4.6. "Informatics and Computer Science". I **confirm** that the candidate fully satisfies the minimum national requirements in the professional field and that no plagiarism has been found in the scientific works submitted for the competition.

Based on the above, I strongly recommend the scientific jury **to award Momchil Emilov Hardalov** an educational and scientific degree "Philosophy Doctor" in scientific field 4. Natural sciences, mathematics and informatics, professional area 4.6. Informatics and Computer Science.

16.01. 2023

Prepared the opinion:
(Prof. PhD Gennady Agre)