

REVIEW

of dissertation for the acquisition of:

educational and scientific degree " doctor "	X
scientific degree " Doctor of Science "	
	the true is indicated by the sign "X"

Author of the dissertation:

		Atanas	Svetoslavov	Garbev	Institute of Electrochemistry, BAS
academic position	scientific degree	name	middle name	last name	workplace

Topic of the dissertation:

Software technologies in robotic systems
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Scientific area:

4.	Natural sciences, Mathematics and Informatics
code	name

Professional area:

4.6.	Informatics and Computer science
code	name

Scientific specialty:

Informatics

The review was written by:

Assoc. prof.	PhD	Aleksandar	Dimov	Dimov	Sofia University "St. Kliment Ohridski"
academic position	scientific degree	name	middle name	last name	workplace

1. Completion of the provided documents:

A) The dissertation and the competition documents are in full compliance with the Regulations.	4 points	
B) The documents are complete but do not fully comply with the requirements of the Regulations.	2 points	X
C) The documents are not completed in accordance with the requirements of the Regulations.	0 points	

		one of the answers given is marked with the sign "X"
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Missing documents and violated standards must be described if response C is marked.

The provided set of documents and materials for the defence lacks the following items (according to the legislation documents in UCTM):

- report for the number of points, according to the indicators for acquiring the educational and scientific degree "doctor"
- The dissertation lacks a concluding part, which justifies the obtained results

2. Meeting the minimum requirements under the Regulations:

A) The candidate meets the minimum requirements	20 points	X
B) The candidate doesn't meet the minimum requirements	0 points	
		one of the answers given is marked with the sign "X"

It must be filled in if answer B is marked. The publication activity of the candidate is analyzed. The response of the results achieved (quoted) is analyzed.

The PhD student has provided one SCOPUS referenced publication, which is on the topic of his dissertation. Thus, he meets the requirements of a minimum of 30 points for the acquisition of the PhD degree, according to the law in Republic of Bulgaria.

Good impression makes the number of 13 citations (also in SCOPUS) of this publication.

3. The relevance of the topic of the dissertation:

A) The topic is relevant and new (there are no known results on the topic by other authors)	8 points	
B) The topic is relevant and results from other authors are known	6 points	X
C) The topic is not relevant, but results from other authors are known	2 points	
D) The topic is not relevant and no results from other authors are known	1 point	
E) The topic does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The evaluation of the relevance of the dissertation must be substantiated

Robotics and software systems for robot control are one of the most rapidly growing areas in the field, and many scientific groups are working on them. In this sense, I consider that the chosen topic of the dissertation work is relevant.

4. Knowledge of the problems, subject of research in the dissertation:

A) The doctoral student knows in detail the achievements of other authors on the topic of the dissertation	8 points	X
B) The doctoral student is partially familiar with the achieved results on the topic of the dissertation	4 points	
C) The doctoral student has no prior knowledge of the status of the problems in the dissertation	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.

The list of literature reference consists of 106 items that are also referenced in the text of the dissertation. The PhD student has made a thorough overview of the field, including not only scientific works, but also practical tools and environments that are used in industry.

I would advise the PhD student in his future works to separate the sources that are non-peer-reviewed online resources or technical documentation from the scientific sources.

5. Type of research:

A) Theoretical	4 points	
B) Applied	4 points	X
C) Theoretical with application elements	4 points	
D) It does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The level of research must be substantiated if answer D is marked.

6. Objectives of the research:

A) Realistic and of scientific and / or applied interest	8 points	X
B) Realistic, but not of scientific and / or applied interest	3 points	
C) Unattainable (unrealistic)	0 points	
		one of the answers given is marked with the sign "X"

Objectives must be specified. The type of the set objectives must be justified.

Goal and objectives of the research correspond to the chosen topic and scientific area and are of applied interest.

7. Methods of research:

A) Adequate to research and set objectives	8 points	
B) Partially appropriate, enabling part of the scientific objectives and / or applications to be achieved	4 points	X
C) Inappropriate methods	0 points	
		one of the answers given is marked with the sign "X"

Methods must be specified. The type of methods used is justified.

The PhD student has chosen a standard methodology for conducting research, which includes a theoretical overview, experiments and analysis of results.

A very good impression makes the professional experience and the knowledge of a large number of technologies, environments and tools for software development and management of robotic systems.

However, the following omissions are observed in the thesis:

- There is a lack of motivation and justification of the selected criteria for the comparative analyses (e.g. page 37 - at the end of item 2.1.)
- Experimental results are not supported by accurate data and analysis
- Sufficient conclusions and (including critical) evaluation of the obtained results are missing in some places.

8. Contributions of the dissertation:

A) With lasting scientific and / or applied response, they form the basis for new research and applications	20 points	
B) They are of significant scientific and / or applied interest, complete and / or summarize previous research	16 points	
C) They are of scientific and / or applied interest	12 points	X
D) Lack of significant contributions	8 points	
E) Lack of contributions	0 points	
		one of the answers given is marked with the sign "X"

Contributions must be specified. The type of results achieved must be justified.

I consider that the contributions of the dissertation are important for the development of the scientific area and would qualify them as applied and scientific-applied. Main contributions are as follows:

- An overview and analysis of the area, including a comparative analysis of various tools and means for programmatic control of robots
- Approaches for visual programming of control programs are proposed
- The application of the latest achievements of artificial intelligence is considered

As the main drawback, I consider the lack of justification of the contributions claimed by the doctoral student and the ambiguous phrasing of some of them, for example:

- Contribution 1.1: "test model" what it is built for, where in the thesis it is described.
- Contribution 1.2: accurate quantitative indicators of the conducted experiments are missing
- Etc.

9. Evaluation of the compliance of the dissertation summary with the dissertation:

A) Full compliance	4 points	X
B) Compliance of the main parts	2 points	
C) Lack of compliance of the main parts	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.

The presented abstract has a volume of 42 pages and its text fully covers the material in the dissertation.

However, it can be noted that the abstract lacks a content section, which makes it difficult to read, and its pages are not numbered.

10. Participation of the doctoral student in the achievement of the results of the dissertation:

A) The doctoral student has at least an equal participation	8 points	X
B) The doctoral student has secondary participation	5 points	
C) The participation of the doctoral student is unnoticeable	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the items B or C is marked.

11. Critical notes:

A) Lack of critical notes	8 points	
B) Critical notes of a technical nature	7 points	
C) Critical notes that would partially improve the results achieved	4 points	
D) Significant critical notes	0 points	X

		one of the answers given is marked with the sign "X"
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Critical notes must be provided if one of the answers C or D is marked.
<p>The dissertation work can be significantly improved in the following areas:</p> <ul style="list-style-type: none"> • More unambiguous statement of the objectives, for example there is some ambiguity in "to propose optimized methods for programming robotic systems". • The contributions of the dissertation work are imprecisely formulated • The dissertation lacks sufficiently motivated conclusions and analysis of the results obtained • There is a lack of motivation and justification of the selected criteria for the comparative analyses • Experimental results are not supported by accurate data and analysis • Sufficient conclusions and (including critical) evaluation of the obtained results are missing in some places. • The purpose of some of the presented program fragments in ch. 1 is not clear – for example in fig 1.1-1.3 there is a need to specify the context in which the robot is controlled (library, environment, etc.). <p>I believe that the mentioned remarks do not reduce the importance of the work done by the PhD student.</p>

12. Conclusion

A) The evaluation of the dissertation is POSITIVE	This evaluation is assigned to a total number of at least 65 points	X
B) The evaluation of the dissertation is NEGATIVE	This evaluation is assigned to a total number below 65 points	
		one of the answers given is marked with the sign "X"

To be filled in at the request of the reviewer
<p>My evaluation of the presented dissertation thesis is positive. I have reviewed it, together with the additional materials provided for the PhD defence and, I consider them to match the normative and legislation requirements for obtaining the PhD degree in the scientific area 4. "Natural sciences, mathematics and informatics" and professional area 4.6. "Informatics and Computer Science". In particular, the total points according to this review template for is 76 points.</p> <p>Thus, in conclusion, I recommend that the candidate should receive PhD degree in the professional area 4.6. "Informatics and Computer Science".</p>

04.09.2024	The review was written by:	
date		signature