

REVIEW OF THE OFFICIAL REVIEWER

for the dissertation work of Chinibayev Yersain Gulislamovich

on the topic “Development of methods for visualization of three -dimensional objects through augmented reality technology”,
provided for the degree of Doctor of Philosophy (PHD) in the specialty “6D070400 - computer technology and software.”

№	Criteria	Compliance with the criteria (mark one of the answer options)	Substantiation of the position of the official reviewer
1.	The topic of the dissertation (as of the date of its approval) corresponds to the directions of development of science and / or state programs	<p>1.1 Compliance with priority areas for the development of science or government programs:</p> <p>1) The dissertation was completed within the framework of a project or target program financed from the state budget (indicate the name and number of the project or program)</p> <p>2) The dissertation was completed within the framework of another state program (indicate the name of the program)</p> <p>3) The dissertation corresponds to the priority direction of the development of science, approved by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan (indicate the direction)</p>	<p>The dissertation corresponds to the tasks of the state program "Digital Kazakhstan" (December 12, 2017. Decree of the Government of the Republic of Kazakhstan No. 827)</p> <p>The dissertation corresponds to the priority direction of the development of science for 2021–2023:</p> <p>4. Information, telecommunication and space technologies; minutes of the meeting of the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan dated April 29, 2020.</p>
2.	Importance for science	The work makes / does not make a significant contribution to science, and its importance is well disclosed / not disclosed	The work makes a significant contribution to science and its importance is revealed

3.	The principle of self-reliance	<p>Self-reliance level: 1) high; 2) medium; 3) low; 4) no independence</p> <p>4.1 Justification of the relevance of the thesis: 1) justified; 2) partially substantiated; 3) not justified</p> <p>4.2 The content of the dissertation reflects the topic of the dissertation: 1) reflects; 2) partially reflects; 3) does not reflect</p> <p>4.3. The purpose and objectives correspond to the topic of the dissertation: 1) comply; 2) partially correspond; 3) do not match</p> <p>4.4 All sections and provisions of the dissertation are logically interconnected: 1) are fully interconnected; 2) the relationship is partial; 3) there is no relationship</p> <p>4.5 The new solutions proposed by the author (principles, methods) are argued and evaluated in comparison with the known solutions: 1) there is a critical analysis; 2) partial analysis; 3) the analysis is not one's own opinions, but quotes from other authors</p>	Medium.
4.	The principle of internal unity	<p>5.1 Are scientific results and provisions new? 1) completely new; 2) partly new (25–75% are new); 3) not new (less than 25% are new)</p>	<p>The relevance is determined by the developed models of the service space, the area of perception and behavior of the user of the augmented reality service.</p> <p>The content fully reflects the topic of the dissertation</p> <p>Correspond.</p> <p>The dissertation consists of an introduction, four sections, a conclusion and a list of references. All sections are interconnected.</p> <p>There is a critical analysis. The results are presented in the dissertation in tables and graphs.</p>
5.	The principle of scientific novelty	<p>The author has developed new models of the service space, the area of perception and behavior of the user of the augmented reality service. The use of which increases the efficiency of interaction by at least a quarter of all available solutions.</p>	

		<p>5.2 Are the conclusions of the dissertation new? 1) completely new; 2) partially new (25-75% are new); 3) not new (less than 25% are new)</p> <p>5.3 Technical, technological, economic or managerial decisions are new and justified: 1) completely new; 2) partially new (25-75% are new); 3) not new (less than 25% are new)</p>	<p>The findings are completely new, due to the development of new models.</p> <p>When implementing the information system, the author used existing technological solutions, but using the created models.</p>
6.	Validity of the main conclusions	<p>All key findings are based/not based on scientifically sound evidence, or reasonably well-founded (for qualitative research and arts and humanities courses)</p> <p>The following questions need to be answered for each position separately: 7.1 Is the position proven? 1) proven; 2) rather proven; 3) rather unproven; 4) not proven 7.2 Is it trivial? 1) yes; 2) no 7.3 Is it new? 1) yes; 2) no 7.4 Level to apply: 1) narrow; 2) medium; 3) wide 7.5 Is it proven in the article? 1) yes; 2) no</p>	<p>Theoretical studies carried out within the framework of the dissertation made it possible to obtain results of practical and scientific importance.</p> <p>7.1. - proven 7.2. - is not trivial 7.3. - is new 7.4. – the scope of application is very wide 7.5. – proven in the article “DEVELOPMENT OF AN INTERACTIVE INFORMATION SYSTEM USING AUGMENTED REALITY MEANS”</p>
7.	Basic provisions for defense		

8.	The principle of certainty. Reliability of sources and information provided	8.1 The choice of methodology - is the methodology justified, is it described in sufficient detail 1) yes; 2) no	Yes
		8.2 The results of the dissertation work were obtained using modern methods of scientific research and methods of processing and interpreting data using computer technologies: 1) yes; 2) no	Yes
		8.3 Theoretical conclusions, models, identified relationships and patterns are proven and confirmed by experimental research (for areas of training in pedagogical sciences, the results are proven on the basis of a pedagogical experiment): 1) yes; 2) no	Yes
		8.4 Important statements are supported / partially confirmed / not supported by references to current and reliable scientific literature	Important statements are supported by references to relevant and reliable scientific literature in all sections of the dissertation.
		8.5 Used literature sources are sufficient / not sufficient for a literature review	The used literature sources are sufficient, consist of 70 titles.
9	Principle of practical value	9.1 The dissertation has a theoretical value: 1) yes; 2) no	The theoretical and applied results obtained in the work can be used in the design and development of information systems.
		9.2 The dissertation is of practical importance and there is a high probability of applying the results obtained in practice: 1) yes; 2) no	Yes
		9.3 Are the practice suggestions new?	Partially new

	1) completely new; 2) partially new (25-75% are new); 3) not new (less than 25% are new)	
10.	Quality of writing and design Quality of academic writing: 1) high; 2) average; 3) below average; 4) low.	The quality of writing and design of the dissertation work is average, the structure and design rules are observed.

Dissertation comments:

1. The applicability of the developed models in real conditions is insufficiently substantiated. In the work, it is necessary to expand the number of scenarios, or bring real cases of practical applicability. For example: to obtain data on traffic on the roads, it is possible to use Sergek cameras, as well as data from taxi services that collect similar data to estimate congestion, without the need for UAVs.
2. In the dissertation work there are drawings of low resolution (for example: drawings 2.6, 2.10, 2.18, 2.19, 3.3 - in Russian, 3.1 must be renamed, has nothing to do with architecture).

The above comments and suggestions do not diminish the relevance and significance of the dissertation work.

The dissertation work of Chinibayev Yersain Gulislamovich on the topic "Development of methods for visualizing three-dimensional objects using augmented reality technology (Augmented Reality)" meets all the requirements for dissertations for the degree of Doctor of Philosophy (PhD) in the specialty "6D070400 - Computer Science and Software."

Conclusion:

apply to the Committee for the award of a PhD or Doctor of Philosophy degree to a doctoral student.

Official reviewer

Ph.D., Professor of the
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(signature)

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(full name)