

The Report on the Decisions Taken Dissertation Council for Information and Communication Technologies on the Award (Refuse to Award) of the Degrees of Doctor of Philosophy (PhD) for 2021

1. The number of hold meeting

The Dissertation Council has hold 8 meeting during its work with considering the requirement to notify about the upcoming defense no later than one month before the deadline date.

2. Names of council members who attended less than half of the meeting

- none.

3. List of doctoral students with an indication of the organization

№	Full name	Name of University
1	Dinara Kassymova	KazNRTU named after K.I. Satbayev
2	Zhassulan Mendakulov	KazNRTU named after K.I. Satbayev
3	Jalal Kudratovich Jamalov	KazNRTU named after K.I. Satbayev
4	Kirill Yakunin	KazNRTU named after K.I. Satbayev
5	Nigina Toktassynova	KazNRTU named after K.I. Satbayev
6	Yelena Kulakova	KazNRTU named after K.I. Satbayev
7	Assem Talasbek	Suleyman Demirel University
8	Nazerke Sultanova	Suleyman Demirel University

4. The brief of dissertation that have been considering by the Council during the report year

The Dissertation Council considered 8 thesis's in the reporting year. The name of dissertation by specialization given below.

№	Full name	Thesis thesis	Code and name of the specialty
1	Dinara Kassymova	Research and development of methods for identifying and eliminating contradictions in big data	6D070300 – Information systems
2	Zhassulan Mendakulov	Development of the possibility of indoor positioning using low-energy Bluetooth signals	6D071900 – «Radio engineering, Electronics and Telecommunications»
3	Jalal Kudratovich Jamalov	Development of the software complex for modeling pollution transfer in the Ili-Balkhash basin	6D070400 - Computing Systems and Software
4	Kirill Yakunin	Development of models and methods for collection, analysis	6D070400 - Computing Systems and Software

		and classification of media-publications based on natural language processing methods	
5	Nigina Toktassynova	Simulation and research of control system of phosphorite ore sintering process	6D070200 - «Automation and Control»
6	Yelena Kulakova	Development of an Intelligent Control System for the Process of Gravity Ore Enrichment	6D070200 - «Automation and Control»
7	Assem Talasbek	Profession inclination identification using machine learning	6D070400 - Computing Systems and Software
8	Nazerke Sultanova	Open vocabulary model for Kazakh language using neural networks	6D070400 - Computing Systems and Software

4.1 Analysis of the dissertation work of **Kassymova Dinara**:

Dissertation work of doctoral student **Kassymova Dinara** on the topic «Research and development of methods for identifying and eliminating contradictions in big data» is characterized by relevance and scientific novelty.

The aim of the research: Research and development of methods for automatic detection and elimination of contradictions in big data to improve the efficiency and effectiveness of decision-making based on statistical processing and machine learning.

Scientific novelty:

- A comprehensive method for automatic detection and elimination of contradictions in big data is proposed based on statistical analysis and machine learning methods and a developed methodology for selecting its components, taking into account the specifics of the subject area.

- For the first time, an architecture, algorithm and program of an intelligent information system were created to identify and eliminate contradictions in big data of urban public transport, which increases the efficiency and effectiveness of decision-making when managing public transport in the city.

- An algorithm and a program for generating templates and a management solution for drawing up a preliminary schedule of a city bus route in an intelligent information system based on cleaned big data of the city's public transport have been developed.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

The dissertation work corresponds to the tasks of the State Program “Digital Kazakhstan” 2018-2022. According to the program, set of measures has been 3 key areas, one of which is the transition to a digital state. According to the plans for 2022, large Kazakhstan cities will develop within the framework of the Smart City concept, which includes intelligent control.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The information system, based on analytical and statistical research and machine learning algorithms, has increased the efficiency of public transport (bus fleet) by optimizing the distance, automatically identifying and eliminating inconsistencies in the creation and processing of large data. Research has also shown that it is possible to increase the efficiency of large-scale data processing in the field of public transport.

4.1 Analysis of the dissertation work of **Mendaklov Zhassulan**:

Dissertation work of doctoral student **Mendaklov Zhassulan** on the topic «Development of the possibility of indoor positioning using low-energy Bluetooth signals» is characterized by relevance and scientific novelty.

The aim of the research: study of the influence of LOS / NLOS conditions on the passage of a radio signal and the possibility of reducing interference interference using a multi-frequency method of transmission and reception for problems of positioning in enclosed spaces.

Scientific novelty: Analysis of publications and patent search on the topic of dissertation research shows that the proposed methods are original, new and aimed at solving problems of increasing the stability of the received signal level, which will improve the accuracy of the developed positioning systems in enclosed spaces.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

The topic of the dissertation corresponds to the priority area according to the competitive documentation for grant funding of young scientists for scientific and (or) scientific and technical projects for 2022-2024. The documentation contains the relevant priority and specialized research areas.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The obtained experimental and computer results can be used in the deployment of positioning systems in enclosed spaces. The proposed methods of multi-frequency transmission and multi-frequency reception, the "minimax" method will reduce the mean square errors, thereby stabilizing the signal level indication. The stability of the received signal level reduces the uncertainty in determining the coordinates. The proposal to reduce the height of transmitters and receivers relative to the floor of the room is aimed at reducing the error in measuring the signal level under interference conditions. This method has practical benefits when applied to mobile robotic vehicles. An incoherent accumulation of measurement results is proposed. This method will improve the signal-to-noise ratio. With a weak level of the received signal, at long distances, this method will eliminate the uncertainty in determining the coordinates.

4.1 Analysis of the dissertation work of **Jamalov Jalal**:

Dissertation work of doctoral student **Jamalov Jalal** on the topic «Development of the software complex for modeling pollution transfer in the Ili-Balkhash basin» is characterized by relevance and scientific novelty.

The aim of the research: work is the development and implementation of an algorithm for predicting the transfer of pollution on the example of the Ili-Balkhash basin by integrating various software packages and models, as well as using GIS technologies. And also 9 forecasting scenarios for changing water quality with a decrease in inflow to the territory of the Republic of Kazakhstan.

Scientific novelty:

- Creation of a hydraulic model of the Ili River;
- Development of the algorithm for predicting the transfer of pollution in the water basin;
- Development of the algorithm for calculations for diffusion sources of pollution;
- Development of the automated web-oriented system for scenario modeling;
- Comparison of the results obtained with factual data.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

The dissertation work was carried out at the National Scientific Laboratory for the Shared Use of Information and Space Technologies of Satpayev KazNRTU within the framework of the scientific project "Modeling the transfer of pollution in the Ili-Balkhash basin using a supercomputer", grant of the Ministry of Education and Science of the Republic of Kazakhstan No. 1049 / GF4 for 2014-2017.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The implementation act was received, indicating that the results obtained within the framework of the dissertation research on the topic "Development of a software package for modeling pollution transfer in the Ili-Balkhash basin", as well as the results of the grant project of the Ministry of Education and Science of the Republic of Kazakhstan No.1049/GF4 "Modeling of pollution transfer in the IliBalkhash basin using a supercomputer" were implemented in EcoRisk LLP

4.1 Analysis of the dissertation work of **Yakunin Kirill**:

Dissertation work of doctoral student **Yakunin Kirill** on the topic «Development of models and methods for collection, analysis and classification of media-publications based on natural language processing methods» is characterized by relevance and scientific novelty.

The aim of the research: The purpose of the work is the development of models and methods for automatic multicriteria assessment of textual information from media sources and social networks within the distributed information system.

Scientific novelty:

1. A method for vectorizing text documents using the BigARTM thematic model is proposed
2. A method for assessing thematic interbody imbalance is proposed for self-learning of the classification model
3. A method of multifactorial

assessment of the social significance of a publication is proposed. 4. The proposed methodology for multi-criteria assessment of mass media MMA based on the Bayesian aggregation system, the analysis of hierarchies (AHP) and thematic modeling.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

The presented results were obtained during the implementation of the project IIVT KN MES RK (source of funding Science Committee MES RK): program-targeted funding (PCF) SC MES RK BR05236839 "Development of information technologies and systems to stimulate sustainable development of the individual as one of the foundations of the development of digital Kazakhstan" in 2018-2020 years.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The results of scientific research, in particular, the developed information system can be used for a number of purposes: 1. Use by researchers and scientists. As shown in section 5.3.1 of the work, there is great potential for using the developed information system for a variety of humanities research. 2. Use by large companies and government agencies to support decisionmaking. 3. Use by large companies to solve the problem of reputation management. 4. Use by ordinary users for intelligence search of data of interest.

4.1 Analysis of the dissertation work of **Toktassynova Nigina**:

Dissertation work of doctoral student **Toktassynova Nigina** on the topic «Simulation and research of control system of phosphorite ore sintering process» is characterized by relevance and scientific novelty.

The aim of the research consists in modeling the sintering process of phosphorite ores and developing a control structure.

Scientific novelty: Based on the theory of heat transfer in porous media, develop a mathematical model based on physicochemical transformations occurring during sintering to conduct research on the sintering process and obtain sintering temperature curves for developing a prediction system. Develop an optimal dynamic model for predicting the burn through point based on a small volume of the initial sample and several variables, and propose a control structure based on the prediction.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

This work is closely related to previous studies on the scientific and technical projects "AP05130067-OT-18 Development and testing of intelligent algorithms for optimal control of the technological process for the production of phosphorus anhydride P₂O₅ in a pilot plant NDFZ" and "AP08856867-OT-18" Development and testing of intelligent algorithms for optimal control of the technological process of purification of yellow phosphorus in the conditions of the NDFZ" 2018-2020.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The scientific novelty of the research is as follows:

- a model of the sintering of phosphorite ores was developed based on the physics of heat transfer in porous media instead of classical heat transfer in solid and gas;
- a new optimal predictive grey model was developed, model based on continuous integral grey model and “particle swarm” optimization algorithm;
- on the basis of the developed optimal predictive grey model, an algorithm is proposed for obtaining a burn through point prediction of the sinter;
- a structure for control the sintering process is proposed, including the developed dynamic predictive model.

4.1 Analysis of the dissertation work of **Kulakova Yelena**:

Dissertation work of doctoral student **Kulakova Yelena** on the topic «Development of an Intelligent Control System for the Process of Gravity Ore Enrichment» is characterized by relevance and scientific novelty.

The aim of the research is developing the intelligent control system for the process of gravitational ore enrichment, which will provide high technological indicators of enrichment

Scientific novelty: The scientific novelty of the research lies in the development of a mathematical model for the movement of particles of concentrate and waste rock in a separator-type jigging machine; a technique for processing expert information in the formation of a training sample is proposed; the synthesis and study of intelligent models (algorithms) were carried out to determine the optimal values of the key variables of the gravity enrichment process; a technique for assessing the adequacy of the developed models (algorithms) was developed using passive experiment data.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

The dissertation work is related to research on the development of intelligent algorithms for controlling the processes of obtaining phosphorus anhydride (2018-2020) and the current research AP08856867-OT-21 "Development and testing of intelligent algorithms for optimal control of the technological process of purification of yellow phosphorus in the conditions of NDFP" for 2020-2022.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The main scientific guidelines (proven scientific hypotheses and other conclusions that are new knowledge) submitted for defense:

- the model of the movement of concentrate and waste rock particles in the gravitational field of a separator-type jigging machine;
- methodology of processing expert information in the formation of a knowledge base (training sample);
- intelligent control models of gravity enrichment machines;
- methodology for assessing the adequacy of the obtained algorithms using passive experiment data.

4.1 Analysis of the dissertation work of **Talasbek Assem**:

Dissertation work of doctoral student **Talasbek Assem** on the topic «Profession inclination identification using machine learning» is characterized by relevance and scientific novelty.

The aim of the research: It is to develop an application that identifies the profession inclination of a person based on personality classification by using different data and applying machine learning techniques to reach a high accuracy level.

Scientific novelty: The novelty of the dissertation is to design an automated method for profession inclination identification by considering the psychological characteristics of a person. The results obtained from various experiments implemented by using Instagram posts and combining models of recurrent neural network (RNN) and convolutional neural network (CNN) were first proposed in this research.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

The dissertation is devoted to the actual problem of determining a person's propensity for a profession based on personality classification, using various data and applying machine learning methods to the corresponding priority area 6D070400 - "Computer Engineering and Software" approved by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The practical value of the dissertation is to improve services in the field of career guidance, academic performance and the possibility of applying research results in various recommendation systems for school and university graduates, which helps to improve systems that help identify the psychotype and inclinations of students, employees, criminals, etc.

4.1 Analysis of the dissertation work of **Sultanova Nazerke**:

Dissertation work of doctoral student **Sultanova Nazerke** on the topic «Open vocabulary model for Kazakh language using neural networks» is characterized by relevance and scientific novelty.

The aim of the research: The target is to deliver unseen words which might be easily fit into the particular context. Here comes the addition of attention layer for the LSTM model to enhance the syntactic performance of the work.

Scientific novelty: is determined by the fact that the innovative language model has been built. The research towards Open Vocabulary Language Model for Kazakh language has been conducted in this work. The use of neural networks is essential to overcome the sparseness problem and produce relevant results.

Moreover, the character-based neural model is suggested to compromise with limitedness of vocabulary. Therefore, the mentioned goal will be achieved by implementing by stage and analyzing the proposed models into a language. Moreover, results shed light on future tasks to emerge the type of words in a context by adding word type information also. This can be very useful in agglutinative languages as the Kazakh language where the meaning and structure of words are very dependent on word endings. The substantive novelty differs from the previous models based on the application of the neural networks using the graphical processing unit that makes the computation more efficient. The constructed architecture with attention layer enhanced the model performance. The developed model can preserve the logic of the narrative and build dialogues on relatively short texts (3-4 sentences long), but it lacks a global context and preservation of the structure of the narrative, as in real works of art.

4.1.2 Connection to the subject dissertations with national state programs as well as targeted republication and regional scientific and technical programs.

The dissertation is devoted to the actual problem of natural language processing corresponding to the priority direction 6D070400 - "Computer Engineering and Software" approved by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan.

4.1.3 Analysis of the level of use of the scientific results of the considered works, proposals for the expanded implementation of the practical significance.

The significant novelty differs from previous models based on the use of neural networks using a GPU, which makes calculations more efficient. The built architecture with the attention layer increased the performance of the model.

5. Analysis of the work of reviewers (with examples of the most low-quality reviews)

Reviewers of dissertations of doctoral students for the degree of Doctor of Philosophy (PhD), were appointed persons in accordance with the requirements of the Standard Regulations on the dissertation Council.

Information about the appointment reviewers is provided below:

№	Full name	Reviewers	
1	Dinara Kassymova	Mansurova Madina – Candidate of Technical Sciences, professor at кандидат физико- математических наук, и.о. профессора, Казахский национальный университет имени аль-Фараби	Kuandykov Abu Abdykadyrovich – Doctor of Technical Sciences, professor at «Information system» in JSC «The International University of Information Technology»
2	Zhassulan Mendakulov	Ibraimov Margulan Kassenovich - PhD, assistant professor, Head	Litvinov Yuri Georgievich – candidate of physical

		of the department of solid-state physics and non-linear physics Al-Farabi Kazakh National University	and mathematical sciences, National Academy of Sciences
3	Jalal Kudratovich Jamalov	Natalia Sergeevna Glazyrina - PhD, Associate Professor of the Department of Computer Science, L.N.Gumilyov Eurasian National University	Didar Yedilkhan - PhD, Associate Professor (Programming, Algorithms and Data Structures, Databases, Data Science), Department of Computer Engineering, Astana IT University
4	Kirill Yakunin	Akzhalova Assel – PhD, Professor, Kazakh-British Technical University	Seilova Nurgul Abadullaevna - Candidate of Technical Sciences, Professor, Professor, Dean of the Faculty of Computer Technologies and Cybersecurity of International Information Technology University
5	Nigina Toktassynova	Dzhunisbekov Mukhtar Shardarbekovich - Candidate of Technical Sciences, professor at M.Kh. Dulaty Taraz Regional University	Kuandykov Abu Abdykadyrovich – Doctor of Technical Sciences, professor at «Information system» in JSC «The International University of Information Technology»
6	Yelena Kulakova	Toporov Viktor Ivanovich - Doctor of Technical Sciences, Director of «Sistemotechnika» LLP	Fedorenko Igor Anatolyevich - Candidate of Technical Sciences, Head of the Department of Automation and Control of JSC Almaty University of Energy and Communications

7	Assem Talasbek	Mukhamediev Ravil Ilgizovich - Doctor of Engineering Sciences, Professor at "Kazakh National Research Technical University named after K.I. Satpayev" NJSC	Satymbekov Maksatbek Nurgaliuly - PhD, acting Associate Professor at Al-Farabi Kazakh National University
8	Nazerke Sultanova	Yerimbetova Aigerim Sembekovna - PhD, Associate Professor, Professor of the Department of Software Engineering, "Kazakh National Research Technical University named after K.I. Satpayev" NJSC	Omarov Batyrkhan Sultanovich - PhD, Acting Associate Professor of Al-Farabi Kazakh National University

In order to ensure compliance with the requirements of the Standard Regulations on the work of the DC, each reviewer was sent a memo with the requirements for the content and design of the review of the dissertation work.

All the reviews were submitted on time and in accordance with the requirements of the Committee for control in education and science of MES of RK.

There are no negative reviews.

- **Information on the accepted negative decisions:** there is no negative decisions accepted by the dissertation work.

- **Information on doctoral students who did not defend their dissertations (for what reason they did not defend their dissertations):** According to the defense plan, in the DC, the number of applicants who planned to defend their dissertations by the end of 2021 was 8 persons.

5. Proposals for further improvement of the system of training of scientific personnel – no.

6. Data on the dissertation considered for the degree of Doctor of Philosophy PhD:

	6D070300 – Information systems	6D070400 – Computing Systems and Software	6D075100 – Computer science, Computing Systems and Control	6D070200 – Automation and Control	6D071900 – Radio engineering, Electronics and Telecommunications
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Dissertation withdrawn from consideration	-	-	-	-	-
Including those removed from the DC	-	-	-	-	-
Dissertation that received negative reviews from reviewers	-	-	-	-	-
Dissertation with positive decision based on the results of the defense	1	4	-	2	1
Including those other organizations	-	2	-	-	-
Dissertation with negative decision based on the results of the defense	-	-	-	-	-
Including those other organizations	-	-	-	-	-
Total number of dissertation defended	1	4	-	2	1
Including those other organizations	-	2	-	-	-

Chairman of the dissertation council

Scientific Secretary of the Dissertation Council



B. Suleimenov

M. Turdalyuly