Выпуск № 10

№	Статья и ссылка	Аннотация
1.	Begimbayeva, Y., & Zhaxalykov, T. (2022). RESEARCH OF QUANTUM KEY DISTRIBUTION PROTOCOLS: BB84, B92, E91. *Scientific Journal of Astana IT University*, *10*, 4–14. https://doi.org/10.37943/qrkj7456	The proposed article is devoted to the investigation of quantum key distribution protocols. The idiosyncrasy of this theme lies within the truth that present day strategies of key distribution, which utilize classical computing at their center, have critical downsides, in contrast to quantum key distribution. This issue concerns all sorts of calculations and frameworks for scrambling mystery data, both symmetric encryption with a private key and deviated encryption with an open key. A case is that in a communication channel ensured by quantum key distribution, it is conceivable to distinguish an interceptor between two legitimate organize substances utilizing the standards laid down in quantum material science at the starting of the final century. Standards and hypotheses such as the Heisenberg guideline, quantum trap, superposition, quantum teleportation, and the no-cloning hypothesis. The field of ponder of this theme may be a promising and quickly creating zone within the field of data security and data security. There are as of now made commercial items with the usage of a few of the quantum key dispersion conventions. Numerous of the made items are utilized in different circles of human movement. The significance of applying quantum key distribution conventions beneath perfect conditions without taking into consideration blunders within the frame of quantum clamor is analyzed. The usage of three quantum key distribution conventions is illustrated, as well as the comes about of the appearance of keys and the likelihood of event of each of them. The purpose of the article is pointed at analyzing and investigating quantum key distribution conventions. The article examines the points of interest and impediments of the BB84, B92, and E91 quantum key distribution conventions.
2.	Bokan, M. E. (2022). NEGATIVE-SAMPLING WORD-EMBEDDING METHOD. *Scientific Journal of Astana IT University*, *10*, 15-21. https://doi.org/10.37943/ELGD6408	One of the most famous authors of the method is Tomas Mikolov. His software and method of theoretical application are the major ones for our consideration today. It is better to pay attention that it is more mathematically oriented. The use of embedding models to turn KGs into vector space has become a well-known field of research. In recent years, a plethora of embedding learning approaches have been proposed in the literature. Many of these models rely on data already stored in the input KG. Following the closed world assumption, the knowledge not presented in the KG cannot be judged untrue; instead, it may only be labeled as unknown. On the other hand, embedding models, like most machine learning algorithms, require negative instances to learn embeddings efficiently. To deal with this, a variety of negative sample generating strategies have been developed. The author himself had more to do with mathematics, and his method concerns, first of all, a mathematical solution for a theoretical, and then a practical solution for creating this and the method we are analyzing. Dense vector word representations have lately gained popularity as fixed-length features for machine learning algorithms, and Mikolov's system is now widely used. We investigate one of its main components, Negative Sampling, and offer efficient distributed methods that allow us to scale to indicate and exclude the possibility of probability loss in a similar value. Furthermore, this method is laser-focused on a single action in the broad sense for processing the recognition of the above-mentioned vector or words. It is important to pay attention to mathematical theory and understand the importance of the neural network in this field.
3.	Muratuly, D., Denissova, N., Krak, Y., & Apayev, K. (2022). BIOMETRIC AUTHENTICATION OF STUDENTS TO CONTROL THE LEARNING PROCESS IN ONLINE EDUCATION. *Scientific Journal of Astana IT University*, *10*, 22-32. https://doi.org/10.37943/LYFW8581	This article considers the relevant problem of biometric authentication of students in higher educational institutions. The authors present the results of using a turnstile system with a face recognition terminal, with the ability to provide unique biometric data in real time. The study was conducted among students of the D. Serikbayev East Kazakhstan Technical University, Ust-Kamenogorsk, Kazakhstan. The article presents the results of studies of one of the biometric methods of personality recognition. In this method, the process of proving and verifying the identity of the person can be carried out through the presentation by the user of his biometric image. The processing results are sorted and compared with typical images from the database. With its positive decision, the developed software issues the results of biometric authentication of a person who presented himself in front of a digital scanner. The applied value of the results of the work lies in the possibility of using them in the field of education, and various industries to make a decision on providing access to information resources. In the course of the study, a technology was developed to provide biometric authentication processes for university students. Domestic and foreign scientists who have made a significant contribution to the development of methods for processing facial images are noted. A review of biometric methods of recognition is carried out, and tools for electronic authentication and modern information security systems are described. Factors that significantly affect the probability of correct recognition of students' faces are determined. The analysis of ways to increase the probability of correct recognition of students by the image of the face is carried out.

4.	Petrov, B., Bakenova, A., & Yensebayeva, S. (2022). DEVELOPMENT OF A DATABASE OF DIGITAL MULTICULTURAL CONTENT AND APPLICATION IN JOURNALISM LESSONS. *Scientific Journal of Astana IT University*, *10*, 33-44. https://doi.org/10.37943/DNSG5604	The development of digital technologies stimulates changes in the field of education, including for students of the educational programs «Digital Journalism» and «Media Technologies». This paper presents the practice of using a database of digital multicultural content in journalism lessons. The relevance of this scientific publication is due to the need to integrate digital technologies into the educational process and the development of students' skills in working with programming languages. The importance of using such content is described by the modern realities of the educational system, when all members of the academic community are involved in the process of forming national identity within the country and global globalization. Kazakhstan's conditions demonstrate the penetration of cultures of various ethnic groups, religions, which is the reality of modern teachers and students. The author offers a model for creating a database of digital multicultural content. To do this, the multicultural content of three TV channels and online publications posted on digital services is being studied. The design and structuring of web portals, interfaces, and content are studied. The author conducts quantitative and qualitative research of media materials. A parallel is drawn between the amount of digital content published on television and on Internet resources. Through lexical and compositional analysis, trends and issues of digital multicultural content are identified. The information obtained during the study was organized into a database in the PostgreSQL programming language. As an experiment, the use of the database was tested in journalism lessons when performing exercises and conducting mini-studies. At the end of the training course, a survey of students was conducted on the effectiveness of using databases in the classroom. The students' answers are analyzed and presented in a generalized form. The methodological methods of working with students described and analyzed in this article are important material for the development of the educational goals of future journalists.
5.	Akhmetbek, S. (2022). FORECASTING CUSTOMER FUTURE BEHAVIOR IN RETAIL BUSINESS USING MACHINE LEARNING MODELS. *Scientific Journal of Astana IT University*, *10*, 45-60. https://doi.org/10.37943/ILMM7870	The ability to forecast customers' future purchases, lifetime value, and churn are fundamental tasks in business management. These tasks become more complicated when the relationship between customers and business is not contractual. Therefore, the application of an appropriate method of customer analysis influences the efficiency of company cost management in interaction with their customers. The purpose of this paper is to compare existing solutions of customer lifetime value prediction and provide a new way to predict the future behavior of customers with consideration of the drawbacks of previous works. The method should have the following properties: use data that is available in any retail business; take into account that markets are constantly changing; be more precise than existing solutions. In this paper, we proposed the method of identifying customer churn provided a way to analyze customer behavior associated with churn or retention. In order to understand why customers churn, we used eleven customer behavioral metrics. The relationship of used metrics with churn was proved using churn cohort analysis. The results of training of logistic regression and neural network on prepared dataset showed that their forecast accuracy is in the healthy range for highly predictable churn. Based on predicted churn probabilities, we calculated the customer lifetime value in the future period. Our research results on customer behavior in the retail business confirm the hypothesis that customers who make many purchases are less likely to churn than customers who make few purchases. The main uniqueness of this work is the way of finding customer churn, as no such data was provided in the initial dataset. In addition, the minimum amount of data that most retail companies have was used. This enables the proposed methodologies to be applied to a large number of retail companies.
6.	Mazakov, T., Jomartova, S., Ziyatbekova, G., Sametova, A., & Mazakova, A. (2022). Intelligent Dam Breach Threat Monitoring System. *Scientific Journal of Astana IT University*, *10*,61-67. https://doi.org/10.37943/YQTE5603	The article is devoted to the development of a river flow modeling technique. The paper considers possible approaches to modeling the flow of fluids, as well as an analysis of existing solution methods and the formulation of research problems. The task is analyzed and the main problems that may arise in the course of its solution are identified. A general description of the problem and the formulation of research objectives are given. The advantages and disadvantages of the described methods are highlighted. A comparative analysis of known methods for complex analysis, forecasting the consequences of natural and man-made emergencies using modern technologies of mathematical modeling and a computational experiment with displaying the results in a geographic information system and a study of a mathematical model of a dam breakthrough was carried out. A description of the flood and flood monitoring technology developed in Kazakhstan is given, the results of its practical use in certain regions are discussed, and directions for further development are outlined. Thus, based on the analysis of various existing methods, the goal and main objectives of research aimed at developing a methodology for predicting a hydrodynamic accident as an emergency were formulated. The continuous wave method or ultrasonic pulse echo method is used. Based on microprocessor technology and sensors, an autonomous microcomputer system for transmitting climate data has been developed. A program for monitoring the factors of breakthrough waves in real time has been developed. An autonomous microcomputer system for transmitting climate data has been developed. The autonomous power supply subsystem for satellite data transmission systems includes a set of equipment, the functions of which are to generate and store energy for its subsequent use in order to provide power supply to the equipment. Water level measurement equipment can be different. To ensure the functioning of the system, the measuring equipment will be interfaced with the data transmission subsystem and the power supply subsystem. The pairing of these systems will make it possible to monitor the water level in moraine lakes, the location of which is extremely inaccessible. Technical means measuring the water level must be able to receive data from sensors with different periodicity. The accumulated data is used to predict possible floods and floods, calculate water consumption, and for other purposes. The characteristics of dams and the capabilities of modern control systems based on the use of microprocessor technology are analyzed.

7.	Nazyrova, D., & Aitkozha, Z. (2022). APPLICATION OF MULTISPECTRAL IMAGES TO SEARCH FOR CONSTRUCTION OBJECTS ON THE SPECTRAL SIGNATURES BASE. *Scientific Journal of Astana IT University*, *10*(10). https://doi.org/10.37943/eoqd2512	Abstract: The work is devoted to the study of Landsat-8 multispectral images of not high resolution using the spectral angle method on the base of spectral signatures libraries to detect objects under construction in an urban area. The physical basis of the research method is that all objects have different reflection coefficients depending on the wavelength. This property makes it possible to identify various substances by their spectral signatures. In the work, an automatic comparison of the curves of the spectral reflectivity of objects on a lowresolution space multispectral image was made to identify the identity of the characteristic energy absorption and reflection zones for detecting objects in the construction process. The article also describes the stages of image preprocessing, cross-track illumination correction of the image, atmospheric correction, and mathematical operations of bands transformation, which provide more opportunities for analysis and recognition of objects using a spectral study of a space image. The study accurately determines the presence or absence of the desired materials, since the search is based on the molecular structure of the substance. Also, the use of multispectral images allows you to analyze the entire city at the same time. The initial data was taken from a 2021 Landsat-8 satellite image with 11 bands, with a resolution of 30 meters, which was enhanced to 15 meters during pre-processing. The results of the search and detection of objects under construction in the city are given. The detection results can be used as input data for further in-depth analysis.
8.	Zhilmagambetova, R., Mubarakov, A., & Alimagambetova, A. (2022). EXPERIMENTAL VERIFICATION OF THE EFFECTIVENESS OF TEACHING METHODS USING ADAPTIVE MATHEMATICS TEACHING. *Scientific Journal of Astana IT University*, *10*(10). https://doi.org/10.37943/hojh1901	The article presents theoretical and empirical results of the study of the advantages of adaptive learning. The practice of creating and organizing adaptive learning for students using the «Moodle» platform is considered, and the results of the application of the adaptive learning model in the preparation of first and second-year students in secondary vocational education are presented. The article presents the results of the input, intermediate, and control measures that the control and experimental groups took. The results are presented both in tabular form, indicating the individual achievements of students in points, and in the form of bar charts. Based on the data obtained, it is possible to quantify the progress in the study of the discipline of mathematics and to compare the individual achievements of students. Thanks to a detailed assessment of various aspects of the results of experimental tasks, it is possible to identify with high accuracy the strengths and weaknesses in the preparation of each of the students, to give individual recommendations for further training. The verification of the validity of the coincidences and differences in the characteristics of the control and experimental groups was carried out by using the Kramer–Welch statistical criterion, which demonstrated, on the one hand, the equality of the training levels of the control and experimental groups at the beginning of the pedagogical experiment under consideration, and on the other hand, the significance of the difference in the level of training at the end of the training process through the application of the proposed methodology
9.	Mussina, A., Aubakirov, S., & Trigo, P. (2022). PARAMETRIZED EVENT ANALYSIS FROM SOCIAL NETWORKS. *Scientific Journal of Astana IT University*, *10*(10). https://doi.org/10.37943/tsyv3590	The growth of data in social networks facilitate demand for data analysis. The field of event detection is of increasing interest to researchers. Events from real life are actively discussed in the virtual space. Event detection results can be used in a variety of applications, from digital marketing to collecting data about natural disasters. Thereby, researchers face the emergence of new algorithms along with the improvement of existing solutions in the event detection field. This paper proposes improvements to the SEDTWik (Segment-based Event Detection from Tweets using Wikipedia) algorithm. The SEDTWik algorithm is designed to detect events without contextual guidance. The overall SEDTWik detection process excludes the perspective of a topic, or multi-topic, guided (or semi-supervised) event detection approach. As a result, some interesting narrowly focused events are not detected as they are weakly relevant in a broader context (e.g., Wikipedia) although acquiring relevance within a conditioned context. Therefore, there is a need for an adaptive perspective where data is to be analysed against a set of narrower topics of interest. This paper shows that SEDTWik gains expressive power after being extended with multi-topic semi-supervision. The evaluation of the current proposal uses the well-known corpora with labeled events, Events2012. In the Events2012 dataset used notation category for events, meaning that events are combined by a certain topic. SEDTWik with topic dictionaries was checked across all categories. In the main part of the article, it is also explained the process of topic dictionary construction from Events2012 labeled tweets. At this stage of the research, in all tasks unigrams were used. SEDTWik with dicti
10.	Bushuyev, S., Tanaka, H., Elmas, C., & Babayev, I. (2022). INSPIRATIONAL INTUITION AND INNOVATION IN IT PROJECT MANAGEMENT. *Scientific Journal of Astana IT University*, *10*(10). https://doi.org/10.37943/ixym7063	The role and place of inspiring intuition and creativity in the management of IT projects and development programs of organizations are considered. A conceptual model of the interaction of inspiring intuition and creativity in the processes of IT project management is presented. The influence of inspiring intuition and creativity on the life cycle of innovative projects for the development of knowledge and management technologies is determined. With the help of intuition, IT project managers can anticipate new products, management processes, business areas and development. Such promising actions usually cannot be planned purely rationally, but require an “intuitive feeling.” Vision and imagination open up opportunities for action beyond the paths. This is “inspiring intuition”. This inspiring dimension of intuition has a long-lasting, holistic and gradual effect. The key competencies and strategic priorities of the organization for the implementation of the strategy of sustainable development are considered. In the process of research, two models of sustainable development based on the use of innovative projects and programs were selected. The first model, the Strategic Sustainable Development Framework (FSSD), defines three levels of creative competencies - linear, literal, and holistic. Within the framework of this model, the qualitative influences of individual competencies on the formation of inspiring intuition are determined by example. The second model is related to the application of the system of knowledge and competencies for the management of IT projects and P2M programs. Within this model, priority competencies have been identified that shape the inspiring intuition of project managers. Within the framework of the evaluations, a matrix of qualitative influences on

		inspiring competence in the processes of implementation of innovative projects and programs was built.
11.	Imankulova, B., Alpar, S., & Amanzholova, S. (2022). DATA SECURITY, MODELING AND VISUALIZATION OF DATA FROM IOT DEVICES. *Scientific Journal of Astana IT University*, *10*(10). https://doi.org/10.37943/acwt2121	The article describes the IoT infrastructure, the hardware of the IoT system, considers the issue of security of the chosen LoRa data transmission technology. Data was received from sensors for gas, temperature and humidity, atmospheric pressure, as well as the location of the end device. At the same time, the standardized security features of the selected LoRa technology for transmitting data from sensors to the server were investigated. The article deals with LoRa bi-directional secure communication line, the security function requires devices/end devices to be configured through the LoRa gateway. Security research is devoted to the development of a security mechanism to increase its resilience. The payload was formed with a hash of the last bytes, and the entire payload was encrypted with AES for integrity and confidentiality. A method for assessing and visualizing atmospheric air pollution is given on the example of the city of Almaty, Kazakhstan. The process of numerical modeling of the study of emissions of harmful substances into the atmosphere is based on a mathematical model formed by the system of Navier-Stokes equations, consisting of the continuity equation, as well as the equations of motion and the k-epsilon turbulence model. To test the numerical methods for processing mixing and chemical reactions, a test problem was chosen – a jet in a transverse flow. Three-dimensional numerical simulation has been implemented. The use of the Internet of Things (IoT) and the acquisition of big data made it possible to simultaneously observe the concentrations of several pollutants in the atmosphere, calculate this concentration and analyze the state of the surface air layer. Modeling allows forecasting the possible concentration of pollutants in certain areas at certain times of the year
12.	Teslia, I., Yehorchenkova, N., Khlevna, I., Yehorchenkov, O., Biloshchytska, S., & Kataieva, Y. (2022). APPROACH AND STRUCTURE OF SPECIAL ORGANIZATIONAL, METHODOLOGICAL AND TECHNOLOGICAL COMPONENTS OF PROJECT AND PROGRAM PORTFOLIO MANAGEMENT SYSTEMS. *Scientific Journal of Astana IT University*, *10*(10). https://doi.org/10.37943/ahfo5398	The functional limitations of modern corporate project and program management systems are presented. It is shown that the main limitation of such systems is connected with the weak implementation of organizational and methodological components, especially in the processes of project and program portfolio management. The structure of project and program portfolio management system, focused on the management of project portfolios in project-oriented companies, is proposed. The necessity of creating project and program portfolio management system in the companies involved in the implementation of a significant number of complex projects is justified. It was shown that since such systems combine organizational and methodological components, they are highly dependent on the construction of the project-oriented company itself. On its organizational structure, company management processes, peculiarities of the production process and its management. The consequence of this is the uniqueness of project and program portfolio management system. Description of organizational, methodological, and technological components of such system is given. The distinctive features of these components in different companies are described. It is shown that the organization of 3P-management is based on the creation of a service engaged in the implementation of project management in the company. The methodological component of project and program portfolio management system should be based on project management meta-methodology. And information technology should be based on a matrix model of interaction between company management tools and projects. The ways of integration of organizational, methodological and technological components of project and program portfolio management systems based on the implementation of a system-forming project of creating a project and program portfolio management system are presented.