AL-FARABI KAZAKH
NATIONAL UNIVERSITY

INFORMATION
about publication activity
FACULTY OF INFORMATION TECHNOLOGY

№	Наименование публикации	Выходные данные (doi статьи)	Аннотация статьи	Ссылка для цитирования (Ф.И.О., название статьи, название, номер и/или выпуск, том журнала, страницы, Doi статьи)
2022 ГОД				
1	Analysis of India Ecosystem for Startup with Using Data Mining:Settlement of Big Data		In conditions of knowledge-based and digital economy research ecosystem of the startup have to make some decisions every day and in the framework of it analyze factors influencing them and estimate the potential of an ecosystem. An important feature of the ecosystem of startup development is understanding of what field is popular among the investors and estimate the level of involvement of different areas of the country in the startup ecosystem. Data mining techniques are a necessary approach for accomplishing practical and effective solutions to this problem. Indian startup has been an obvious target for big data. This work directly includes the	Aziza Zhuparova, Rimma Sagiyeva, Dinara Zhaisanova Proceedings of the 32nd International Business Information Management Association Conference (IBIMA) (Seville, Spain), 15-16 ноября, 2018, С. 2176-2183.

			existing literature about ecosystem concept and Big data application.	
2	Electromagnetic pulse transformation by using radio waves		In this article we discuss the conversion of electromagnetic pulses and their obtaining by using radio waves. Wireless charging is gradually becoming popular among users. Nevertheless, it has one major drawback, which eliminates all the advantages. Now, in order to charge the gadget in this way, it is necessary to put it on top of the device. Prototypes of devices using signals of the television range, are able to stably communicate with each other at a distance of several meters. In addition, the energy received from the energy of radio waves is sufficient to ensure the operation of a small microcontroller that controls the operation of the device as a whole, and for the ignition of leds that signal the reception of data from another device.	Ashimov Yeskendyr Materials of International Scientific conference of students and young scientists "Farabi Alemi", Almaty, 2019. P.249.
3	Optimal design problem for three disks on torus		The geometrical-packing and physical-conductivity problems are stated in a periodic toroidal d-dimensional space with an arbitrarily fixed number n of nonoverlapping spheres per periodicity cell. All Delaunay graphs are divided into classes of isomorphic periodic graphs. For any fixed n, the number of such classes is finite. Energy E is estimated in the framework of structural approximations and reduced to the study of an elementary function of n variables. The minimum of E over locations of spheres is attained at the optimal packing within a fixed class of graphs. The optimal-packing location is unique within a fixed class up to translations and can be found from linear algebraic equations.	V. Mityushev, K.Dosmagulova, Zh.Zhunussova, Ashimov Ye. Materials of 13th International ISAAC congress August 2-6 Ghent Belgium p.63
4	Applying probability theory to neural networks		Using mathematical models to create an image of the human brain reproduction of machines by artificial intelligence. An artificial neural network consists of three components: input layer, hidden layers, output layer. Also, in the center of the neural network is the loss function. Which minimizes errors known as: quadratic, cross-entropy, adaboost, Kullback	Ashimov Yeskendyr Уфимская осенняя математическая школа – 2021. Материалы международной научной конференции, том 2. Г.Уфа, 6-9 октября 2021 г.

			distance. Loss function should not depend on the activation values of the neural network.	
5	Kazrivdyn: Toolkit for Measuring the Dynamics of Kazakhstan Rivers with a Graphics Based on Google Earth Engine	Doi.org/10.1109/SIST50301.2021.9465902	Now it is possible to control the change in the Width of the rivers of Kazakhstan using remote sensing. This article presents a platform called kazrivdyn, developed on the Google Earth Engine cloud computing platform, to monitor changes in the width of Kazakhstan's rivers over the past 20 years, with a graph for more accurate data. Due to the fact that in Kazakhstan there is a problem of reducing the Volume of water in rivers, identify the general trend of changing the volume of water, as well as turn prevention to prevent such phenomena as drought and pollution. This platform has been applied to the pool. This platform flows Through two countries, the darkest as the width of the river has changed since 1984. Kazrivdyn is a publicly available tool and can be used to solve scientific problems related to rivers, as well as to create applications for operational water resources management. The results obtained are close to Measurements taken using manual methods, and the application works for all rivers in Kazakhstan.	1.Assel Ospan, Madina Mansurova, Erkin Kakimzhanov, Baurzhan Aldakulov. Kazrivdyn: Toolkit for Measuring the Dynamics of Kazakhstan Rivers with a Graphics Based on Google Earth Engine. 2021 IEEE International Conference on Smart Information Systems and Technologies 28-30 April, 2021, Nur-Sultan. Https://doi.org/10.1109/SIST50301.2021.9465902
6	Microclimate Monitoring System for a Home Greenhouse as Part of ESP32	January - February 2020 ISSN: 0193 - 4120 Page No. 4564 - 4573	Abstract. This article is related to designing a home greenhouse monitoring system using WSN and iot technologies. Wireless Sensor Network (WSN) and Internet of Things (iot) technology are the most advanced IT technologies and provide fast and distributed data collection and monitoring in various industries and widespread access to use. The developed “Microclimate GH” system allows for accurate measurements and monitoring of the microclimate of the home mini-greenhouse in real time through a mobile application. Monitoring data can be stored in the cloud and displayed in the form of reports and graphs and will be available for analysis at any time. Three important processes are being implemented: cooling, watering and lighting. The results of graphs and histograms analysis help the user to timely and accurately identify microclimate violations and take the necessary measures.	Amantur Umarov, Murat Kunelbayev, Maxatbek Satymbekov, Gulzat Turken, Bagila Alimbayeva, Kulbarchin Imanzhanova, Laura Duisembayeva Article Info Volume 82 Page Number: 4564 - 4573 Publication Issue: January-February 2020

			The proposed system is implemented on the basis of the ESP32 microcontroller with built-in Wi-Fi and Bluetooth modules, which has a significant advantage over the analogue of the ESP8266. The developed system compares favourably with its other prototypes by its accessibility to a wide user, good communication quality, good design and construction. The economic effect of using the proposed technology amounted to 10,000 tenge, the payback period is 4 seasons.	
7	Combustion Model of a Dual-Fuel Diesel Engine	10.1002/ceat.202000553	A mathematical model is presented for the volumetric combustion of a homogeneous fuel mixture in compression-ignition and forced-ignition engines. With careful consideration of all combustion parameters, the profile of the burning rate has a two-peak structure. A simple nonlinear heat conduction problem was solved to illustrate the importance of including the isobaric process and heat conduction as functions of the temperature. The study shows that, when the pre-exponential parameter was chosen as a calibrated parameter, the ignition delay time significantly depends on the start of combustion and the pressure in the common rail, while the effect of the engine speed seems less noticeable. The results can be extended to quasi-sized combustion models.	Yao C., Tyulepberdinova G., Gu S. Chemical Engineering and Technology, 2021, 44(6), стр. 1025–1032 DOI:10.1002/ceat.202000553
8	Comparative analysis of numerical methods of the solution of a one dimensional inverse problem of acoustics		Nowadays, a large number of methods for solving inverse problems arising in electrodynamics and acoustics have been developed, but the development of practical systems is necessary to combine a large number of equations that contribute to the substantiation of numerical methods for solving various multidimensional problems. Therefore, the main goal of the work is a comparative analysis of statistical methods for solving the one-dimensional inverse acoustic problem, as well as in the search for acoustic resistance. To achieve this goal, the means of description and comparison, which contributed to the identification of the characteristics of acoustic impedance, were used. Also, the finite-difference solution method, the differential circuit circulation method, and the Landweber iteration method were used. It was established	Periodico Tche Quimica, 2020, 17(34), стр. 321–334 Tyulepberdinova G.A., Oralbekova Z.O., Gaziz G.G., Maxutova, B.A., Baitenova, S.A.

			that the inversion method of the difference scheme is expedient to apply in the case when additional information is known accurately enough, and the reconstructed solution is quite smooth. It was determined that if one of these conditions is violated, the method of reversing the difference scheme becomes unstable. The problems of the correctness of the issues for the wave equation with complex velocity in the one-dimensional and spatial cases were investigated. Formulas for solving these problems were obtained – analogs of classical formulas. Numerical computations show the kind of results that may be expected from the method under consideration. The materials of the paper imply the practical significance for the university teachers of the information technology specializations	
9	Gamification of hand rehabilitation process using virtual reality tools: Using leap motion for hand rehabilitation	10.1109/IRC.2017.76	Nowadays virtual reality (VR) technology give us the considerable opportunities to develop new methods to supplement traditional physiotherapy with sustain beneficial quantity and quality of rehabilitation. VR tools, like Leap motion have received great attention in the recent few years because of their immeasurable applications, whish include gaming, robotics, education, medicine etc. In this paper we present a game for hand rehabilitation using the Leap Motion controller. The main idea of gamification of hand rehabilitation is to help develop the muscle tonus and increase precision in gestures using the opportunities that VR offer by making the rehabilitation process more effective and motivating for patients.	(DOI:10.1109/IRC.2017.76, Scopus) Alimanova M., Borambayeva S., Kozhamzharova D., Kurmangaiyeva N., Ospanova D., Tyulepberdinova G., Gaziz G., Kassenkhan A.
10	Algorithm for Finding Feedback in a Problem with Constraints for One Class of Nonlinear Control Systems	DOI: 10.18255/1818-1015-2021-3-220-233	For a continuous nonlinear control system on a nite time interval with control constraints, where the right-hand side of the dynamics equations is linear in control and linearizablein the vicinity of the zero equilibrium position, we consider the construction of a feedback according to the Kalman algorithm. For this, the solution of an auxiliary optimal control problem with a quadratic functional is used by analogy with the SDRE approach. Since this approach is used in the literature to nd	M. G. Dmitriev, Z. N. Murzabekov, and G. A. Mirzakhmedova, “Algorithm for Finding Feedback in a Problem withconstraints for One Class of Nonlinear Control Systems”, Modeling and analysis of information systems, vol. 28, no. 3, pp. 220-233, 2021

			suboptimal synthesis in optimal control problems with a quadratic functional with formally linear systems, where all coecient matrices in dierential equations and criteria can contain state variables, then on a nite time interval it becomes necessary to solve a complicated matrix dierential Riccati equations, with state-dependent coecient matrices.	
11	Construction of Contro with Constraints fo Nonlinear Systems with Coefficients Depending on the Control Objec State	Https://doi.org/10.1007/s10958-020-04999-4	We consider an optimalcontrol problem on a finite time-interval for a three-sector economic control object. We reduce the economic system to an optimal control problem for a nonlinear system with coefficients independent of the control object state and find a nonlinear synthesizing control based on the feedback principle and certain constraints on control. The results obtained for the nonlinear system are used to construct the control parameters in the mathematical model of a three-sector economic control object. We find an optimal distribution between the labor and investment resources satisfying the balance relations.	Murzabekov, Z.N., Mirzakhmedova, G.A. Construction of Control with Constraints for Nonlinear Systems with Coefficients Depending on the Control Object State. J Math Sci 250, 76–82 (2020). Https://doi.org/10.1007/s10958-020-04999-4
12	Design of PI regulators for dynamic systems with constrained control and fixed endpoints of trajectories	Https://doi.org/10.2298/FIL1803091M	The problem of optimal control for time-varying linear systems with fixed endpoints of trajectories is considered. A corresponding quadratic objective functional depends on the control, the state of the object and on its integral. New technique of designing the PI controller for the automatic control systems with box constraints on values of control is proposed. The problem is solved by using Lagrange multipliers of a special type.	Murzabekov Zainel. Design of PI regulators for dynamic systems with constrained control and fixed endpoints of trajectories Filomat 2018 Volume 32, Issue 3, Pages: 1091-1096
13	Hardware implementation of the coding algorithm based on FPGA	DOI 10.1088/1757-899X/1047/1/012137	In this article, the efficient implementation multiplier of polynomials irreducible polynomials modulo for cryptographic encryption and decryption using FPGA is presented. For this, the Nexys 4 board based on the Artix-7 Field Programmable Gate Array (FPGA) from Xilinx was chosen. Verilog HDL is used to describe the circuit for reducing a number modulo. The results of a timing simulation of the device are presented in the form of time diagrams for a given 8-bit number, confirming the correct operation of the device. The developed	Hardware implementation of the coding algorithm based on FPGA Ibraimov, M.K., Tynymbayev, S.T., Park, J., Zhexebay, D.M., Alimova, M.A. IOP Conference Series: Materials Science and Engineering, 2021, 1047(1), 012137

			encryption algorithm on the basis of non-positional polynomial notations is intended for software, hardware, and also software and hardware implementation. The main hardware-implemented device in non-positional algorithm of the cryptographic transformation is a device for the multiplication of polynomials irreducible polynomials modulo, which produces routine calculations on data encryption. These mathematical operations are computationally intensive and fundamental arithmetic operations, which are intensively used in many fields such as cryptography, number theory, and finite field arithmetic.	
15	Mixed convection in a channel with buoyancy force over backward and forward facing steps: The effects of inclination and geometry	DOI 10.1016/j.csite.2021.101152	This paper presents the computational results of heat transfer for a 2D laminar flow with different channel tilts with forward facing step and backward facing step, taking into account buoyancy forces for various bottom wall lengths. The inclination angle influence on the distribution of velocity and temperature is investigated. The validated numerical algorithm was used to the problem forward and backward facing steps with buoyancy force and at various tilt angles. From the obtained numerical results, it can be noticed that the length of the lower part of the channel has a very strong effect on the flow fluctuation and temperature distribution over the entire channel. It should be noticed that the tilt angle also has a very strong effect on the distribution of flow and temperature. Thus, taking into account the buoyancy force changes the shape of the main recirculation region, but at the same time, regardless of the different tilt angles, the number of vortices does not change, but only the size of the vortices changes. It should also be noticed that when the buoyancy force is taken into account, cooling occurs more efficiently in the middle of the channel.	Issakhov, A., Zhandaulet, Y., Abylkassyomova, A., Sakypbekova, M., & Issakhov, A. (2021). Mixed convection in a channel with buoyancy force over backward and forward facing steps: The effects of inclination and geometry. Case Studies in Thermal Engineering, 26, 101152. Doi:10.1016/j.csite.2021.101152
16	Applications of parallel computing technologies for modeling the flow separation process	DOI 10.1007/978-3-030-12203-4_10	Taking into account the high rate of construction in the modem big cities, it is very important to save the natural aerodynamics between the buildings. It is necessary to explore the ventilation of space between architectural structures, making a preliminary prediction before construction starting. The most	Issakhov, A. ; Abylkassymova, A. ; Sakypbekova, M.Applications of parallel computing technologies for modeling the flow separation process behind the backward

	behind the backward facing step channel with the buoyancy forces		optimal way of evaluating is to build a mathematical model of air flow. This paper presents numerical solutions of the wind flow around the architectural obstacles with the vertical buoyancy forces. An incompressible Navier-Stokes equation is used to describe this process. This system is approximated by the control volume methodand solved numerically by the projection method. The Poisson equation that is satisfying the discrete continuity equationsolved by the Jacobi iterative method at each time step.For check correctness of mathematical model and numerical algorithm is solved test problem. The numerical solutions of the backward-facing stepflow with the vertical buoyancy forces, which was compared with the numerical results of other authors. This numerical algorithm is completely parallelized using various geometric domain decompositions (1D, 2D and 3D). Preliminary theoretical analysis of the various decomposition methods effectiveness of the computational domain and real computational experiments for this problem were made and the best domain decomposition method was determined. In the future, a proven mathematical model and parallelized numerical algorithm with the best domain decomposition method can be applied for various complex flows with the vertical buoyancy forces.	facing step channel with the buoyancy forces. Communications in Computer and Information sciencevolume 998, Pages 97 - 1132019 9th International Conference on Computational and Information Technologies in Science, Engineering and Education, citech 2018Ust-Kamenogorsk25 September 2018 through 28 September 2018Code 224169. Doi:10.1007/978-3-030-12203-4_10
18	Photoluminescence properties of znse:Al, znse:Cu nanoparticles obtained by chemical synthesis	DOI 10.1117/12.2536248	This work represents an effective method for synthesis and doping of znse nanocrystals with elements of group 3 and transition elements. The structure of crystals and their average size are determined. The spectra of optical density and photoluminescence were studied, and a comparative analysis of characteristics of the obtained nanoparticles with their bulk analogs was carried out.	Tepliakova, I.V., Nitsuk, Y.A., Brytavskyi, I.V., Kociubiński, A., Sakypbekova, M.Photoluminescence properties of znse:Al, znse:Cu nanoparticles obtained by chemical synthesis. Proceedings of SPIE - The International Society for Optical Engineering, 2019, 11176, doi: 10.1117/12.2536248

19	Interval arithmetic in calculations	DOI 10.1515/eng-2016-0036	Interval arithmetic is the mathematical structure, which for real intervals defines operations analogous to ordinary arithmetic ones. This field of mathematics is also called interval analysis or interval calculations. The given math model is convenient for investigating various applied objects: the quantities, the approximate values of which are known; the quantities obtained during calculations, the values of which are not exact because of rounding errors; random quantities. As a whole, the idea of interval calculations is the use of intervals as basic data objects. In this paper, we considered the definition of interval mathematics, investigated its properties, proved a theorem, and showed the efficiency of the new interval arithmetic. Besides, we briefly reviewed the works devoted to interval analysis and observed basic tendencies of development of integral analysis and interval calculations.	Bairbekova, Gaziza, Mazakov, Talgat, Djomartova, Sholpan and Nugmanova, Salima. "Interval arithmetic in calculations" Open Engineering, vol. 6, no. 1, 2016. Https://doi.org/10.1515/eng-2016-0036
20	Creating an algorithm of encryption based on prime numbers in positional systems of calculating residual classes	Doi:10.15199/48.2018.02.38	Building a secure local and remote data warehouse requires data transfer over network channels, identification and authentication of objects and subjects of information protection. Development of reliable and efficient cryptographic tools for information protection and security is needed. The goal is achieved through the development of encryption algorithms, formation and exchange of secret keys on the basis of the residual class system. In the article an unconventional algorithm of enciphering an electronic message of a given length consisting of two stages has been proposed.	Waldemar Wojcik, Maksat Kalimoldaev, Rustem Biyashev, Nursulu Kapalova, Ardak Akhmetova, Salima Nugmanova, Yelzhassar Mergenbayev PRZEGLĄD ELEKTROTECHNICZNY, ISSN 0033-2097, R. 94 NR 2/ P.164-169 https://doi:10.15199/48.2018.02.38
21	New technology of data transmission: Li-Fi		Motivated by the looming radio frequency (RF) spectrum crisis, this paper aims at demonstrating that optical wireless communication (OWC) has now reached a state where it can demonstrate that it is a viable and matured solution to this fundamental problem. In particular, for indoor	Sanida Yessenbek , Abdurazak Kasymov, Salima Nugmanova, Lidiya Taimuratova

			communications where most mobile data traffic is consumed, light fidelity (Li-Fi) which is related to visible light communication (VLC) offers many key advantages, and effective solutions to the issues that have been posed in the last decade. This paper discusses all key component technologies required to realize optical cellular communication systems referred to here as optical attocell networks. Optical attocells are the next step in the progression towards ever smaller cells, a progression which is known to be the most significant contributor to the improvements in network spectral efficiencies in RF wireless networks. In this paper we analyzed the Li-Fi system using an optisystem simulation tool. In this analysis, we considered two propagation models. In a LOS propagation model in the receiving end, we can regenerate approximated transmitted signal.	ARPN Journal of Engineering and Applied Sciences, ISSN 1819-6608 VOL. 15, NO. 24, DECEMBER 2020
22	Research of the ellipsoid area geometry illuminated by a point laser source	Doi.org/10.1117/12.2569781	The current state of poultry farming requires the development and application of modern technologies for daily young fledge. Young fledge of high quality guarantees the maximum profit of the production in case of its further growth. It is known that to obtain a healthy, high-immunity young fledge it is necessary to implement an effective process of the eggshell surface disinfection. Therefore, the search and development of highly efficient hatching egg disinfection technologies is an urgent task.	Imanbek Baglan, Saule Smailova, Doszhon Baitussupov, Oksana Pankova Proceedings Volume 11456, Optical Fibers and Their Applications 2020; 114560M (2020)
23	Метод мультистарта с детерминированным механизмом рестарта	Https://doi.org/10.21638/11701/spbu10.2020.202	Разработан и исследован метод решения некоторого класса задач глобальной оптимизации с интервальными ограничениями. Предложен алгоритм глобальной оптимизации, основанный на детерминированном	Амирханова Г. А., Горчаков А. Ю., Дуйсенбаева А.Ж., Посыпкин М.А. Метод мультистарта с детерминированным

			способе выбора стартовых точек для методов локального поиска. Для выбора стартовых точек алгоритм локального поиска (в данной работе покоординатного спуска) модифицирован таким образом, что метод одномерной минимизации возвращает множество найденных им локальных минимумов. Эффективность представленного алгоритма продемонстрирована на примере задачи минимизации энергии фрагмента плоской кристаллической решетки. Энергия межатомного взаимодействия рассчитана с помощью потенциала Терсоффа. Проведено экспериментальное сравнение разработанного алгоритма с классическим вариантом метода мультистарта, в котором для выбора стартовых используются равномерно-распределенные в параллелепипеде псевдослучайные точки. В качестве метода локального поиска в обоих случаях была взята одна из модификаций метода покоординатного спуска. Описанный метод может быть применен для часто встречающихся на практике задач с неизвестным аналитическим выражением для целевой функции.	механизмом рестарта / Вестник Санкт-Петербургского университета. Прикладная математика. Информатика. Процессы управления. – спб., 2020. – Т. 16. Вып. 2. – С. 100-111. – DOI: https://doi.org/10.21638/11701/spbu10.2020.202
24	Combustion process diagnosis and control using optical methods	Doi.org/10.1201/9781315281971-50	Additionally, fossil fuel depletion forces the use of renewable fuels such as biomass, where biomass is milled and burned simultaneously with coal in existing power stations. However, lowemission combustion techniques, including biomass co-combustion have negative effects: directlyinfluence on process control stability/efficiency and indirectly on combustion installations via increased corrosion or boiler slagging (Hein, 1998). These effects can be minimized using	B. Imanbek, A. Asembay, Y. Orakbayev & A. Kalizhanova Publication date/2018/10/26 Book:Environmental Engineering V/Pages 331-336/Publisher-CRC Press

			additional information about the process. Proper combustion monitoring (diagnosis) system ought to be applied (Koshymbaev, 2014), (Kotyra, 2010), (Pawłowski, 2016), (Shuvatov, 2012).	
25	An investigation of the educational curriculum with use of formal concept analysis	DOI-10.1109/SIST50301.2021.9465992	An educational curriculum is a path of learning that students should follow in their study. It consists of learning modules aimed at mastering skills and developing the necessary competencies within the qualification framework. Each module is logically completed and contains a set of related disciplines which responsible for certain group of competencies. Modularity is an attractive approach to organization of study since it provides variability and flexibility of a learning path. However, modularity significantly complicates the process of curriculum planning and developing. The goal of this work is to propose an efficient tool for planning and analysis of educational curricula, based on the mathematical apparatus of the lattice theory. We use formal lattices as a method of studying the consistency and coherence of an educational curriculum. The advantages of this method are clear algorithmization, restrictions on the inclusion of new entities and concepts, automated	Nugumanova A., Baiburin Y.a, Mansurova M., Alimzhanov Y. Proceedings of the 10th IADIS International Conference on Information Systems 2017, IS 2017 DOI-10.1109/SIST50301.2021.9465992

			construction of the hierarchy of relations, analysis of collisions. © 2017 IADIS Press.	
26	Named Entity Extraction Model Based on the Random Walk Method	DOI 10.1109/SIST50301.2021.9465992	In connection with the rapid development of Internet technologies, modern society in recent decades has experienced an information explosion characterized by an exponential increase in the volume of information, including low quality information. This work is intended to provide all interested parties with intelligent tools to support decision-making by automatically extracting knowledge from heterogeneous data sources, including the Internet. In the work, we examined the primary processing and morphological analysis of texts, implemented a random walk method to extract semantically related words. As a result of the calculations, we got a matrix with the affinities of words, as well as a dictionary that connects the word with the vector component. In addition, the neural network, trained to retrieve linguistic constructions, which include the possible values of descriptors of named text entities, was described in the work. © 2021 IEEE.	Mansurova M. Barakhnin V. Kyrgyzbayeva M. Kadyrbek N. SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies 28 April 2021 Номер статьи 94659922021 IEEE International Conference on Smart Information Systems and Technologies, SIST 2021Nur-Sultan28 April 2021 до 30 April 2021Код 171071 DOI 10.1109/SIST50301.2021.9465992
28	Health Monitoring System Using Internet of Things	DOI 10.1109/SIST50301.2021.9465928	The article is devoted to the technical means of monitoring the vital signs of patients. The four main vital signs routinely monitored at doctor's offices include heart rate, blood	Zholdas N. Postolache O. Mansurova M.

			pressure, respiration rate and body temperature. In the future, this system will be supplemented with sensors for measuring the health status of patients with diabetes. Many similar systems are known for measuring and monitoring blood sugar levels. The list of tasks they solve includes actively monitoring blood glucose levels and monitoring physical activity, diet and insulin consumption. Recent advances in diabetes technology and self-management applications have made it easier for patients to access relevant data. The capabilities of the Internet of Things (iot), information and communication technologies and machine learning help optimize costs in healthcare and the organization of online medical services. © 2021 IEEE.	SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies 28 April 2021 Номер статьи 94659282021 IEEE International Conference on Smart Information Systems and Technologies, SIST 2021Nur-Sultan28 April 2021 до 30 April 2021Код 171071 DOI-10.1109/SIST50301.2021.9465928
29	Emulation of x86 Computer on FPGA	DOI 10.1109/AIEEE51419.2021.9435812	It is well known that, emulation in the form of software is the predominant method for engineers to evaluate the capabilities of the studied microprocessors and embedded systems. There are three main criteria for evaluating a model using software tools: modeling speed, model accuracy, and model completeness. The increasing complexity of the processor and the tendency to have an increasing number of processors on the chip put a strain on simulators to achieve all of the above criteria, including accurate fixation of processes in the	Vyazigin Dyusembaev , Mansurova M. 2020 IEEE 8th Workshop on Advances in Information, Electronic and Electrical Engineering, AIEEE 2020 - Proceedings 22 April 2021 Номер статьи 94358128th IEEE Workshop on Advances in Information, Electronic and Electrical Engineering, AIEEE

			OS. Thus, the main task in our work is experiments-prototyping using an emulation system and analysis of the results of the described experiments, which satisfies all three criteria. The system is a Board with FPGA, RAM, ROM, real-time clock, DAC chips, and connectors for connecting a monitor, keyboard, and mouse manipulator soldered on it. The system is based on the FPGA Cyclone IV from ALTERA. Which, thanks to a sufficient number of logical cells, allows you to simulate not only a single processor, but also other components of the computer as a whole. Therefore, you can apply architectural changes to the processor and evaluate their impact on the entire system. We use this FPGA-based emulation system to validate the computer's FPGA emulation capabilities. The paper justified the possibility of emulating a computer on an FPGA and its ability to run real operating systems that are not stripped down. The novelty of this project is that unlike other similar projects, the system developed by us allows you to emulate a full-fledged personal computer with an x86 processor architecture, on the basis of which you can emulate more modern computers with processors. For example: Intel Atom or Intel Celeron. However, to achieve these goals, you will need to use a more developed FPGA,	2020Virtual, Vilnius22 April 2020 до 24 April 2020Код 169117 DOI-10.1109/AIEEE51419.2021.9435812

			based on the methodology proposed in this paper. © 2021 IEEE.	
30	Development of Web Application for Visualizing City Emergencies	DOI 10.1109/SIST50301.2021.9465919	To solve problems with emergencies, you need to have an idea in which regions more different emergencies occurred, in order to identify some kind of report and analysis. It is also not enough to have only the location of the emergency itself, you need to have different types of information about the emergency itself. This work describes a system that displays different types on a map with the necessary information about from sources of news sites. Randomforest and xgboost machine learning methods were used for forecasting. With the help of the geographic information system, types of emergencies are visualized on the maps of the city of Almaty. All visualization algorithms and technologies are implemented in Python. © 2021 IEEE.	Akhmed-Zaki D. Mansurova M. Yertuyak A. Chikibayeva D. SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies 28 April 2021 Номер статьи 94659192021 IEEE International Conference on Smart Information Systems and Technologies, SIST 2021Nur-Sultan28 April 2021 до 30 April 2021Код 171071
31	The Problem of Named Entities Unification based on Geographical Ontologies	DOI 10.1109/AIEEE51419.2021.9435777	The subject of this research is to develop a system for extracting knowledge from both semi-structured and unstructured data and filling with this system a knowledge base that would provide support for decision-making on any problematic issues. The article deals with the problem of	Sarsembayeva T. Mansurova M. Chikibayeva D. Karymsakova D. 2020 IEEE 8th Workshop on Advances in Information, Electronic and Electrical Engineering, AIEEE 2020 - Proceedings 22 April 2021 Номер статьи 94357778th

			unification of named entities based on geographical ontologies. © 2021 IEEE.	IEEE Workshop on Advances in Information, Electronic and Electrical Engineering, AIEEE 2020Virtual, Vilnius22 April 2020 до 24 April 2020Код 169117 DOI-10.1109/AIEEE51419.2021.9435777
32	Technologies for automation creation of an ontology of urbanonyms in the aspect of historical changes (on the example of Almaty)	DOI 10.1088/1742-6596/1727/1/012015	When creating geoinformation systems of a city scale, relation this or that information from Internet, there comes the task of creation an ontology of urbanonyms taking into account their historical changes. The account of historical changes is necessary, for example, to process messages about urban event from blogs: since more and more representatives of the middle and older generations are becoming active Internet users, the massages often contain the former names of urbanonyms. Let us note that it is the accounting of historical changes that is required to solve this problem thatdetermines the need to create not a thesaurus, which is sufficient, as shown in [1], to take into account geographical names commonly used (at least in natural science articles) in their	Barakhnin V., Mansurova M., Dossanov B., Kyrgyzbayeva M. Journal of Physics: Conference Series Открытый доступ Том 1727, Выпуск 119 January 2021 Номер статьи 0120152020 Big Data and Artificial Intelligence Conference, BDAY 2020Moscow, Virtual17 September 2020 до 18 September 2020Код 167120 DOI-10.1088/1742-6596/1727/1/012015

			actual from, but an ontology. Taking into account the specifics of the task of creating an ontology of Almaty,in should be bilingual: in the Kazakh and Russian languages. © Published under licence by IOP Publishing Ltd.	
33	Parallel news clustering and topic modeling approaches	DOI 10.1088/1742-6596/1727/1/012018	At the current age there is an urgent need in developing massively scalable and efficient tools to Big Data processing. Even the smallest companies nowadays inevitably require more and more resources for data processing routines that could enhance decision making and reliably predict and simulate different scenarios. In the current paper we present our combined work on different massivelyscalable approaches for the task of clustering and topic modeling of the dataset, collected by crawling Kazakhstan news websites. In particular, we propose Apache Spark parallel solutions to news clustering and topic modeling problems and, additionally, we describe results of implementing document clustering using developed partitioned global address space Mapreduce system. In our work we describe our experience in solving these problems and investigate the efficiency and scalability of theproposed solutions. © Published under licence by IOP Publishing Ltd.	Shomanov A.S. Mansurova M.E. Journal of Physics: Conference Series Открытый доступ Том 1727, Выпуск 119 January 2021 Номер статьи 0120182020 Big Data and Artificial Intelligence Conference, BDAY 2020Moscow, Virtual17 September 2020 до 18 September 2020Код 167120

34	Algorithmic Approach to Building a Route for the Removal of Household Waste with Associated Additional Loads in the “Smart Clean City” Project	DOI 10.1007/978-3-030-88081-1_56	Growing population in urban areas has led to the necessity of solving the problem of targeted municipal garbage collection. In the smart city Optimization problem for complex smart city dynamic systems is one of the most important elements for garbage collection analysis. The paper contributes with a mathematical model for solving optimization problems and transport scheduling for the targeted garbage collection is suggested, which is a part of a wide range of “Smart City” concepts. The model is based on the apparatus of network optimization algorithms. The possibility of additional loading of the garbage truck during waste collection is the basis for optimizing the parameters of the entire process. As optimization criteria, the cost of the services rendered, the weight of the removed waste, and the reduction in idle run can be considered. © 2021, Springer Nature Switzerland AG.	Dolinina O. Pechenkin V. Mansurova M. Tolek D. Ixsanov S Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)Том 12876 LNAI, Страницы 745 - 7552021 13th International Conference on Computational Collective Intelligence, ICCCI 2021Virtual, Online29 September 2021 до 1 October 2021Код 266349 DOI 10.1007/978-3-030-88081-1_56
35	Understanding Bike Sharing Stations Usage with Chi-Square Statistics	DOI 10.1007/978-3-030-88113-9_34	Bike sharing systems have both great potential and great challenge for the development of smart and green urban environment. Many problems, arising from design and operation of bike sharing systems, have no easy solutions and call for complex mathematical models. Nowadays, there are a	Nugumanova A. Maulit A. Mansurova M. Baiburin Y. Communications in Computer and Information Science Том 1463, Страницы 425 - 4362021 13th

			lot of sophisticated methods for understanding and administration of bike sharing systems, based on Data mining techniques, graph computations, temporal networks models, etc. At the same time, as the digitalization is accelerating, easy and affordable old-school methods are often overlooked. This paper presents a simple but efficient Chi-square test for analyzing bike sharing stations usage in mornings and evenings. The proposed method determines stations that keep the same usage patterns over time. Experiments conducted on citibike trip data for New York City's bike sharing service, have shown promising performance of the proposed method. © 2021, Springer Nature Switzerland AG.	International Conference on Computational Collective Intelligence, ICCCI 2021Virtual, Online29 September 2021 до 1 October 2021Код 266459 DOI 10.1007/978-3-030-88113-9_34
36	Development of the information system for the Kazakh language preprocessing	DOI 10.1080/23311916.2021.1896418	The aim of this work is the design and development of linguistic resources and preprocessing tools for the Kazakh language. The media-corpus of the Kazakh language is presented as a linguistic resource, which is available on Al-Farabi Kazakh National University platform. The media-corpus of the Kazakh language consists of texts of news content and is implemented as an information system. The general architecture of an information system for the automatic and reliable collection, storage and analysis of texts in the Kazakh language is described. Three automatic text	Akhmed-Zaki D. Mansurova M. Madiyeva G. Kadyrbek N. Kyrgyzbayeva M. Cogent Engineering Открытый доступтом 8, Выпуск 12021 Номер статьи 1896418 DOI 10.1080/23311916.2021.1896418

			preprocessing tools for the Kazakh language–word forms generator, morphological analyzer, and morphological disambiguation tool–are presented in the article. The proposed tools can also be applied in the systems of automatic analysis of texts, in creation of other linguistic resources such as thesauri and ontologies. © 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.	
37	Unsupervised keyword extraction using non-smooth NMF	-	In this paper, we introduce a novel unsupervised method for keyword extraction, based on non-smooth nonnegative matrix factorization. We generate a document-term matrix from a given corpus and factorize it into the product of two special matrices: documents-by-topics and topics-by-terms. In our method, we choose a low degree of factorization (k=3,4,5) and use only topics-by-terms matrix to extract top N keywords for each of k topics. Then we merge these obtained N*k keywords into a resulting keyword list excluding duplicates and assign keywords to documents. We validate our method with a large text corpora: “Introduction to information retrieval” textbook (by Manning, Raghavan and Schütze), available online. The result of our method is compared with three popular unsupervised keyword extraction algorithms: textrank, Rake	Nugumanova A. Ahmed-Zaki D. Mansurova M Baiburin Y. Apayev K. Maulit A. Journal of Theoretical and Applied Information Technology Том 98, Выпуск 22, Страницы 3583 - 359630 November 2020

			and Yake. The experiments confirm that the proposed method shows the promising performance in terms of precision, recall and F-measure with respect to various number of candidate keywords. © 2020 Little Lion Scientific. All rights reserved.	
38	Creation of a Dependency Tree for Sentences in the Kazakh Language	DOI 10.1007/978-3-030-63007-2_55	In the semantico-syntactic analysis of great importance is understanding of its formal structure. For this, in the text it is necessary to distinguish units of lexical meaning and designate the types of relations between them. The dependency tree is an indispensable tool for parsing sentences and determination of hierarchical relationships between the main components in it. In this work, an algorithm for constructing a dependency tree for sentences in the Kazakh language using the filter method is proposed. The dependency tree was created on the basis of the spinning tree from the oriented graph constructed according to the rules of syntactic relationship in the Kazakh language. © 2020, Springer Nature Switzerland AG.	Akhmed-Zaki D. Mansurova M. Kadyrbek N. Barakhnin V. Misebay A. Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)Том 12496 LNAI, Страницы 709 - 7182020 12th International Conference on Computational Collective Intelligence, ICCCI 2020Da Nang30 November 2020 до 3 December 2020Код 252179 DOI 10.1007/978-3-030-63007-2_55

39	Development of Kazakh Named Entity Recognition Models	DOI 10.1007/978-3-030-63007-2_54	Named entity recognition is one of the important tasks in natural language processing. Its practical application can be found in various areas such as speech recognition, information retrieval, filtering, etc. Nowadays there are a variety of available methods for implementing named entity recognition. In this work we experimented with three models and compared the performances of machine learning based models and probabilistic sequence modeling method on the task of Kazakh language named entity recognition. We considered three models based on BERT, Bi-LSTM and CRF baseline. In the future these models can be parts of an ensemble learning system for name entity recognition in order to achieve better performance results. © 2020, Springer Nature Switzerland AG.	Akhmed-Zaki D. Mansurova M. Barakhnin V. Kubis M. Chikibayeva D. Kyrgyzbayeva M Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)Том 12496 LNAI, Страницы 697 - 7082020 12th International Conference on Computational Collective Intelligence, ICCCI 2020Da Nang30 November 2020 до 3 December 2020Код 252179 DOI 10.1007/978-3-030-63007-2_54
40	Solving of classification problem in spatial analysis applying the technology of gradient boosting catboost	-	In the paper two models of spatial analysis are considered. The models are dedicated for spatial analysis of ecological factors distribution, such as distribution of contaminant concentration on researched territory. The models are created	Safarov R.Z Shomanova Z.K Nossenko Y.G

			using the method of machine learning - gradient boosting. In order to build the models we have used open source effective library catboost. Functions AUC and Accuracy were calculated for each model. Multiclass - integrated function of catboost library was used for loss minimization. For solving the problem, it was necessary to define affiliation of searched point from test dataset to one of four classes. This problem belongs to the type of classification, or rather multiclassification. As a result of the studies, an effective model was obtained that allows one to perform with sufficient accuracy the spatial forecast of the factor distribution at points and regions of the studied field with an unknown gradient value of this factor. This model works adequately with a training dataset of 0.5% of all analyzed information about the object.	Berdenov Z.G Bexeitova Z.B Shomanov A.S. Mansurova M. Folia Geographica Том 62, Выпуск 1, Страницы 112 - 1262020 ISSN-13366157
41	Investigation of gold electrosorption onto gold and carbon electrodes using an electrochemical quartz crystal microbalance	DOI 10.18321/ectj885	The adsorption behavior of Au3+ ions on metal electrodes has been studied using an electrochemical quartz crystal microbalance combined with the cyclic voltammetry technique. The experiments were carried out for haucl4 using 0.1 mol·L-1 hcl (ph~1) as a background electrolyte solution. The kinetics of electroreduction of Au3+ ions on the rice husk based activated carbon and gold electrodes in chloride	Mansurov Z. Supiyeva Z. Avchukir K. Taurbekov A. Yeleuov M. Smagulova G. Mansurova M. Biisenbayev M. Pavlenko V. Eurasian Chemico-Technological Journal Открытый доступ Том 21,

			electrolytes by the cyclic voltammetry and the electrochemical quartz crystal microbalance with a variation of the scan rate in the range of 5–50 mv·s-1 has been studied. The diffusion coefficient of Au3+ ions for the tested solution on gold and carbon electrodes was determined by the cyclic voltammetry method on the basis of the Randles-Ševčik equation. It is found that electroreduction of gold goes − via the discharge of aucl4 complexes to the formation of metallic gold with a current efficiency of 97–99%. The scanning electron microscopic images of the gold adsorbed carbon surface was taken to see gold particles and their morphology. In SEM images, it is clearly seen that the surface of carbon has a relief structure and gold has grown in the form of clusters. The smallest gold nanoparticles that could be examined were 100–250 nm in diameter on the surface of the carbon electrode. © 2019 Eurasian Chemico-Technological Journal.	Выпуск 4, Страницы 283 – 2892019 ISSN-15623920 DOI-10.18321/ectj885
42	Emulation of x86 Computer on FPGA	10.1109/AIEEE51419.2021.9435812	It is well known that, emulation in the form of software is the predominant method for engineers to evaluate the capabilities of the studied microprocessors and embedded systems. There are three main criteria for evaluating a model using software tools: modeling speed, model accuracy, and model completeness. The increasing complexity of the processor	Vyazigin S., Dyusembaev A., Mansurova M. 8th IEEE Workshop on Advances in Information, Electronic and Electrical Engineering, AIEEE 2020

			and the tendency to have an increasing number of processors on the chip put a strain on simulators to achieve all of the above criteria, including accurate fixation of processes in the OS. Thus, the main task in our work is experiments-prototyping using an emulation system and analysis of the results of the described experiments, which satisfies all three criteria. The system is a Board with FPGA, RAM, ROM, real-time clock, DAC chips, and connectors for connecting a monitor, keyboard, and mouse manipulator soldered on it. The system is based on the FPGA Cyclone IV from ALTERA. Which, thanks to a sufficient number of logical cells, allows you to simulate not only a single processor, but also other components of the computer as a whole. Therefore, you can apply architectural changes to the processor and evaluate their impact on the entire system. We use this FPGA-based emulation system to validate the computer's FPGA emulation capabilities. The paper justified the possibility of emulating a computer on an FPGA and its ability to run real operating systems that are not stripped down. The novelty of this project is that unlike other similar projects, the system developed by us allows you to emulate a full-fledged personal computer with an x86 processor architecture, on the basis of which you can emulate more modern computers with processors. For	10.1109/AIEEE51419.2021.9435812

			example: Intel Atom or Intel Celeron. However, to achieve these goals, you will need to use a more developed FPGA, based on the methodology proposed in this paper. © 2021 IEEE.	
43	Study of the innovations diffusion on the base of naming game mathematical model	10.6084/ijact.v9i1.1036	The innovation diffusion is the research issue being a subject of multiple research works in the recent years. The goal of the innovation diffusion theory is to explain the way, new ideas and practices are spread among the social system's members. The major part of the existing models is based on parameters determining the process of innovation adoption and simple mathematical functions focused on the observation and description of diffusion models. These models allow researching the process of diffusion more accurately, but its use foresees the evaluation of diffusion coefficients obtained as a rule from the empirical data of chronological rows. This may cause some trouble, for example, when the data is insufficient or missing. The paper considers the process of innovations distribution in the social community based on the Naming Game Model. Numerous experiments have been conducted and main scenarios of the innovation diffusion in the social system are identified. There is a suggestion to apply an alternative approach to modeling	Murzakhmetov A. Dyusembaev A. Umbetov U. Abdimomynova M. Shekeyeva K. Compusoft Том 9, Выпуск 1, Страницы 3547 – 35512020 ISSN-23200790 DOI-10.6084/ijact.v9i1.1036

			the innovation diffusion in order to overcome some issues typical of the existing models. © National Institute of Science Communication and Information Resources (NISCAIR).	
44	Neural Network Construction for Recognition Problems with Standard Information on the Basis of a Model of Algorithms with Piecewise Linear Surfaces and Parameters	10.1134/S1064562419050041	Abstract: For recognition problems with standard information, a neural network reproducing computations performed by a correct algorithm is constructed on the basis of the operator approach and a model of algorithms with parameters and piecewise linear surfaces. © 2019, Pleiades Publishing, Ltd.	Zhuravlev Y.I. Dyusembaev A.E Doklady Mathematics Том 100, Выпуск Страницы 411 - 4151 September 2019 ISSN-10645624 DOI-10.1134/S1064562419050041
45	Construction of a Correct Algorithm and Spatial Neural Network for Recognition Problems with Binary Data	10.1134/S0965542518100068	Abstract: Conditions under which it is possible to design a correct algorithm and a six-level spatial neural network reproducing the computations performed by this algorithm for recognition problems with binary data (Ω-regular problems) are found. A distinctive feature of this network is the use of diagonal activation functions in its internal layers, which significantly simplify intermediate computations in the inner and outer loops. Given an Ω-regular problem, the network sequentially computes the rows of the classification matrix for the test sample objects. The computational process (i.e., the inner loop) for each test object consists inside the elementary 3-level network (i.e., μ-block) of a single iteration determined	Dyusembaev A.E Grishko M.V. 58(10), с. 1673-1686 Computational Mathematics and Mathematical Physics Том 58, Выпуск 10, Страницы 1673 - 16861 October 2018 10.1134/S0965542518100068

			by a single object of the training set. The proposed approach to the neural network construction does not rely on the conventional approach based on the minimization of a functional; rather, it is based on the operator theory developed by Zhuravlev for solving recognition and classification problems. © 2018, Pleiades Publishing, Ltd.	
46	On Correctness Conditions for Algebra of Recognition Algorithms with μ-Operators over Pattern Problems with Binary Data	10.1134/S1064562418060078	The concept of an Ω-weakly regular problem is introduced. On the basis of the Zhuravlev operator approach combined with the neural network paradigm, it is shown that, for each such problem, a correct algorithm and a six-level spatial neural network reproducing the computations executed by this algorithm can be constructed. Moreover, the set of Ω-weakly regular problems includes the set of Ω-regular problems. It turns out that a three-level spatial network (μ-block) is a forward propagation network whose inner loop under estimation of the class membership for each test object consists of a single iteration. As a result, the amount of computations required for the six-level network is reduced noticeably. © 2018, Pleiades Publishing, Ltd.	Dyusembaev A.E Grishko M.V. Doklady Mathematics Том 98, Выпуск 2, Страницы 421 - 4241 September 2018 10.1134/S1064562418060078
47	Expansion of ideas and processes in social and biological communities	10.32523/2306-6172-2018-6-4-17-28	Most modern technological, social and information systems can be viewed as a complex system with a set of interacting components. Modeling the interaction of these components is	Fedotov.A.M,Dyusembaev A.E,Murzakhmetov A.N

			of considerable interest [1-4]. The paper has been investigated the expansion of ideas under different initial conditions. The constructions of analytical solutions the equations allows to determine of the saturation conditions for the solutions which have been founded. The effect of standing waves since the presence of a diffusion term in the equation of cellular automata is founded. In the numerical modeling of the processes of the dissemination of ideas, a fact of "spotting" was found - the grouping (clustering) of agents with the same ideas. For the biological population, the phenomenon of "spotting" was first noticed by A.A. Lyapunov. © 2018, L.N. Gumilyov Eurasian National University.	Eurasian Journal of Mathematical and Computer Applications Том 6, Выпуск 4, Страницы 17 – 28 10.32523/2306-6172-2018-6-4-17-28
48	End-to-End Model Based on RNN-T for Kazakh Speech Recognition	1109/ICCCI51764.2021.9486811*87	Automatic speech recognition is a rapidly developing area in chine learning. The most popular speech recognition systems ay are end-to-end systems, especially those models that ctly output a sequence of words taking into account the input nd in real time, which are online end-to-end models. Stream ech recognition allows to transfer the audio stream to speech-ext conversion and get the results of stream speech recognition eal time as the audio is processed. This article discusses and lements a popular RNN-T-based model for recognizing zakh speech. The analysis of works related to recognition of	Orken Mamyrbayev, Dina Oralbekova, Aizat Kydyrbekova, Tolganay Turdalykyzy, Akbayan Bekarystankyzy International Conference on Computer Communication and the Internet (ICCCI) June 25-27, 2021, Nagoya, Japan, -P. 163 – 167.

			zakh speech based on the CTC model is also given. The lings demonstrated that an RNN-T-based model can work well hout additional components, like a language model and showed best outcome on our dataset. As a result of the research, the tem reached 10.6% CER, which is the best indicator among er end-to-end systems for recognizing Kazakh speech. © 2021 E.	
49	Transient analysis in 1st order electrical circuits in violation of commutation laws	World Transactions on Engineering and Technology Education 10.15199/48.2021.09.05	The paper considers the usage of non-standard analysis mathematical apparatus to solve some non-trivial problems of electrical engineering theory. The axiomatics of non-standard analysis makes it possible to simplify the transient analysis in the 1st order electrical circuits in violation of the commutation laws. Examples of solving such problems are given. © 2021 Wydawnictwo SIGMA-NOT. All rights reserved.	Orken Mamyrbayev,V. V. Kukharchuk, S. V. Pavlov. S. Sh. Katsyv, A. M. Koval, V.S. Holodiuk, M. V. Lysyi, A. Kotyra, A. Kalabayeva
97	Single-Word Speech Recognition using Convolutional CNN Neural Networks			Psychology and education.-2021. Volume 2. №. 58. P. 10572 - 10576. Nurbapa Mekebayev, Orken Mamyrbayev, Dina Oralbekova, Madiyar Tasbolatov

	Metrological features of a pathospecific device for the diagnostic of glaucoma		The chapter describes the structure of the pathospecific device for the diagnosis of glaucoma. Performed a description of the phase space is given and a metrological analysis of the errors possible with the use of such an installation. Using of such devices can improve the quality of glaucoma diagnostics and increase the productivity of diagnostic physicians. © 2021 Taylor & Francis Group, London, UK.All right reserved.	O.A. Avdeyuk, Yu.P. Mukha, D.N. Avdeyuk, M.G. Skvortsov, Z. Omiotek, R. Dzier˙zak, M. Dzie´nkowski, A. Kozbakova Information Technology in Medical Diagnostics III. – 2021. February 10, P. 15-25.
	Output Tracking Control for High-Order Nonlinear Systems with Time Delay via Output Feedback Design	Https://doi.org/10.3390/sym13040675	Design approach of an output feedback tracking controller is proposed for a class of high-order nonlinear systems with time delay. To deal with the time delays, an appropriate Lyapunov– Krasovskii the tracking analysis is ingeniously constructed, and an output feedback tracking controller is designed by using a homogeneous domination method. It is shown that the proposed output controller independent of time delay can make the tracking error be adjusted to be sufficiently small and render all the trajectory of the closed-loop system as bounded. An example is given to illustrate the effectiveness of the proposed method. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.	Keylan Alimhan,G. A. Abdenova,A. Akmetkalyeva Symmetry. - 2021. Volume 675. P. 1 - 13.
	Automatic Multilingual Ontology Generation Based on Texts		Nowadays, the explosive growth of textual information on computer networks has made the automatic ontology	Nina Khairovaa, Anastasiia Kolesnyka, Orken Mamyrbayev,

	Focused on Criminal Topic		generation from the text a very up-and-coming research area. The main reason for this is that usage of ontologies can produce efficient and beneficial in such different applications as information extraction, question answering systems, information retrieval and many others. However, the manual creation of ontologies is a time-consuming and costly process. Accordingly, over the past few years, many approaches tried to automate ontologies generation based on textual data have appeared. This paper suggests the approach to automated multilingual ontology generation that covers the domain focused on the criminal topic. The approach is based on the three basic components: multilingual synonym dictionary, themultilingual and parallel text corpora focused on criminal topics and the logical-linguistic model of facts extraction from texts. This paper shows these basic components created for four languages: English, Ukrainian, Kazakh and Russian. In addition, it also discusses the ontology construction process that includes all of these three mentioned essential components.	Galiya Ybytayeva, Yuliia Lytvynenko 5th International Conference on Computational Linguistics and Intelligent Systems. April 22–23, 2021, Kharkiv, Ukraine, - P. 1-10.
	Kaznewsdataset: Single country overall digital mass media publication corpus	.3390/data6030031	ss media is one of the most important elements influencing the rmation environment of society. The mass media is not only a rce of information about what is happening but is often the	Yakunin K.,Kalimoldayev M.,Mukhamediev R.I.,Mussabayev R.Barakhnin

			hority that shapes the information agenda, the boundaries, and ms of discussion on socially relevant topics. A multifaceted and, ere possible, quantitative assessment of mass media formance is crucial for understanding their objectivity, tone, matic focus and, quality. The paper presents a corpus of zakhstan media, which contains over 4 million publications from primary sources (which has at least 500 publications). The pus also includes more than 2 million texts of Russian media comparative analysis of publication activity of the countries, o about 4000 sections of state policy documents. The paper efly describes the natural language processing and multiple-eria decision-making methods, which are the algorithmic basis he text and mass media evaluation method, and describes the ults of several research cases, such as identification of paganda, assessment of the tone of publications, calculation of level of socially relevant negativity, comparative analysis of lication activity in the field of renewable energy. Experiments firm the general possibility of evaluating the socially significant vs, identifying texts with propagandistic content, evaluating the timent of publications using the topic model of the text corpus ce the area under receiver operating characteristics curve OC AUC) values of 0.81, 0.73 and 0.93 were achieved on vementioned tasks. The described cases do not exhaust the	V.Kuchin,Murzakhmetov S.Buldybayev T.Ospanova U,Yelis M.,Zhumabayev A.,Gopejenko V.

			ssibilities of thematic, tonal, dynamic, etc., analysis of the nsidered corpus of texts. The corpus will be interesting to earchers considering both multiple publications and mass dia analysis, including comparative analysis and identification common patterns inherent in the media of different countries.	
	Study of the mathematical model of Kazakhstan's electricity system	1109/codit49905.2020.9263947	recent years, with the continued growth of energy demand, lligent energy systems have become a common choice for the rld's energy to meet the challenges of the future. This article sents the current state of the electric power system of zakhstan on the basis of a mathematical model. The production l consumption of electricity in Kazakhstan has been studied, l a mathematical model for the stabilization of the power system s been developed. The numerical solution of this problem is ained using multistep methods of Adams-Bashforth and ams-Moulton and graphical results are shown.	Kalimoldayev M,Abdildayeva A,Zhukabayeva T.7th International Conference on Control, Decision and Information Technologies, codit 2020Страницы 604 - 60929 June 2020 Номер статьи 92639477th International Conference on Control, Decision and Information Technologies, codit 2020Prague29 June 2020 до 2 July 2020Код 165461 1109/codit49905.2020.9263947
	Robot Singular Motion at Onward Travelling and Kinematics Problem Solving and Covering of Workspace and Global Asymptotic Control	10.1109/ICECCE49384.2020.9179428	In this paper, we consider the plane motion of a mobile platform of a 3RPR type robot with three degrees of freedom [3]. For each time point, it is required to solve the minimization problem. The requirement of constancy of the rotation angle of the platform is obtained. Jacobian is used when moving from the speeds of actuators to the generalized speeds of the working tool. The method of the non-uniform coverings is applied for a	Kalimoldayev M,Mukanova B,Akhmetzhanov M,Kunelbayev M.2nd International Conference on Electrical, Communication and Computer Engineering, ICECCE 2020 June 2020 Номер статьи 9179428

			planar parallel robot of 3RPR type. The coverings of the workspace are constructed for different rotation angles of the robot's mobile platform. Volumes of the workspace at different rotation angles were calculated. The dependence of the number of covering elements on the approximation tolerance and the length of the linking rods was analyzed. Control actions that ensure stabilization of intelligent electric power systems have been found. © 2020 IEEE.	
	FPGA Implementation of Encryption Algorithms Based on Residual Polynomials	10.1109/ELNANO50318.2020.9088890	This paper describes an encryption algorithm based on a polynomial system of residual classes. We study the FPGA bitstream implementation on the Xilinx and 16-nm ultrascale™ ASIC architecture which enables floating-point operation, multi-processing, parallelism, pipelining, highperformance computing, etc. The software-based bitstream encryption and on-chip decryption are performed with the stored encryption key and encrypted bitstream, generated by a Vivado tool. The self-authenticating algorithms with a symmetric key are investigated. The encryption algorithms are implemented using the polynomial system of residual numbers. Data encryption in a residual number system is effectively implemented by asics. Design of irreducible polynomial is proposed and discussed.	Kalimoldayev M,Tynymbayev S,Magzom M,Tananova D,Lyshevski S.E.2020 IEEE 40th International Conference on Electronics and Nanotechnology, ELNANO 2020 - Proceedings Страницы 667 - 671

			Our developments and findings are empowered by the low-power finfet FPGA architecture.	
	Mobile composite wind power plant with diffuser	0.32014/2020.2518-170X.101	This research focuses on the stage of engineering a technical prototype of a composite wind power plant with a diffuser (WPPD). The area of a particular interest in the article is the mathematical aspect of the engineering stage. The article presents a theoretical study as well as experimental and practical data essential to obtain an effective shape of the diffuser. Here are also given engineering calculations and results of patent researches and field tests. The authors calculate the most rational design parameters capable of ensuring the maximum speed in the area of the blades. This leads to an increase in the generated electricity, since it depends on the speed cubed. The increase in speed is stipulated by the passage of the air flow through the narrow part of the diffuser into the area of expansion and is consistent with the Bernoulli equation. The differential equation relates the flow velocity to the cross-sectional area of the diffuser. It should be noted that its inner part is the surface of rotation of the generatrixes around the axis of the diffuser. The surface shape can be adjusted based on the obtained mathematical calculations. In the research, these curves are described in the	Baishagirov K.Z,Kalimoldayev M,Karimbayev T.D,Omarov B.M,Yermaganbetova S.K. News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences Открытый доступтом 5, Выпуск 443, Страницы 30 - 38

			form of polynomials of various degrees. After integrating the differential equation for each curve individually the best option is selected. Here is also given an example with a quadratic function, which was experimentally substantiated in earlier researches and is used to compare the effects received from different generators. The described technology, with account taken of the shape of the generator fairings, contributes to the further improvement of the WPPD. The article serves as the basis for engineering a technical prototype of a mobile composite WPPD.	
	[Assessment of the knowledge quality level based on fuzzy models of its acquisition processes] [(Ocena poziomu jakości wiedzy na bazie rozmytych modeli procesów jej zdobywania)]	15199/48.2020.09.24	To assess the quality of knowledge acquisition by students of technical universities and to acquire relevant competencies, it is proposed to apply the idea of integrating education and the fuzzy mathematical model, supplemented by a procedure of probabilistic processing of fuzzy values. The fuzzy mathematical model is synthesized in the form of the Mamdani knowledge base, whose language variables characterize various parameters of the process of knowledge acquisition by students. A technique of assessing the quality of the knowledge acquisition process with the use of a synthetic model and suggested efficiency evaluation criteria have been	Mokin B.I,Mokin O.B,Kosaruk O.M,Kalimoldayev M,Wójcik W,Muslimov K.Przeglad Elektrotechniczny Том 96, Выпуск 9, Страницы 114 – 1192020 ISSN-00332097 10.15199/48.2020.09.24

			developed. The testing of the suggested model and technique was performed in Vinnytsia National Technical University, the results of testing proved their efficiency. © 2020 Wydawnictwo SIGMA-NOT. All rights reserved.	
	The device for multiplying polynomials modulo with analysis of two least significant bits of the multiplier per step	10.32014/2020.2518-170X.60	We consider a device for multiplying polynomials modulo where two bits of the polynomial multiplier are analyzed per multiplication step. Such a device can serve as the basic unit for building cryptosystems based on non-positional polynomial number systems, where the binary representation of the polynomial multiplicand can show a fragment of the encrypted text, and the binary representation of the polynomial multiplier can serve as a secret key. The module is a binary representation of the irreducible polynomial of these two polynomials. © 2020, National Academy of Sciences of the Republic of Kazakhstan. All rights reserved.	Kalimoldayev M,Tynymbayev S,Gnatyuk S,Ibraimov M,Magzom M.News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical sciencesоткрытый доступтом 3, Выпуск 441, Страницы 102 - 1092020
	Analysis of modern approaches for the prediction of electric energy consumption	10.1515/eng-2020-0028	A review of modern methods of forming a mathematical model of power systems and the development of an intelligent information system for monitoring electricity consumption. The main disadvantages and advantages of the existing modeling approaches, as well as their applicability to the energy systems of Ukraine and Kazakhstan,are identified. The main factors that affect the dynamics of energy consumption are identified. A list	Kalimoldayev M,Drozdenko A,Koplyk I,Marinich T,Abdildayeva A,Zhukabayeva T. Open Engineering Открытый доступтом 10, Выпуск 1, Страницы 350 - 3611 January 2020

			of the main tasks that need to be implemented in order to develop algorithms for predicting electricity demand for various objects, industries and levels has been developed. © 2020 M. Kalimoldayev et al., published by De Gruyter.	
	Algorithms for detection gender using neural networks	10.46300/9106.2020.14.24	In this paper, we investigate two neural architecture for gender detection tasks by utilizing Mel-frequency cepstral coefficients (MFCC) features which do not cover the voice related characteristics. One of our goals is to compare different neural architectures, multi-layers perceptron (MLP) and, convolutional neural networks (cnns) for both tasks with various settings and learn the gender-specific features automatically. © 2020, North Atlantic University Union.	Kalimoldayev M,Mamyrbayev O,Mekebayev N,Kydyrbekova A International Journal of Circuits, Systems and Signal Processing Открытый доступтом 14, Страницы 154 - 1592020
	Fuzzy Logic for Medical Diagnosis of Clinical and Hematological Symptoms	10.1109/AICT47866.2019.8981755	Practical medicine still remains a difficultly formalized area of human activity, in which specialists in decision making often proceed from previous professional experience and their own intuition, and not from an analysis of objective data. In such situation, it is difficult to avoid medical mistakes, the social and economic importance of which is extremely high. The urgency of the problem is in the need to develop intelligent medical systems based on effective methods, algorithms and models of support for making medical decisions in the context of incompleteness and uncertainty of the initial data of the	Uvaliyeva I,Kalimoldayev M,Rustamov S,Belginova S. 13th IEEE International Conference on Application of Information and Communication Technologies, AICT 2019 - proceedingsoctober 2019 Номер статьи 898175513th IEEE International Conference on Application of Information and Communication Technologies, AICT 2019

			medical-technological process, allowing to ensure high adequacy and validity of the decisions made in the context of limited time resources. The main goal of the this research is to use a model of a fuzzy inference for a medical diagnostic system in order to provide effective information support for the diagnosis process, as well as the process of recommendatory medical care. © 2019 IEEE.	
	Implementation of covering algorithm for the robot with parallel structure	10.32014/2019.2518-170X.142	The paper considers a 3RPR robot with a parallel structure. One of the main tasks in robotics is to determine the working area of the robot. Algorithms for solving systems of this type are given. The properties and accuracy estimates of the obtained approximations are proved. As an approach to determining the work area, the method of non-uniform coatings was used in this work, which allows one to determine the external and internal approximation of the set of solutions of the system with a given accuracy. © 2019, National Academy of Sciences of the Republic of Kazakhstan. All rights reserved.	Kalimoldayev M,Akhmetzhanov M,Mukanova B,Azimova D. News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences Открытый доступтом 5, Выпуск 437, Страницы 197 - 201September-October 2019 ISSN 22245278
	The investigation of the internet of things (iot) in electric power systems	10.32014/2019.2518-170X.136	In recent years, with the continued growth of energy demand, intelligent energy systems have become a common choice for the world’s energy to meet the challenges of the future. Currently, the rapid development of the Internet of Things leads to the use of new, advanced solutions in various fields. One of	Maksat K,Assel A,Tamara Z,Turaev S. News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical sciencesоткрытый доступтом 5,

			the target markets for iot is electric power systems. This article presents the current state of electric power systems based on iot. The architecture of the Internet of Things and its components, as well as its importance in electric power systems, have been studied. The methodology and structure of the application of the Internet of Things in the electric power industry are shown. © National Academy of Sciences of the Republic of Kazakhstan, 2019.In recent years, with the continued growth of energy demand, intelligent energy systems have become a common choice for the world's energy to meet the challenges of the future. Currently, the rapid development of the Internet of Things leads to the use of new, advanced solutions in various fields. One of the target markets for iot is electric power systems. This article presents the current state of electric power systems based on iot. The architecture of the Internet of Things and its components, as well as its importance in electric power systems, have been studied. The methodology and structure of the application of the Internet of Things in the electric power industry are shown. © National Academy of Sciences of the Republic of Kazakhstan, 2019.	Выпуск 437, Страницы 144 - 150 ISSN 22245278

	Matrix multiplier of polynomials modulo analysis starting with the lower order digits of the multiplier	10.32014/2019.2518-170X.113	The advantage of an unconventional data encryption system using non-positional polynomial number systems (NPNS), known as polynomial residue number system, is considered. When hardware and software-hardware implementations of cryptosystems based on the NPNS, circuit solutions are needed multipliers of polynomials modulo an irreducible polynomial. In this paper, we present the design of matrix multiplier of polynomials modulo irreducible polynomial. The correct operation of the proposed multiplier is verified by implementing it on the FPGA of the company Xilinx of model Artix 7. In conclusion, a comparative analysis of the matrix multipliers considered is given in terms of time parameters and hardware costs for their implementation. © National Academy of Sciences of the Republic of Kazakhstan, 2019.	Kalimoldayev M,Tynymbayev S,Gnatyuk S,Khokhlov S,Magzom M,Kozhagulov Y. News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical sciencesоткрытый доступтом 4, Выпуск 436, Страницы 181 - 187July-August 2019
	Particularities of multi-cutter cutting dynamics	10.32014/2019.2518-170X.90	Certain particularities of steady continuous cutting dynamics for multi-cutter turning and the results of mathematical modeling are discussed in the paper. The effect of processing parameters on the excitation of vibration in the case of multi-cutter turning of a long cylindrical part with finite flexibility is studied. Depending on the fixing rigidity of the cutters and their relative positioning, different forms of the tool oscillation and formed chips are analyzed. The model is based on equations	Gouskov A.M,Guskov M.A,Panovko G.Y,Shokhin A.E,Kalimoldayev M.N,Ualiyev Z.G. News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical sciencesоткрытый доступтом 3, Выпуск 435, Страницы 231 - 239May-June 2019,ISSN 22245278

			of motion and the cutting law in the form of a fractional function together with the equation for new surfaces formation which are represented as a system of differential-algebraic equations with several delays describing the dynamics of multi-cutter turning. These equations allow consider the regenerative mechanism of oscillations excitation in the system. The evolution of the cutter's oscillations to steady regime in the case of an angular shift of the cutters, as well as the evolution of chips are shown in the work. An example of the operation of cutters, which angular shift allows to control the work of the cutting edges is given. The reasons for the stability loss and the self-oscillations excitation are noticed. The procedure for integrating systems of differentialalgebraic equations with retarded argument and the model of two-cutter turning taking into account the compliance of the cutting tool fixation is considered. Influence of the technological system parameters on the stability of continuous cutting regime is analyzed. © National Academy of Sciences of the Republic of Kazakhstan, 2019.	
	Output tracking by state feedback for highorder nonlinear systems with time-delay		This paper addresses the problem of global practical output tracking for a class of high-order time-delay uncertain non-linear systems via state feedback. On the basis of the	Alimhan K,Otsuka N,Kalimoldayev M,Tasbolatuly N.Journal of Theoretical and Applied Information technologутом 97, Выпуск 3,

			homogeneous domination technique, under mild conditions on the system nonlinearities involving time delay, we construct a homogeneous state feedback controller with an adjustable scaling gain. With the aid of a homogeneous Lyapunov-Krasovskii functional, the scaling gain is adjusted to dominate the time-delay nonlinearities bounded by homogeneous growth conditions and make the tracking error arbitrarily small while all the states of the closed-loop system remain to be bounded. Finally, a simulation example is given to illustrate the effectiveness of the tracking controller. © 2005 - ongoing JATIT & LLS.	Страницы 942 - 9561 February 2019.ISSN 19928645
	Information systems of integrated machine learning modules on the example of a verbal robot	10.32014/2019.2518-170X.173	In this work, information systems of integrated machine learning modules have been performed using the verbal robot as an example. Hardware components have been developed, logical components that have been assembled and /or developed to implement an automated verbal robot system, module tracking has been also performed that can track human faces in real time through the opencv library and automated services on Jetson TX1 soc for maneuvering a mobile robot chassis. © 2019, National Academy of Sciences of the Republic of Kazakhstan. All rights reserved.	Kalimoldayev M,Kalimoldayev M,Kunelbayev M,Sundetov T.News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences Открытый доступ Том 6, Выпуск 438, Страницы 215 - 2222019 ISSN 22245278

	Graph models with multiple bayesian networks	10.15199/48.2020.12.55	This paper is devoted to some issues of using multiple Bayesian networks in the various applied problems. Sometimes we deal with applied problems that are difficult to describe with a model that is represented by only one Bayesian network. At the same time, the considered problem may contain blocks with various types of uncertainties that can be well described by multiple Bayesian networks. Even if the problem can be described by only one Bayesian network, the size of this network could be so large that it will be impossible to find the solution with the help of existing software products. In this case, it is better to decompose in some way this large Bayesian network into several smaller ones. However, existing software products are poorly adapted to work with several Bayesian networks simultaneously. In this project, we develop and describe a software product that allows us to work with several Bayesian networks simultaneously.	SHAYAKHMETOVA A,LITVINENKO N,MAMYRBAYEV O,WÓJCIK W.Przeglad Elektrotechniczny Том 96, Выпуск 12, Страницы 252 - 255
	Cycles in bayesian networks	10.24425/ijet.2021.135962	The article is devoted to some critical problems of using Bayesian networks for solving practical problems, in which graph models contain directed cycles. The strict requirement of the acyclicity of the directed graph representing the Bayesian network does not allow to efficiently solve most of the problems	Zhamangarin D,SHAYAKHMETOVA A,LITVINENKO N,MAMYRBAYEV O,WÓJCIK W International Journal of Electronics and Telecommunications Том 67,

			that contain directed cycles. The modern theory of Bayesian networks prohibits the use of directed cycles. The requirement of acyclicity of the graph can significantly simplify the general theory of Bayesian networks, significantly simplify the development of algorithms and their implementation in program code for calculations in Bayesian networks.	Выпуск 2, Страницы 181 - 1862021,ISSN-20818491
	Bayesian approach for competence formation for students of it-specialty		The Bayesian networks theory has recently become very popular in solving various applied problems in multiple fields of science and industry. For the practical application of the Bayesian approach, a high quality software product that implements the mathematical theory of Bayesian networks is required. The Bayesian approach is a promising approach for creating an intelligent environment to enhance student competence. To implement Bayesian networks, the bayesialab application software package is well suited and is one of the high-quality software products, which is specialised in artificial intelligence technologies. With the help of the bayesialab package, various models of Bayesian networks can be created, explored, edited and analysed. This article introduces student competences and explores the possibilities of using Bayesian networks in the formation of the competences of information technology (IT) students and for this purpose, a general	Shayakhmetova A,Seisenbekova P,Othman M,Mamyrbayev O,Kassymova D.ISSN-19928645.Journal of Theoretical and Applied Information technologутом 10, Выпуск 19, Страницы 3172 - 3182October 2020

			algorithm and a specific architecture of the intellectual environment have been developed. It is a known fact that improved professional competence in education increases the competitiveness of specialists and updates the corresponding educational environment.	
	The Use of the Bayesian Approach in the Formation of the Student's Competence in the ICT Direction	10.1109/I2CACIS.2019.8825060	The theory of Bayesian networks has recently become very popular in solving various applied problems in various areas of science and production. To effectively use the Bayesian approach, a high-quality software product is needed that implements the mathematical ideas of Bayesian networks in practice. Such software products currently developed quite a large number. This paper presents the most common ones. The paper gives a small introduction about the competence of students and explores the possibility of using Bayesian networks in the formation of the competence of an IT trainer. Developed an integrated algorithm for the formation of the competence of training in the direction of IT.	Seisenbekova P,Shayakhmetova A,Othman M.2019 IEEE International Conference on Automatic Control and Intelligent Systems, I2CACIS 2019 - proceedingsоткрытый доступстраницы 85 - 90June 2019 Номер статьи 8825060 ISBN-978-172810784-4
	Analytical review of software for multi-agent systems and their applications		In this article there was conducted an analytical review of the most common modern software and implemented on their basis practical applications. There is considered the history of development of multi-agent systems (MAS). The relevance of the use of multi-agent technologies for the creation of	Samigulina G.A,Nyusupov A.T,Shayakhmetova A.S.News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical sciencesтом 3,

			information systems for the complex objects modeling based on various methods and algorithms is noted. There were considered the most widespread agent-oriented platforms of multi-agent systems, the comparative analysis of their characteristics and presented the development tools was carried out. The examples of modern multi-agent applications implemented with the help of these software products in industry, science and education were presented. The features of applications functioning in the production of goods and services, as well as of complex processes modeling were pointed out. Particular attention is paid to the Java Agent Development Framework (JADE), presented the structure, main functions and methodology of the multi-agent systems development. The advantages of multi-agent systems (flexibility of operation, operational interaction between agents, optimal distribution of computing resources, self-organization and multifunctionality) at creating innovative intellectual technologies based on different approaches applying and on system analysis were shown. There were analyzed the features of agent technologies and prospects of their use for the development of complex multi-user programs	Выпуск 429, Страницы 173 - 1816,ISSN-22245278

	Innovative intelligent technology of distance learning for visually impaired people	10.1515/eng-2017-0046	The aim of the study is to develop innovative intelligent technology and information systems of distance education for people with impaired vision (PIV). To solve this problem a comprehensive approach has been proposed, which consists in the aggregate of the application of artificial intelligence methods and statistical analysis. Creating an accessible learning environment, identifying the intellectual, physiological, psychophysiological characteristics of perception and information awareness by this category of people is based on cognitive approach. On the basis of fuzzy logic the individually-oriented learning path of PIV is con- structed with the aim of obtaining high-quality engineering education with modern equipment in the joint use laboratories.	Samigulina G,Shayakhmetova A,Nuysuppov A. Open Engineering Открытый доступтом 7, Выпуск 1, Страницы 444 - 452
	NMF-based approach to automatic term extraction	DOI 10.1016/j.eswa.2022.117179	This work describes automatic term extraction approach based on the combination of the probabilistic topic modelling (PTM) and non-negative matrix factorization (NMF). Topic modeling algorithms including NMF-based ones do not require expensive and time-consuming manual annotations for domain terms, but only a corpus of domain documents. The topics emerge from the corpus documents without any supervision as sets of most probable words. This work is aimed to investigate how fully and precisely these most probable words from topics can reflect domain terminology. We run a series of experiments on the novel, qualitatively annotated dataset ACTER that was first used in the termeval 2020 Shared Task. We compare five different NMF algorithms and four different NMF initializations when changing the	Nugumanova, A., Akhmed-Zaki, D., Mansurova, M., Baiburin, Y., Maulit, A. Expert Systems with Applications, 2022, 199, 117179

			number of topics extracted from documents and the number of most probable words extracted from topics in order to determine optimal combinations for best performance of term extraction. Finally, we compare the obtained optimal combinations of NMF with the competitive methods in termeval 2020 and prove that our approach is second only to two much more sophisticated, domain-dependent supervised methods. © 2022 Elsevier Ltd	
	A Personalized mhealth Monitoring System for Children and Adolescents with T1 Diabetes by Utilizing iot Sensors and Assessing Physical Activities	DOI 10.15837/ijccc.2022.4558	The problem of diabetes mellitus is becoming alarming due to the increase in morbidity among children. Patients are undergoing vital insulin replacement therapy, the dose depends on the level of glucose in the blood. The glucose level prediction program, taking into account the impact of physical activity on the body, the use of mobile health capabilities will allow us to develop personalized tactics for a child patient and minimize the risks of a critical health condition. The target group of this study are children and adolescents with type 1 diabetes. This study provides an iot based mhealth monitoring system, including sensors, medical bracelets, mobile devices with applications. The mobile healthcare application for personalized monitoring can implement the functions of more effectively targeting young users to support their own health and improve the quality of life. In addition to monitoring blood glucose levels, the effect of physical activity on the condition of patients is also taken into account. The use of the proposed method for calculating the probable change in the patient's blood glucose level after the end of physical activity will allow the doctor to make individual recommendations for the diet before the start of physical activity and its intensity. © 2022. By the authors. Licensee Agora University, Oradea, Romania.	Zholdas, N., Mansurova, M., Postolache, O., Kalimoldayev, M., Sarsembayeva, T. International Journal of Computers, Communications and Control, 2022, 17(3), 4558

	Application of mhealth Technologies to Improve Self-Control of Children and Adolescents with Type 1 Diabetes	DOI 10.1109/memea54994.2022.9856485	Our research has shown that the use of mobile technologies (mhealth) to improve self-control of children and adolescents with diabetes, as well as for parental control, gives positive results. A functional implemented in a mobile application has been developed that contains recommendations from endocrinologists based on the analysis of data from sensors, taking into account the individual characteristics of the patient's body. Digital health profiles of patients with diabetes mellitus, containing the values of state indicators obtained from various sensors, mobile phones, medical watches and fitness bracelets, make it possible to develop systems for monitoring and supporting personalized decision-making. By observing a patient's digital profile, clinicians can determine some of the possible causes of deviations in glucose readings in predetermined time segments. During the project, under the close supervision of endocrinologists and a pediatrician, patient data were collected, such as continuous monitoring glucose sensor values, fitness bracelet records, anthropometric data, disease and family history data, eating behavior data, hbal c (glycated hemoglobin) level data in beginning and end of the study to assess carbohydrate metabolism compensation, FA (fructosamine) level data twice during the study period in order to short-term assess the degree of carbohydrate metabolism compensation, general blood analysis and general urine analysis data in order to additionally assess the reliability of previous tests for data analysis. © 2022 IEEE.	Zholdas, N., Mansurova, M., Sarsembayev, M., ...Shomanov, A., Sarsembayeva, T. 2022 IEEE International Symposium on Medical Measurements and Applications, memea 2022 - Conference Proceedings, 2022
	Improvement of HVAC System Using the Intelligent Control System	DOI 10.1109/ENERGYCON53164.2022.9830375	The article is given to the issue of guideline of hotness supply and cooling in the room. A robotized framework for checking the unique attributes of such sensors is depicted, which is a product and equipment complex for setting up a test seat and dissecting the boundaries of sensors for dynamic temperature control and cooling. The framework fills the roles of controlling the Google Coral USB Accelerator, designing the ADC	Tasmurzayev, N., Amangeldy, B., Baigarayeva, Z., ...Resnik, B., Amirkhanova, G. ENERGYCON 2022 - 2022 IEEE 7th International Energy Conference, Proceedings, 2022

			(Analog-digital converter) and deciding the sufficiency recurrence and stage recurrence qualities of temperature sensors, switches, leak sensors and cooling taking into account the latest values from temperature and humidity sensors, fixing attributes and monitoring in SCADA (Supervisory Control And Data Acquisition) Genesis64 program. The plan of the test seat, the summed-up calculation of the framework activity and the screen type of the program activity are introduced. The product of the robotized framework for temperature control and cooling in the room is created based on SCADA Genesis 64 programs and technologies with OPC UA (Unified Architecture) and modbus TCP data receive protocol. © 2022 IEEE.	
	Towards to sustainability of education: the mutual cooperation with partners in Smart city project	DOI 10.1109/ENERGYCON53164.2022.9830212	The article presents the European evaluation within the scope of the project SMARTCITY:Innovative Approach Towards a Master Program on Smart Cities Technologies. The evaluation covers assessment of teachers from PC universities (SSTU, NSTU, NUM, MUST.KAZNU, ENU), who have been selected to participate in the project-related mobilities to increase knowledge in the field of SCT. In the project is planned developing of 18 teaching materials published with e-ISBN by PC teachers involved in the project.The article also covers quality assessment of teaching materials developed within the project by PC universities and assessment of students' knowledge which is done at the beginning of their training in the EU Universities and during the Master theses defense. © 2022 IEEE.	Mitova, M., Tomov, P., Kunicina, N., ...Mansurova, M., Namsrai, O.-E. ENERGYCON 2022 - 2022 IEEE 7th International Energy Conference, Proceedings, 2022
	Design and Development of Pipeline of Preprocessing Tools for Kazakh Language Texts	DOI 10.1007/978-3-031-05328-3_9	Nowadays, the Kazakh language belongs to the category of less-resourced languages, as there is a small number of resources developed and accessible to a wide range of users, such as text corpora, electronic dictionaries, morphological analyzers, thesauri, which allow to analyze text documents. The aim of this work is the design and development of pipeline	Mansurova, M., Barakhnin, V.B., Madiyeva, G., Kadyrbek, N., Dossanov, B. Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial

			of preprocessing tools for media-corpus of the Kazakh language. Media-corpus is hosted by al-Farabi Kazakh National University and serves linguists as an empirical basis for research in the contemporary written Kazakh language. The development of pipeline of preprocessing tools for media-corpus, the lexical and grammatical features of the Kazakh language were analyzed, on the basis of which the composition of the fundamental rules for changing the words (inflection) of the Kazakh language was determined. In the process of research, the tools for generation and lemmatization of the word forms of the Kazakh language were created. The proposed tools can be applied at the stage of morphological analysis in the systems of automatic analysis of the texts, in the creation of thesauruses and ontologies. For the case of the presence of homonymy, the template method was used, which allow to reduce the level of homonymy. © 2022, Springer Nature Switzerland AG.	Intelligence and Lecture Notes in Bioinformatics), 2022, 13212 LNAI, стр. 129–142
	NMF-based approach to automatic term extraction	DOI 10.1016/j.eswa.2022.117179	This work describes automatic term extraction approach based on the combination of the probabilistic topic modelling (PTM) and non-negative matrix factorization (NMF). Topic modeling algorithms including NMF-based ones do not require expensive and time-consuming manual annotations for domain terms, but only a corpus of domain documents. The topics emerge from the corpus documents without any supervision as sets of most probable words. This work is aimed to investigate how fully and precisely these most probable words from topics can reflect domain terminology. We run a series of experiments on the novel, qualitatively annotated dataset ACTER that was first used in the termeval 2020 Shared Task. We compare five different NMF algorithms and four different NMF initializations when changing the number of topics extracted from documents and the number of most probable words extracted from topics in order to determine optimal combinations for best performance of term	Nugumanova, A., Akhmed-Zaki, D., Mansurova, M., Baiburin, Y., Maulit, A. Expert Systems with Applications, 2022, 199, 117179

			extraction. Finally, we compare the obtained optimal combinations of NMF with the competitive methods in termeval 2020 and prove that our approach is second only to two much more sophisticated, domain-dependent supervised methods. © 2022 Elsevier Ltd	
	A Personalized mhealth Monitoring System for Children and Adolescents with T1 Diabetes by Utilizing iot Sensors and Assessing Physical Activities	DOI 10.15837/ijccc.2022.4558	The problem of diabetes mellitus is becoming alarming due to the increase in morbidity among children. Patients are undergoing vital insulin replacement therapy, the dose depends on the level of glucose in the blood. The glucose level prediction program, taking into account the impact of physical activity on the body, the use of mobile health capabilities will allow us to develop personalized tactics for a child patient and minimize the risks of a critical health condition. The target group of this study are children and adolescents with type 1 diabetes. This study provides an iot based mhealth monitoring system, including sensors, medical bracelets, mobile devices with applications. The mobile healthcare application for personalized monitoring can implement the functions of more effectively targeting young users to support their own health and improve the quality of life. In addition to monitoring blood glucose levels, the effect of physical activity on the condition of patients is also taken into account. The use of the proposed method for calculating the probable change in the patient's blood glucose level after the end of physical activity will allow the doctor to make individual recommendations for the diet before the start of physical activity and its intensity. © 2022. By the authors. Licensee Agora University, Oradea, Romania.	Zholdas, N., Mansurova, M., Postolache, O., Kalimoldayev, M., Sarsembayeva, T. International Journal of Computers, Communications and Control, 2022, 17(3), 4558
	RESEARCH OF ACOUSTIC AND LINGUISTIC MODELING BASED ON REPETITIVE	10.51889/2022-1.1728-7901.16	The ordinary automatic speech recognition(ASR) frameworks utilize the GMM-HMM for acoustic modeling and the n-gram for language modeling. In the course of the last decade, the deep feed-forward neural network (DFNN) has nearly replaced the GMM in acoustic modeling. The current ASR	N. Mekebayev,Ch Tuyebaev, K. Sabrayev,A Yerkebay ВЕСТНИК казнпу им. Абая, серия «Физико-математические науки»

	NEURAL NETWORKS FOR SPEECH RECOGNITION OF CHILDREN		systems are predominantly dependent on the DFNN-HMM acoustic model and the n-gram language model (LM). Inferable from better long-termcontext displaying capacity, the recurrent neural network(RNN) based lms have as of now been accounted for to yield lower perplexitythan the n-gram lms. As of late a variation of RNN, the long-short term memory(LSTM) has been effectively investigated inacoustic modeling. Strangely, the assessment of an ASR systemem ploying both RNN-based acoustic and semantic demonstrating is yetto be accounted for. Further, we note that most of these advancementsare explored in the context of adults' ASR only. Persuaded bythose works, in this paper we investigate LSTM-based acoustic modeling joined with RNN-based LM for children's ASR.Our exploratory outcomes show that such consolidated RNN-based modeling is found viable in both coordinated and mismatched children's ASR tasks.	No1(77), 2022 г. Стр.119-126 Https://doi.org/10.51889/2022-1.1728-7901.16
	Decision support system for assessing the consequences of cyber attacks	ISSN 2709-4707	The architecture of the Bayesian_Net decision support system (DSS) is described, which was developed to analyze data on signs of anomalies and cyberattacks based on the use of Bayesian Networks (BN) for this task. The proposed DSS is distinguished by the use of object-oriented programming and has a modular architecture. The Bayesian_Net DSS is designed to solve data mining problems, in particular, to analyze weakly structured problems related to cybernetic security (CS) of informatization objects (IO), and to assess the consequences of cyber attacks in conditions of weakly structured data on signs and detected anomalies.	Б. С. АХМЕТОВ, В. А. ЛАХНО, М. Б. ЫДЫРЫШБАЕВА,А. К. АБУОВА, Ш. САГЫНДЫКОВ Вестник Национальной инженерной академии Республики Казахстан. 2022. No 1 (83) стр.21-29
	A machine learning model based on heterogeneous data	10.26577/JMMCS.2022.v114.i2.09.	Big data is widely used in many areas of business. The information between organizations is systematically reproduced and processed by data, and the collected data differs significantly in attributes. By composing heterogeneous data sets, they complement each other, therefore, data exchange between organizations is necessary. In a machine	Narbayeva S.M, Tapeeva S.K., Turarbek A., Zhunusbayeva S. Journal of Mathematics, mechanics and Computer Science, №(114) 2022

			learning collaborative learning process based on heterogeneous data, the current schema has many challenges, including efficiency, security, and availability in real-world situations. In this paper, we propose a secure SVM learning mechanism based on the consortium blockchain and a threshold homomorphic encryption algorithm. By implementing the consortium's blockchain, it is possible to build a decentralized data exchange platform, and also to develop a secure algorithm for the support-vector machine classifier based on threshold homomorphic encryption	Https://doi.org/10.26577/JMMCS.2022.v114.i2.09.
	Semantic Connections in the Complex Sentences for Post-Editing Machine Translation in the Kazakh Language	**ISSN** 20782489 **DOI** 10.3390/info13090411	The problems of machine translation are constantly arising. While the most advanced translation platforms, such as Google and Yandex, allow for high-quality translations of languages with simple grammatical structures, more morphologically rich languages still suffer from the translation of complex sentences, and translation services leave many structural errors. This study focused on designing the rules for the grammatical structures of complex sentences in the Kazakh language, which has a difficult grammar with many rules. First, the types of complex sentences in the Kazakh language were thoroughly observed with the use of templates from the fuzzywuzzy library. Then, the correction of complex sentences was completed with parallel corpora. The sentences were translated into English and Russian by existing machine translation systems. Therefore, the grammar of both Kazakh–English and Kazakh–Russian language pairs was considered. They both used the rules specifically designed for the post-editing steps. Finally, the performance of the developed algorithm was evaluated for an accuracy score for each pair of languages. This approach was then proposed for use in other corpora generation, post-editing, and analysis systems in future works.	Turganbayeva, A., Rakhimova, D., Karyukin, V., Karibayeva, A., Turarbek, A.

	Graphical Visualization of the Connections of Involved Users and Identifying Influential Spreaders in a Social Network	ISBN 978-166546754-4 DOI 10.1109/ICEEE55327.2022.9772556	According to the latest research, the use of social media to track the spread of radical ideas and extremist threats has attracted the attention of researchers for over 10 years. In recent years, there has been a surge in research interest in identifying criminals through social media accounts and analyzing the visualization of the connections of the users involved, since criminals actively use social media, and the number of calls for extremism through social media is growing every year. In this paper, we consider the current problem of using identification methods based on public data of user profiles and social network analysis to identify nodes for the dissemination of criminal information in social networks. It provides an overview of existing solutions and approaches, as well as proposes a proprietary method for identifying user profiles and analyzing graph properties. The applicability of the proposed method has been demonstrated experimentally through testing real datasets. The results of the experiment show high accuracy in detecting engaged users.	Mussiraliyeva, S., Baispay, G., Ospanov, R., Medetbek, Z., Shalabayev, K. 2022 9th International Conference on Electrical and Electronics Engineering, ICEEE 2022, 2022, стр. 311–315
	Comprehensive ddos Attack Classification Using Machine Learning Algorithms	ISSN 15462218 DOI 10.32604/cmc.2022.026552	The fast development of Internet technologies ignited the growth of techniques for information security that protect data, networks, systems, and applications from various threats. There are many types of threats. The dedicated denial of service attack (ddos) is one of the most serious and widespread attacks on Internet resources. This attack is intended to paralyze the victim’s system and cause the service to fail. This work is devoted to the classification of ddos attacks in the special network environment called Software-Defined Networking (SDN) using machine learning algorithms. The analyzed dataset included instances of two classes: benign and malicious. As the dataset contained twenty-two features, the feature selection techniques were required for dimensionality reduction. In these experiments, the Information gain, the Chi-square, and the F-test were applied to decrease the number of features to ten. The	Ussatova, O., Zhumabekova, A., Begimbayeva, Y., Matson, E.T., Ussatov, N. Computers, Materials and Continua, 2022, 73(1), стр. 577–594

			classes were also not completely balanced, so undersampling, oversampling, and synthetic minority oversampling (SMOTE) techniques were used to balance classes equally. The previous research works observed the classification of ddos attacks applying various feature selection techniques and one or more machine learning algorithms. Still, they did not pay much attention to classifying the combinations of feature selection and balancing methods with different machine learning algorithms. This work is devoted to the classification of datasets with eight machine learning algorithms: naïve Bayes, logistic regression, support vector machine, k-nearest neighbors, decision tree, random forest, xgboost, and catboost. In the experimental results, the Information gain and F-test feature selection methods achieved better performance with all eight ML algorithms than with the Chi-square technique. Furthermore, the accuracy values of the oversampled and SMOTE datasets were higher than that of the undersampled and imbalanced datasets. Among machine learning algorithms, the accuracy of support vector machine, logistic regression, and naïve Bayes fluctuates between 0.59 and 0.75, while decision tree, random forest, xgboost, and catboost allowed achieving values around 0.99 and 1.00 with all feature selection and class balancing techniques among all the algorithms.	
	INFORMATION TECHNOLOGIES FOR THE SYNTHESIS OF RULE DATABASES OF AN INTELLIGENT LIGHTING CONTROL SYSTEM	ISSN 19928645 Издатель Little Lion Scientific	The results on the development and research of information technology (IT) for the synthesis and optimization of effective rule databases (RDB) with an optimal set of consequents and an optimal number of rules for fuzzy systems of the Mamdani type are presented. The study of the information model of the structure of the intelligent lighting control system based on fuzzy logic is carried out. RDB study for Smart lighting system was carried out. The possibility of minimizing the number of rules for the Smart lighting system, their optimization is	Vasylyshyn, S., Lakhno, V., Alibiyeva, N., ...Pleskach, V., Lakhno, M. Journal of Theoretical and Applied Information Technology, 2022, 100(5), стр. 1340–1353

			shown, which, as a result, makes it possible to significantly simplify the further hardware and software implementation of such a system for various customers. © 2022 Little Lion Scientific. All rights reserved.	Https://www.scopus.com/record/display.uri?Eid=2-s2.0-85127514847&origin=resultslist&sort=plf-f
	Automation of Information Security Risk Assessment	ISSN 20818491 DOI 10.24425/ijet.2022.141273	An information security audit method (ISA) for a distributed computer network (DCN) of an informatization object (OBI) has been developed. Proposed method is based on the ISA procedures automation by using Bayesian networks (BN) and artificial neural networks (ANN) to assess the risks. It was shown that such a combination of BN and ANN makes it possible to quickly determine the actual risks for OBI information security (IS). At the same time, data from sensors of various hardware and software information security means (ISM) in the OBI DCS segments are used as the initial information. It was shown that the automation of ISA procedures based on the use of BN and ANN allows the DCN IS administrator to respond dynamically to threats in a real time manner, to promptly select effective countermeasures to protect the DCS. © The Author(s).	Akhmetov, B., Lakhno, V., Chubaievskyi, V., ...Adilzhanova, S., Ydyryshbayeva, M. International Journal of Electronics and Telecommunications, 2022, 68(3), стр. 549–555 Https://www.scopus.com/record/display.uri?Eid=2-s2.0-85137678691&origin=resultslist&sort=plf-f