№	Статья и ссылка	Аннотация
1.	Kerimkhan, B., Zhumadillayeva A., & Nedzvedz, A. (2022). ANALYSIS OF DYNAMICAL CHANGES FROM LARGE SET OF REMOTE SENSING IMAGES. *Scientific Journal of Astana IT University*, *11*(11), 4–13. https://doi.org/10.37943/SUET5603	Basic elements of changes on the multi-temporal satellite image and their basic sets of dynamic objects are formulated and defined, for which the main characteristics define the dynamic object as an area of motion. Such dependents of objects are inherited not only between objects and their dynamic groups. In such a case, the concept of dynamic objects in a multi-temporal sequence of satellite images has been developed based on the formalization of processes occurring on a change stream. A specific methodology has been developed to select a dynamic object from a dynamic group based on the analysis of the changing characteristics of the object's environment. It means that objects in a group have similar changing for separate characteristics. Such objects are included in specified ranges and are combined into dynamic groups. Characteristics dynamic group is characterized by changing every object of it. The monitoring is performed for such a group. The technique includes six stages: image acquisition and pre-processing, image scene segmentation and selection of regions, image scene analysis for segmented areas, control of compliance with the conditions for behavioral characteristics, and classification of the behavioral line of objects in the region. As a result, it is possible to describe the properties of the group's behavior and objects in the group as separate characteristics. The control of fulfillment of conditions for the behavioral characteristic is carried out to control the object as a dynamic group element. Thus, monitoring is carried out as a control for the motion of many objects rather than images.
2.	Bektemyssova, G., Ahmad, A. R., Mirzakulova, S., & Ibraeva, Z. (2022). TIME SERIES FORECASTING BY THE ARIMA METHOD. *Scientific Journal of Astana IT University*, *11*(11), 14–23. https://doi.org/10.37943/HFCH4395	The variety of communication services and the growing number of different sensors with the appearance of IoT (Internet of Things) technology generate significantly different types of network traffic. This implies that the structure of network traffic will be heterogeneous, which requires deep analysis to find the internal features underlying the data. A common model for analyzing the processes of a multiservice network is a model based on time series.

Numerous empirical data studies indicate that the packet intensity time series do not belong to the general aggregates of a normal distribution.

The problem of predicting network traffic is still relevant due to managing information that flows into a heterogeneous network.

In this work, the authors studied the time series for stationarity in order to select an appropriate forecasting model. A visual assessment of the series assumed non-stationarity. The Augmented Dickey-Fuller Test is applied, and the measured network traffic is predicted using the ARIMA (Auto-Regressive Integrated Moving Average) statistical method. Results were obtained using the Econometric Modeler Matlab (R2021b) application. The results of the autocorrelation function (ACF) and partial ACF are analyzed, with the help of which the ARIMA model is optimized. As a result of the study, a software algorithm for the ARIMA (0,2,1) model was developed. |

| 3. | Khaimuldin, A., Mukatayev, T., Assanova, N., Khaimuldin, N., & Alshynov, S. (2022). TRACKING OF NON-STANDARD TRAJECTORIES USING MPC METHODS WITH CONSTRAINTS HANDLING ALGORITHM. *Scientific Journal of Astana IT University*, *11*(11), 24–35. https://doi.org/10.37943/AEPO1273 | In recent decades, a Model-Based Predictive Control (MPC) has revealed its dominance over other control methods such as having an ability of constraints handling and input optimization in terms of the value function. However, the complexity of the realization of the MPC algorithm on real mechatronic systems remains one of the major challenges. Traditional predictive control approaches are based on zero regulation or a step change. Nevertheless, more complicated systems still exist that need to track setpoint trajectories.

Currently, there is an active development of robotics and the creation of transport networks of movement without human participation. Therefore, the issue of programming the given trajectories of vehicles is relevant. In this article, authors reveal the alternative solution for tracking non-standard trajectories in spheres such as robotics, IT in mechatronics, etc., that could be used in self-driving cars, drones, rockets, robot arms and any other automized systems in factories.

The ability of Model-Based Predictive Control (MPC) such as the constraints handling and optimization of input in terms of the value function makes it extremely attractive in the industry. Nevertheless, the complexity of implementation of MPC algorithm on real mechatronic systems remains one of the main challenges.

Secondly, common predictive control algorithms are based on the regulation approach or a simple step shift. However, there exist systems that are more complicated where a setpoint to be tracked is given in the form of trajectories. In this project, there were made several modifications in order to improve an MPC algorithm to make better use of information about the trajectories. |
| 4. | Muratuly, D., Denissova, N., & Krak, I. (2022). SUBJECT BEHAVIOR DETECTION AND ANALYSIS BASED ON COMPUTER VISION TECHNOLOGY. *Scientific Journal of Astana IT University*, *11*(11), 36–47. https://doi.org/10.37943/UIXY4934 | This article discusses the current problem of identifying violations during distance learning during the final certification.

The coronavirus (COVID-19) pandemic has served as a stimulus for innovation in the field of education in all countries, including Kazakhstan. Innovative approaches are being taken to ensure the continuity of education and training. Thanks to the rapid response measures taken by governments and partners around the world to ensure the smooth learning process. The ongoing digital transformation of an educational institution requires appropriate information content, suitable methodological models, effective teaching methods and a supportive learning environment. The solution to one of the urgent tasks is to ensure the quality and reliability of assessing the knowledge of students by introducing an online proctoring system. The primary task of the online proctoring system is to recognize faces and identify abnormal behavior of students.

The basis for obtaining data is the unified information educational environment of the D. Serikbayev East Kazakhstan Technical University is represented by the SPORTAL hardware and software system, which is an |

		integration of two powerful subsystems: a Web application - the Dales of Knowledges educational portal and the SPORTAL information and software complex.
		The main theoretical results obtained are aimed at solving practical problems and are being introduced into the educational environment of D. Serikbayev East Kazakhstan Technical University to increase the degree of confidence in the results of students' knowledge in distance learning using an online proctoring system. The article presents the results of studies of one of the Viola-Jones face detection methods, commonly known as Haar cascades. During the study, a technology for identifying faces and detecting violations in real time was developed. Domestic and foreign scientists who have made a significant contribution to the development of methods for processing facial images are noted.
5.	Popov, V. (2022). SHIFT IN PARADIGM: STARTUP BUSINESS-INCUBATION AT UNIVERSITIES DURING THE EDUCATIONAL DISCIPLINE INSIDE OF CURRICULUM RATHER THAN EXTRACURRICULAR ACTIVITIES OF STUDENTS. *Scientific Journal of Astana IT University*, *11*(11), 48–60. https://doi.org/10.37943/WDNE3944	Diploma or Dropout - it is argued, whether graduation is more important than a successful startup. Students drop either college or their ideas. A presented exploratory study about the incubation of technological startups among students tries to solve this contradiction. The curricula business incubation as the educational discipline inside of the curriculum was offered in opposition to the extracurricular activities of students. There is not a lot of data about this model of student incubation outside of the university's entrepreneurship center and every contribution is valuable. The used research method is Qualitative studies, so the surveys among students are conducted during and after the incubation process on the educational discipline "Startup & Technological Entrepreneurship". At the end of this research, the framework was proposed, a set of actions, for helping students to go all the way from Idea to Product and Techno-Business. The framework is tested on a limited number of students in several universities in developing countries. The experiment is about embedding the syllabus into the Curriculum and measuring of achievements of students. The course is supposed to be elective and only students wishing to develop something are accepted. Later, interviews are conducted with two groups of students: those who passed the offered course and those who tried to develop startups independently. The final aim is to prove whether the inter-curricular framework works and how it overperforms other similar extra-curricular solutions.
6.	Asmaganbetova, K., Otarbay, Z., & Turginbekov, A. (2022). DEVELOPMENT OF INNOVATIVE DIGITAL TECHNOLOGIES FOR ENTERPRISE MANAGEMENT . *Scientific Journal of Astana IT University*, *11*(11), 61–73. https://doi.org/10.37943/KNWA6376	The efficacy of the organization and corporate strategy are substantially impacted by enterprise resource planning (ERP) technologies. However, it might be difficult to manage and apply the anticipated benefits of ERP. Workarounds further complicate outdated and evolving business procedures, which impedes the ongoing development of ERP. As a result, reaping the rewards is sometimes challenging. The complexity of realizing advantages also rises when subsidiaries are not able to discover new benefits on their own, even though benefits may differ from subsidiary to subsidiary. ERP systems, which integrate, synchronize, and centralize corporate data, are frequently viewed as a key resource for businesses that thrive in a fast-evolving global market. The selection of ERP systems is a crucial and challenging strategic choice because of the high cost of purchasing, installation, and implementation as well as the variety of offers. Because there are many different tangible and intangible requirements. This paper presents data on the development of innovative digital technologies in enterprise management. The main theoretical concepts of innovative digital technologies are described, as well as automated control systems and methods of their development are studied. This paper presents a model of innovation management in an industrial enterprise, an analysis of the ICT market, and developed recommendations on the methodology for implementing an ERP (Enterprise Resource Planning) system.

| 7. | Toxanov, S., Neftissov, A., Abzhanova, D., & Kazambayev, I. (2022). THE CONCEPT OF THE SMART CITY OF ASTANA: ENERGY-EFFICIENT TECHNOLOGIES AND SOLUTIONS FOR SUSTAINABLE DEVELOPMENT. *Scientific Journal of Astana IT University*, *11*(11), 74–86. https://doi.org/10.37943/TCVA7066 | Digitalization of the economy is one of the priority tasks set in the development strategies of Kazakhstan. Currently, there is a rapid change in information and communication technologies (ICT). Emerging changes affect network technologies, computing and communication devices themselves, as well as data processing. As a result, information technologies are being used in an increasing number of spheres of human life and economic life. One of the relevant areas of scientific research is the sphere of the living environment, which is currently developing from the field of Smart Homes into the field of Smart City, Smart Transport system, etc.

Today, cities have become the main force of economic development and have taken a central place in production, consumption networks, the definition of social and economic relations and currently provide a significant share of the gross domestic product of many countries. Cities began to play a major role in national, regional, and global development. The quality of people's lives depends on them. Therefore, today, more than ever, special requirements are imposed on them, such as the availability of affordable urban infrastructure, high mobility, security of urban areas, environmental friendliness, and developed urban self-government. Governments and city government bodies are facing new challenges that should not only solve a whole range of emerging problems, but also carry out a radical transformation of cities. One of the key components of the transformation is intelligent electrical networks.

This article aims to identify and systematize technological, economic and other effects of the introduction of intelligent networks. The article analyzes current trends and approaches to urban planning with an emphasis on energy infrastructure. A comprehensive approach to the development of the power supply system is noted, the main directions of its intellectualization are highlighted. The general requirements for the "smart" power supply system of Astana are defined, a conceptual management model of the "smart" power system is developed, and the effects of its implementation are described. |
| 8. | Biloshchytskyi, A., Kuchansky, A., Biloshchytska, S., Andrashko, Y., & Toxanov, S. (2022). INFORMATION-ANALYTICAL SYSTEM FOR EVALUATING THE SCIENTIFIC PERFORMANCE OF STRUCTURAL UNITS OF UNIVERSITIES AND RESEARCH INSTITUTES BASED ON THE APPROACH OF CONSTRUCTING COMPLEX INTEGRAL EVALUATION. *Scientific Journal of Astana IT University*, *11*(11), 87–117. https://doi.org/10.37943/XTPK5061 | The article discusses the creation of an information-analytical system for evaluating the scientific performance of structural units of universities and research institutes based on the approach of constructing complex integral evaluation. A model of information technology for evaluating the results of scientific activity is proposed, consisting of four modules: an information collection module, an information storage module, an analytical module, and a module for user interaction and data visualization. The modular structure of the technology will allow expanding and modifying the capabilities of each of the modules independently of the others, as well as increasing the stability and flexibility of the technology. The implementation of this system is performed using microservices technology. A conceptual model of the information system and a structural model of the functioning of the information collection module, as well as a structural model of the information system database, are proposed.

It is shown that most of the well-known indices for evaluating the performance of subjects of scientific activity, for example, h-index, g-index, e-index, I-10 index, etc., do not fully take into account information about citation. Therefore, the method for calculating the evaluation of scientific research activities of scientists was proposed, which does not lose information about any citation of the author and publication. This method determines the scalar evaluation of the results of scientific activity, and it is based on determining a few |

		coefficients. The coefficients define one scientist's citation in the publications of other scientists. As a result, assessment is obtained by solving a system of linear algebraic equations that are constructed based on calculated coefficients. Most of the known evaluation approaches have their own calculation features and disadvantages, which are associated with the loss of some information. Therefore, it is not recommended to give preference to one of them. For the purposes of a comprehensive assessment of the productivity of research activities of scientists, the authors proposed a method of vector evaluation of the results and the construction of the integral assessment. This method is based on the construction of vectors and scalar estimates for each scientist in a multidimensional metric space. The dimensionality of the space is determined by the number of calculated scalar estimates. The method is also based on the construction of an ideal point, which consists of scalar estimates that are the best in terms of achieving maximum performance. The assessment of each subject of scientific activity is calculated as the metric distance from the ideal point to the vector of scalar estimates of this subject of scientific activity.