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Шановні колеги!

Запрошуємо Вас взяти участь у XIV Міжнародній науково-технічній конференції **«АВІА-2019»**, яка відбудеться **23-25 квітня 2019 року** в Національному авіаційному університеті.

Матеріали подаються і будуть розміщені на сайті англійською мовою.

Офіційні мови конференції – англійська, українська та російська.

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Application of block-chain technology in car insurance

The block-chain technology is being tried in various areas. One of the promising directions for the use of this technology is car insurance. The main problems of the insurance industry are weak transparency in the decision-making process, a large percentage of frauds with insurance policies, and low payments due to an imperfect mechanism for processing an insured event. Completeness and accuracy of information is necessary to ensure an objective decision, but existing outdated insurance claims processing systems often make it difficult for car owners to receive legal payments.

Through the use of block-chain technology and smart contracts to create a common decentralized database of insured vehicles, it is possible to provide a fast and completely transparent decision-making mechanism for insured events. The algorithm of the created software application provides for integration with the existing infrastructure of the insurance company, which will automate the decision-making process (due to the information processed by the internal algorithms of smart contracts). The use of various work confirmation algorithms for different types of data allows reducing the load on adding new blocks.

The developed software confirms during testing that the implementation of the system on .Net Core in conjunction with the NoSQL database provides high performance and ease of scaling. Using IronPython to write smart contracts opens up broad possibilities for analyzing and processing data using artificial intelligence, which can be successfully applied to improve the decision-making mechanism for insured events.

For further development, the developed application provides the ability to integrate into the block-chain network data collected from vehicle sensors, which will significantly improve the efficiency of decisions made.

Processing automation of text data of large size (big data)

To obtain more information on the potential user of the services (in order to provide quality service taking into account the preferences of a particular consumer), large companies use the Big Data. The main task in computer processing of large textual data is to obtain qualitatively new knowledge in the shortest possible time. For this, data processing must be carried out quickly and without loss of quality.

The main problems in the processing of large textual data include the high computational complexity of the available analysis algorithms, the need to work with both structured and unstructured data, the rapid growth in the amount of data collected. In addition, personal data must take into account the risks associated with

their privacy and security. This in turn leads to a constant increase in the time spent on data analysis.

For computer processing of data in the created software application the Bayesian classification algorithm is used. It is based on the Bayes' theorem on the assumption of independence of features. This algorithm can perform multi-component classification.

Data processing and analysis consists of the following steps:

- selection of data (selection of signs that are significant for a particular study);
- preliminary data processing and correction of inaccuracies;
- transformation;
- direct knowledge extraction;
- interpretation of results.

Testing of the created software application was carried out, which confirms the effectiveness of the used algorithm for fast processing of textual data of a larger size and establishing their belonging to certain categories and subcategories for specified topics.

Computer model of news content mining

Providing personal recommendations that the problem of providing materials that are relevant to the user is an important issue in the rapid development of information technology and electronic mass media. Because millions of content characters are formed every day, the human does not have the physical capability to handle all the information. Because of the lack of a method of providing personal recommendations, valuable time is waste on searching for information, and opportunities to obtain sufficient quality information are limited. Providing personal recommendations is due to solve this problem. Recommendation systems development is versatile effort which includes experts from various fields, including data mining that is a powerful approach for the development of recommendations.

This work deals with the use of data mining methods to provide personal recommendations, including news content. Pre-processing user profile and text content were considered and use of algorithms TF-IDF, RF and LDA was offered. Matrix factorization tools and modification are provided taking into account variable time, which is important for recommendation systems. A hybrid algorithm was developed to increase the accuracy of counseling and optimal use of resources and ensure high productivity.

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Flexible agile methodology

The history of Agile begins with the publication in 2001 of the "Manifesto of flexible software development", consisting of 12 principles. Of course, certain Agile-approach provisions appeared before that, but only this document systematized and outlined them in a measure sufficient for use. Every year, new companies, IT specialists and project managers subscribe to the manifesto.

Agile is an iterative development model in which software is created incrementally from the very beginning of the project, in contrast to cascade models, where the code is delivered at the end of the operating cycle.

The basis of a flexible methodology is the partitioning of projects into small working pieces called user stories. According to the priority, tasks are solved within short two-week cycles (iterations).

The 12 principles that make up Agile Methodology can be divided into 4 main ideas [1-3, 5, 7]:

- Priority of people and communication over tools and processes;
- Priority of the working product over the full documentation;
- Priority of cooperation with customers over contract approval;
- The priority of willingness to change over following the originally created plan.

There are many types of flexible methodologies that are used depending on the number of resources on the technology stack, the time spent on implementing the project, the human resources of the project, as well as qualitative characteristics such as the development team, the availability of testing in a team, knowledge about the product owner of the product, etc.

Here are some of the methods that are used most often in software development:

Scrum. Rugby is obliged to its term “Scrum”, in which the word means a team game method in the form of building three lines for each of the opponents and trying to grab the ball. For successful interception, not only good physical training is necessary, but also the coherence of each participant in the fight and a clear understanding of the goal [4].

Such companies as Microsoft, Yahoo, Siemens Healthcare successfully use the method, and the project manager at Amazon even described the Scrum implementation case based on the experience gained.

Since scrum is a development framework, in each subsequent example it may differ significantly from the previous one.

Jeff Sutherland, author of Scrum. Revolutionary project management method ”highlighted 8 steps to use the methodology:

- Select the owner of the product - he knows about the purpose of the project and the expected result.

● Gather a team - up to 10 people with the necessary skills to create a workable product.

● Find a scrum master - he monitors the project progress, helps the project team deal with difficulties.

● Build the backlog of the product — on the Agile board, prioritize each product requirement. The owner of the product plays a big role in this. It collects the wishes of the product for evaluation by the backlog team.

● Schedule sprints (iterations) - time spans for performing a certain number of tasks.

● Organize daily fifteen-minute "mit-ups" - ask 3 questions to each of the team: what you did yesterday, what will happen today, what prevents you from completing the task.

● Make reviews of the working parts of the product - with involvement in the review and discussion of stakeholders.

● Do a retrospective - discuss the problem and find a solution after each sprint. The resulting change plan is implemented on the next sprint.

There are 4 key elements to scrum:

● Product Backlog - list of project requirements

● Sprint Backlog - a list of requirements that need to be met in the next sprint

● Sprint Goal - Sprint Goal

● Sprint Burndown Chart is a chart that updates as tasks complete. It is easy to understand the dynamics and level of progress of the team in the project.

eXtreme Programming (XP). The developer of the methodology, Kent Beck, created an extremal programming method, the purpose of which is to cope with the ever-changing requirements for a software product and improve the quality of development [4, 6].

It is applicable exclusively in the field of software development, and is built around 4 processes:

● coding - according to the same standards in the team;

● testing - tests are written by the programmers themselves before writing the code to be tested;

● planning - both the final build and individual iterations. The latter takes place on average once every two weeks.

● hearing - both the developers and the client, during which the ambiguities disappear, requirements and values are determined.

Crystal methodologies. A family of methodologies, little-known in the domestic expanses of project management, developed by Alistair Kokburn, one of the authors of the Flexible Software Development Manifesto. Classification Cockburn proposes to carry out the colors for the criterion of the number of people in a team: from 2 (Crystal Clear) to 100 (Crystal Red). For more ambitious projects, Maroon, Blue and Violet colors are highlighted [6, 9].

Crystal projects must meet 3 main indicators:

● Fast delivery of working code – development of the idea of an iterative Agile development model.

● perfection through reflection – the new software version is improved on the basis of the previous one.

● "Osmotic" interaction is the innovation of Alistair, a metaphor for communication and information exchange between software developers in the same room.

A detailed family of methodologies is described in Alistair's book Crystal Clear: A Human-Powered Methodology for Small Teams.

Dynamic Software Development Method (DSDM). Over the development of DSDM worked not one person and not even a team, but a consortium of 17 British companies. DSDM, like extreme programming, is primarily used to create software [7, 8, 10].

A special role is played by the participation of the end user (user) in the development process. In addition to this principle, the basic ones include:

● frequent releases of working product versions

● developer autonomy in terms of decision making

● testing throughout the entire life cycle.

DSDM is divided into versions that are updated with the development of technology, the emergence of new requirements for software development. The last one for today is DSDM Atern, released in 2007, although the previous one (2003) is still in service.

At the beginning, the team examines the reality of application development and scope. Further work is divided into three interrelated cycles:

The functional model cycle is the creation of analytical documentation and prototypes.

Design and construction cycle – bringing the system into working condition.

Implementation cycle – system deployment.

To summarize, we can add plus and minus the use of flexible methodologies.

Pros:

● involvement of stakeholders - the team has more opportunities to understand the desires of the client. And the early and frequent delivery of software enhances the trust of stakeholders in the project team and draws them even deeper into the project.

● Early and predictable delivery - the development model through iterations (short intervals from 1 to 6 weeks) gives flexibility, speeds up the release of a product release.

● Focusing on business value - Collaboration with the client provides the team with an understanding of how to make the product as valuable as possible to the consumer.

● Continuous quality improvement — testing during each iteration, dividing the final build into individual pieces of the working code allows you to improve and cope with software errors before the final product is released.

Minuses:

● increased requirements for the team and customers - without close interaction between the project team and users, it is impossible to achieve a quality

product with high value. And the abundance of tools and methods in Agile for implementation requires an experienced team.

● not suitable for outsourcing and projects where participants interact with each other only online.

● the risk of never releasing the final version of the software - this minus, oddly enough, comes up from the iterative development and continuous improvement of the product - the advantages of Agile.

● It does not work without a clear vision of the project's business goals - since the Agile team is focused on stakeholders, development is impossible without the development of objectives and product concepts.

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Approach to the multipurpose use of the pipeline-liquid system in the nonlinear range of perturbations

The pipelines on which the liquid is transported is an integral part of many transport and construction systems. Such systems surround us, both in the civil engineering sector, in transport systems and in transport infrastructure. Such systems are operated under high pressure conditions under vibration conditions. The pipelines are interacting with other components. Let's assume that the pipeline connects the fuel tank and the engine, the pipeline connects the turbine and the trunk line, which transports for example oil or gas.

The use of pipelines can be found in many areas of human life: pipelines are used in water supply, heating, technological cleaning, various constructions and structures, in automobiles, in mechanical engineering and mechanism, in power engineering, industry, aircraft engineering and space technologies. One of the most important tasks of science is the study of the behaviour of pipelines in transitional modes of fluid flow in the vicinity of critical velocities of the fluid. Particular attention is paid to the behaviour of the system when approaching the critical flow of velocities, when there is a loss of stability of the rectilinear form of the pipeline. This can lead to the destruction of the pipeline. Therefore, in view of the great value of such objects and the possible negative consequences in the event of pipeline destruction, the question arises about the development of effective methods for mathematical modelling of the pipeline system - the liquid in the linear and nonlinear ranges of system parameters changes. On the basis of the developed methods, it is necessary to conduct a study of passive and active quenching of unwanted oscillations that arise in the transitional modes of the system of the pipeline - the liquid during operation. The results showed that the mechanism of action of the Coriolis forces far exceeds the nonlinear mechanisms for promoting the redistribution of energy in a pipeline with a flowing fluid. Coriolis forces contribute to the excitation of higher forms of oscillation, which ultimately leads to the manifestation of a superharmonic in the resulting change in the parameters of the system fluctuations. For the case of different fixings of the pipeline, the expression of the Coriolis forces is decisive and leads to approximately the same effects. The presence of a free edge greatly enhances the manifestation of nonlinear mechanisms, which, moreover, manifest in conjunction with the action of the Coriolis forces.

The developed methods of mathematical modelling, to solve the problem of quenching of vibrations at this stage, are related to the study of passive and active quenching of unwanted oscillations that arise in pipeline-fluid systems during operation under transitional modes of motion.

Due to the choice of effective parameters and locations of damping devices, active damping of fluctuations of pipelines is possible. To provide an effective mode of operation of pipelines with liquid, to determine effective methods of damping oscillations, allows research of transient processes of pipeline dynamics. The results that can be obtained in the course of these studies can be applied in various fields: space and aviation industry, energy, transport industry, chemical and oil refining engineering.

A considered multicomponent system consists of an elastic tube which is under the influence of the high velocity flow of the fluid in it. Creation of a pipeline-fluid system model in the study of transients connected with significant mathematical difficulties. Classical linear theory does not provide results that are consistent with practice. It does not take into account the influence of nonlinear mechanisms, which significantly reduces the accuracy of modelling of real oscillations. When taking into account nonlinear members of the equations of motion, obtaining an exact analytical solution to the problem of pipeline dynamics is not possible even for the simplest cases of system movement. At the same time, the solution of the problem within the framework of nonlinear formulation by analytical methods is impossible so far, therefore, it is necessary to apply a numerical-analytical approach. The behaviour of this system is investigated on the basis of a nonlinear model whose construction is based on the Hamilton-Ostrogradsky variation principle. On the basis of the method, the motion of systems is presented in the form of decomposition in the form of oscillations. Such a problem is reduced to a discrete model: a finite-dimensional system of ordinary differential equations with respect to the amplitude parameters of the beam fluctuations on separate forms. The important point is that the input system for the case of a nonlinear model requires a mixed description of its component.

Numerical results have shown that the mechanism of these forces is much greater than the nonlinear mechanisms that facilitate the redistribution of energy in a pipeline with a liquid. For the case of various reinforcements of the pipeline, the manifestation of such forces is decisive and at the considered interval of time leads to approximately the same consequences; but the presence of a free edge greatly enhances the manifestation of nonlinear mechanisms. The developed model is sufficiently versatile and can be applied to study many application problems of pipeline dynamics in transitional modes of motion. Important results are an analysis of the influence and nature of various nonlinear mechanisms, the study of different fluid flow regimes, and the possibility of applying the flow law to damping oscillations.

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Computer Expert Systems for Transport Platforms

The article considers the information technologies used in transport companies work and the transport platforms activities in Ukraine on the basis of the review of the transport market. The effectiveness of intermediary activities in Ukraine is proved by the saturation of the transport market with offers, therefore expanding the range of services and increasing the level of information resources security could become a competitive advantage. The list of services transport platforms, popular in Ukraine, turned out to be diverse, but insufficient, given the rapid development of social networks, IoT and disruptive transport innovations.

Today, more and more people can't imagine their lives without information systems and technologies, as they significantly help both in work and in everyday affairs. Modern information technologies cover almost all sectoral structures of a particular state. An information site is a resource oriented to the outside audience, its task is to present its services to potential customers. In the research information portals used by the participants of the transport process are considered. At present, there are many transport platforms and in Ukraine the most popular are Lardi Trans, Della, Cargo.lt, Trans.eu, Degruz, Timocom.

Transport platforms are the fastest, most convenient and affordable way to find partners for themselves. Each resource has its own interface, functions, services, price policy and etc. They should maximally satisfy the requirements of absolutely all categories of users to achieve their desired result and provide their services promptly. Therefore, a comparative characteristic of the most popular transport platforms in Ukraine was carried out (Table 1). With the help of transport platforms, users have the opportunity to find potential partners for themselves, both nationally and internationally, as they provide a detailed and operational review of the state of the freight transport market. Earlier, forwarders spent extra time looking for new business partners through directories and now they are using a simple software application. With the help of the Internet resource, you can set the parameters for finding the necessary information (in terms of proposals for the type of cargo or transport, countries and places of departure (destination), etc.). As a result of surveys and studies, participants in transport platforms that do not yet have regular partners start their cooperation only with companies that are registered on relevant Internet resources, which does not guarantee, however, it reduces the risks of unscrupulous partners. One of the advantages of using the transport platform for them was a significant reduction of empty mileage of vehicles. Even when the "reboot" breaks down, in most cases you can quickly find another batch of cargo through a particular transport platform. Table 1 is based on the analysis of services provided by each transport platform. Consequently, the work of each of them can be classified according to three criteria (Figure 1). In addition, access may be fully or partially paid.

Table 1.

Comparative characteristic of the functionality of transport platforms

Resource name	Main functions					Additional functions	Price policy
	Applying for applications	View applications	Catalog	Advanced access to company data	Feedback		
LardiTrans	*	**	***	*	*	forum / trans blog /calculation of distances / reliability zone / automarket / advertising / insurance / news	Depending on the tariff plan: 150-3500 UAH / month.
Della	*	**	*	*	*	distance calculation card / statistics of price policy for shipping / search for related cargo and transport / advertising	The site management provides information on the tariff only after registration.
Cargo.LT	*	**	*	*	*	forum / bulletin board / auction / map / certification system for managers and companies / news / advertising / debt collection service	From 30 Euro / month
Degruz	*	**	****	****	-	distances between cities / freight rates / the cost of transportation	399 UAH / 3 months
Trans.eu	*	**	*	*	*	news / legal support / shop for the transport industry civil liability insurance / fund for driver support / debt support ISO certification / GPS navigation online	828 euro / year
Timocom	*	**	*	*	*	news / tenders for freight transportation / transportation orders / international debt collection / tracking	Approximate price up to 1000 Euro / year

Legend: * - only registered users; ** - available without contact information; *** - available without registration; **** - full access, except for contact details of the cargo owners

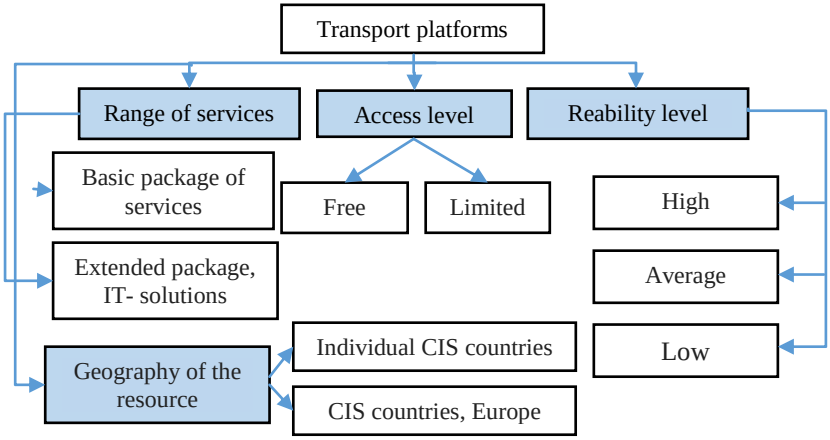

Figure 1. Classification of transport platforms

Transport platforms have a convenient mechanism for finding operational information on the goods to be transported and vehicles freely available for further work. Their users have the opportunity to accelerate the daily planning of transportation, find potential Ukrainian and foreign partners, assess the current state of the cargo transportation market and get legal advice. In addition, the procedure for registering on transport platforms and the terms of exclusion from it give an idea of the level of reliability of its users. The effectiveness of mediation in Ukraine is proven by the richness of the market proposals, therefore expanding the range of services and increasing the level of information resources security can be competitive advantage. Regarding to the shortcomings of the platforms, even if only companies that have undergone the appropriate inspection are allowed to work and provide a high level of security of the information resource, fraud cases still arise. Company employees need to know what is the situation at the market of carriers and forwarders, as well as the conditions on which the partners work, in order to achieve positive results and solve the tasks.

Conclusion

Consequently, thanks to the transport platforms, almost all the carriers have had the opportunity to place their offers without any effort, to review the offers of other companies, to easily find partners for themselves. In case of force majeure, you can find downloads for you anywhere in the world. In spite of the advantages, in order to strengthen the position of the transport market, transport platforms must constantly develop the reliability and diversity of their services, given the rapid development of social networks and the emergence of new subversive transport technologies. And given the steady increase in the level of harmful emissions as a result of the work of cars, new services that will reduce the empty mileage, build the optimal route of transportation with the use of other, less harmful modes of transport, determine transport conditions that will ensure energy efficiency, can attract the attention to transport platforms of foreign investors.