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ABSTRACTS

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CONFERENCE HOMEPAGE https://icic.liepu.lv

TABLE OF CONTENT

HOW TO CALCULATE ENTROPY FOR VIDEO LECTURE?

Linda Alksne[1], Andris Ozols[2]
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Keywords: entropy, formula, information, measure, video lecture

This paper is dedicated to the entropy calculation of video lecture. There are all the components described and explained. Formula is customized to calculate the entropy directly to the video lecture, because the aim why this calculation of entropy is needed is to compare different types of video lectures by the amount of information. Entropy is a measure of the unpredictability of the state, or equivalently, of its average information content. So first the video is analysed by its picture and sound to find out what components are needed to include in formula of entropy calculation, then intervals are defined and in the end there is methodology and formula for calculating the entropy for short part of video lecture.

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The paper was prepared with the financial support of the project "Promotion of research, innovation and international cooperation in science at Liepaja University", Project No. 1.1.1.5/18/I/018.

MODELLING THE POTENTIAL ACCUMULATION ZONES OF SURFACE CURRENT AND WIND DRIVEN PARTICLES IN THE SHORELINE OF BALTIC SEA IN LATVIA

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Keywords: drift modelling, Baltic Sea, fimarweb

University of Latvia (UL) has acquired experience in the development of operational oceanographic data visualisation software FiMar for search and rescue purposes since 2004. Additionally free operational object drift forecast service developed by UL is available on the internet site: www.water.lv/fimarweb since 2019. Previously mentioned developments benefit from oceanographic model data from Copernicus Marine Environment Monitoring service and operational oceanography Hiromb-BOOS model at UL (UL_HBM) and marine meteorology data from the Danish Meteorological Institute driven HARMONIE model. Recent experience has shaped the numerical drift experiment in which floating particles have been daily released on the surface of the virtual Baltic Sea model on uniform 5x5 km grid and their paths have been analysed. The time step – 1 hour and a wind factor 1.5 % have been used for the period of interest 2008 – 2018 in the numerical experiment.

Results show that the coastline of Latvia, which accounts 3.4 % of the total coastline in the model, receives 9.1 % of the released particles. This result illustrates the dominant wind impact in the region. In case Baltic Sea shoreline of Latvia is analysed it has been shown that the largest amount of the particles is washed ashore during summer and autumn month – 34% and 29% of the total particles, respectively. The sites of origin of the washed ashore particles are shown in Fig. 1.

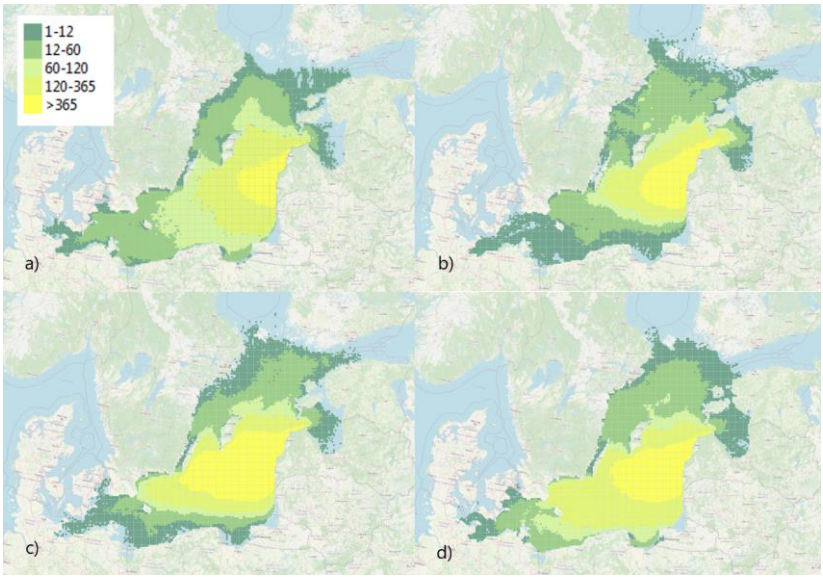

Figure 1: Number of particles in each 5x5 km grid cell that are washed ashore on Nida-Cape Kolka shoreline during 2008-2018 (a – winter, b – spring, c – summer, d – autumn).

Research has benefited from the support of the Latvian Academy of Sciences, project lzp-2018/1-0162 DRIMO – Drift Modelling for pollution reduction and safety in the Baltic Sea, 2018-2021.

APPLICATION OF ECM (ELECTRONIC COMPUTING MACHINE) WHEN COMPUTING POWER RESIDUES

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Keywords: algorithm, cycle operator, comparations, modulo, residue classes, power residues

Natural number power residues and properties thereof are considered in modulo 10^k, where k takes values of 1, 2, …, 10. With the help of computer based computations those one-digit, two-digit and three digit numbers are found, the powers of which are comparable to the number itself. Based on the laws discovered within the frameworks of numerical experiments, additional properties of power residues are defined.

Using a computational machine, power residues of natural numbers modulo 10^k are computed, where k takes values of 1, 2, 3. Special algorithms in FORTRAN language allowed avoiding computation of powers, for example, for three-digit numbers with indicators larger than 100. Multiple use of cycle operators and embedded functions allowed composition of full systems of residues for one-digit, two-digit and three-digit numbers in modulo equal to the base of the numbering system, namely: 10, 10^2 and 10^3. Such computations allowed discovery of little known properties of power residues and gave stimulated research in the case of modulo larger than 10^3.

LATVIAN LANGUAGE ELECTRONICAL MANUAL – CORRELATION OF DIDACTICS AND TECHNOLOGY

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Keywords: handbook, principles of didactics, digital learning resources, online learning materials, and exercises for learning language issues.

The concept of correlations as an indicator of cross-compliance and relations has been widely used not only in natural sciences and in engineering. It is also increasingly viewed in the sub-sectors of social sciences and the humanities, to describe the interrelation between phenomena, concepts, events, etc. In this study, correlation is used as a measure of relation to determining how strong and interacting the relationship between two different systems is – the principles of modern didactics and the functions of a learning tool, respectively, application capabilities.

The handbook essentially is a compilation of the main information for practical purposes. It is a type of teaching aids in which development and preparation of certain didactic principles, such as scientificity and visualization, systematic and sequence, readability, accessibility respected. However, a modern learning process is inconceivable without several other didactic principles as well (e.g., free creative activities, positive emotional background of learning, linking learning experience to real life, intellectual activities and self-expression options of pupils, etc.). When designing a handbook for use in the electronic environment, a balance between the conditions of good practice in the didactics and opportunities and limitations of technologies must be found.

The handbook uses various technological solutions:

(1) Multimedia allows using text, pictures, audio, and video in the explanation of study content. (2) Hyperlinks allow providing quick access to appropriate information both in different sections of the handbook and on the Internet. (3) Interactivity, which ensures the involvement of the learner in the learning process, the choice of topics and the order in which they are acquired, and to perform self-testing tasks, etc. The handbook is developed by implementing best practices in responsive design, i.e., the content of the material is equally well-comprehensible on different screens (computer screen, tablet, smartphone).

The object of the research is the "Latvian Language Handbook" („Latviešu valodas rokasgrāmata"; *valodasrokasgramata.lv*), which has been developed as a multifunctional informative practical electronic tool for any

Latvian language learner. The study aims to characterize a tripartite correlation between 1) adherence to didactic principles in the development of electronic teaching aid, 2) human learning habits, and 3) the opportunities and limitations of modern technology.

To achieve the aim of the study, it is important to clarify several issues:

Whether technology is a sufficiently motivating language learning tool that could lead to a waiver of one or another of the didactic principles; whether the correlation can be characterized as a mutually positive factor, i.e., the more limited the potential of the electronic learning tool, the more effective the respect of didactic principles should be, and vice versa.

How current capabilities (text, audio, images, and interactivity) offered by an electronic learning tool correlate with the learner's creativity, and self-expression; tests and self-tests do not allow for several correct solutions, they must be "unambiguous", verifiable with computer tools.

USABILITY EVALUATION OF BUSINESS PROCESS MODELLING TOOLS THROUGH SOFTWARE QUALITY METRICS

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Keywords: usability, quality metrics, business process modelling, evaluation

Due to the widening range of functionality, the software is becoming more complex, and there are a number of problems related to its ease of use, and more specifically, its usability. The concept of "usability" is associated with the ease, efficiency and satisfaction of using any item, including computer technology.

Specialists in the development of user interfaces face the challenge of creating products based on user experience and combining aesthetics, functionality, ergonomics, the ability to quickly accomplish the tasks, while also having to comply with the constraints imposed by the specificity of the activity for which the software applications are intended.

It can be said that business process modelling software is characterized by medium and even high complexity due to the many functionalities they offer. In this regard, the purpose of this paper is to propose and implement a method for evaluation the usability of this type of product based on software quality metrics.

TASK STALLING BUFFER APPLICATION IN GRID COMPUTING

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Keywords: task stalling buffer, grid computing, task scheduling.

The purpose of our research is to test task stalling buffer application opportunities in grid computing. Task stalling buffer was first presented for solving slow server problem [1]. Their proposed method reduces slow server load by redirecting incoming tasks to the task stalling buffer, which is then processed by the fast server. As a result, the slow server receives new tasks only if the task stalling buffer is full. We adapted and applied this method for solving heterogeneous grid computing environment performance and availability issues. Experiment results show reduced total task execution makespan by up to 36,48% (Figure 1). This allows us to conclude that task stalling buffer can be successfully applied to improve service quality in grid computing applications.

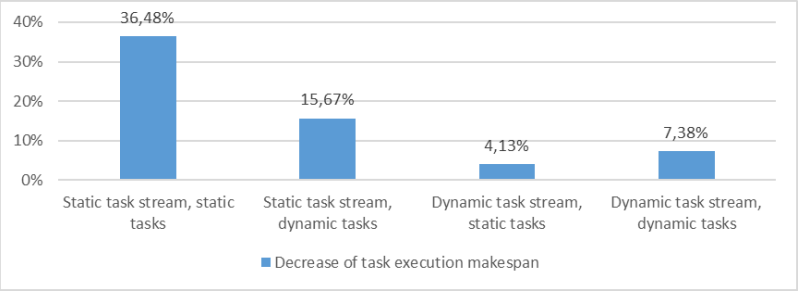

Figure 1: Decrease of task execution makespan in heterogeneous grid with an applied task stalling buffer.

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RED SEAWEED *FURCELLARIA LUMBRICALIS* AS A RESOURCE: SKIN CARE PROJECT

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Keywords: seaweed detritus, Kurzeme coast, herbal approach, phytotherapy, phytocosmetics.

From old times wild-harvested marine seaweeds (or macroalgae) have been used as a valuable bioresource (namely, as a food, fodder, fertilizer, fuel and medicine source as well as as a habitat for fish stock) to support coastal communities. Nowadays consumption of seaweeds is even more intense; accordingly, coastal stakeholders` interests are markedly focused on availability of sea macroalgae stocks.

In Baltic Sea region Black carrageen *Furcellaria lumbricalis* (division *Rhodophyta*, red algae) has the longest-lasting gathering history among seaweeds. This macroalgae is also one of the most common and abundant seaweed species distributed along the Latvian Baltic Sea coast. *Furcellaria* populations are particularly large and dense here on sites nearby Liepaja city and Pavilosta town (both settlements are situated on the Kurzeme coast, i.e. in Western Latvia) representing thus a remarkable resource for local commercial use. Moreover, also carrageen detritus (i.e. dead biomass) which is washed ashore and piled up on Kurzeme beach constitutes a valuable feedstock for relevant business developments. Traditionally, Latvian *Furcellaria* resources have been exploited for production of furcellaran or agar-agar (a common additive in the food industry). Most part of furcellaran has been sent to sweet factories of Baltic States, Russia, Ukraine. Furcellaran manufacturing industry flourished at the end of XX century and then this business deceased.

Just like other red algae *Furcellaria lumbricalis* has been used, among others, for cosmetic and pharmaceutical business. This seaweed is rich in antioxidants and, accordingly, *Furcellaria* made products can protect human skin against harmful impact of free radicals and other environmental stressors. Black carrageen cells contain bioactive substances which have anti-inflammatory, anti-aging, wound healing, sunscreen, moisturising, etc. effect on skin: accordingly, there is an urgency for relevant skin care business projects, and proposed research is carried out to provide appropriate experimental support. This study is rooted in herbal approach (i.e. utilization of a whole plant – usually as an unrefined extract – instead of using relevant natural chemical substances or their synthetic derivatives) applied for

creating new *Furcellaria* origin products with simultaneous phytotherapeutic and cosmetic skin care effect – like soaps, skin treatment oils, fragrances.

LOW DENSITY POLYETHYLENE AS A BINDER COMPOUND FOR THE RECYCLING OF CRUDE MILLED ASPHALT FROM PAVEMENT MILLING WORKS

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Keywords: Low Density Polyethylene, LDPE, recycling, asphalt, crude milled asphalt

The use of waste plastics as a binder compound in asphalt recycling is widely researched and even some commercial applications are already available, though there are still some lesser researched topics in this field. One of such examples is recycling of crude milled asphalt from pavement milling works in typical commercial processes without additional equipment. In such case not every type of plastics can be used – only those with melting temperatures similar to asphalt and widespread enough to keep competitive price of the whole recycling process. This research investigates the use one of such plastics - Low Density Polyethylene (LDPE).

DIGITAL TRANSFORMATION OF THE THEATER EXPERIENCE

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Keywords: Digimodernism, theatre, post-dramatic, visuality, fragmentation, Digital Natives

The paper examines the impact of digital technologies on current processes in European theatres by analyzing specific performances. The research based on the theory of digimodernism by Oxford scientist Alan Kirby who defined digimodernism as visuality affected by digital technologies that changes every conceptual structure of the art and forms a new cultural landscape and aesthetics. Digimodernism is viewed both as a method of artwork (in this case – theatre) and as a discourse on the problematics of the Digital Age which focuses on the different perceptions between generations. The American theorist Marc Prensky describes the difference of generations by naming them the Digital Natives and Digital Immigrants. Digital Natives are the generation that has grown within the Digital Age, whereas Digital Immigrants are their parents and grandparents with a different worldview. The author of Article also questions the contemporary theory of "postdramatic theatre" as a concept that quite freely combines extremely different forms of performing arts in variant periods and thus prevents defining a single, identifiable form. Both the theoreticians of post-dramatic theatre and digimodernism point to different principles in the formulation of the "text" – all sign systems that form the performance in theatre. The research concluded that the ability to perceive and understand the author's idea becomes possible when the recipient has learned the language of that type of art, and this language is increasingly adapted to the perception of the digital generation. The concept of 'digimodernism' allows a more precise description of a certain direction in the theatre. It places fragmented visuality as a priority; physical characters as opposed to psychological, the message of performance created by the dominance of technological expressions; and we can identify the difference from the so-called dramatic theatre. Today such productions considered an avant-garde, experimental direction. At the same time a traditional theatre, where directing, stage design, music, choreography and drama are of crucial importance, still exists and develops. However, digimodernism in contemporary theatre announces new problematics that significantly affect not only the Art of Theatre as an aesthetic phenomenon but also its perception within the different social groups.

RECENT TRENDS IN DATABASE TECHNOLOGY

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Keywords: relational databases, NoSQL, NewSQL

Rapid development of information technologies puts forward new requirements to data storage, processing and management. Social networks, web 2.0, web 3.0 technologies, cloud computer technologies require certain means enabling effective management of unstructured information dataflow. As an alternative to relational databases NoSQL and NewSQL database management systems become more and more popular. This paper briefly discussed the past achievements of database research and development, present differences between different types of databases.

E-MATERIAL FORMATTING APPLICATION PROTOTYPE 2.0

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Liepaja University, Latvia

Keywords: app prototype, e-learning, e-material, formatting application

Digital devices provide the most amount of nowadays textual information. Unfortunately, the humans' vision system is not fully adapted to the new reading situation - digital reading model. Screen users are having complains during and after screen use.

Firstly, current recommendations and methodologies for e-material formatting are not appropriate for digital reading. It is based on printed material and is not adapt to e-materials. It increases complains of users.

There are developed parameter recommendations for more appropriate and user-centric e-material formatting. It is developed for e-learners without significant reading and learning limitations and without disabilities but with the possibility to modify.

Secondly, based on research, there is no automated process of personalized formatting for e-materials.

For automatization of the formatting process, an app is developed to reach the improvement of visual perception faster. It is important to reach a wider range of users and increase the possibility of personalization.

Prototype 2.0 is focused on improvements in the application. In the second prototype has been used PHP7.3 programming language. As it is the server language it is appropriate for this kind of app. The prototype 2.0 focus is to make it accessible and workable on all the most popular formats of e-materials. The significant upgrade is that the app is made in such a way so it could be used with any e-material system not only Moodle.

The improved version of the application is focused on visual appearance as prototype 2.0 is planned to use for the alpha testing.

TOOLS TO PROVIDE E-LEARNING MATERIALS FOR ENGINEERING STUDY PROGRAMS

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Keywords: e-learning, electronics, learning materiāls.

Increasing interest in distance learning and education has brought Universities at a point that they are forced to think differently and find options to make e-learning suitable in different fields.

Experimentation and laboratory practices are crucial in the process of learning physics and engineering. Therefore a challenge exists how educational institutions can provide students with suitable learning materials to learn skills in e-learning format and what are the most common used tools for designing such materials. This research demonstrates the tools that are used to make e-learning materials to provide necessary skills to master basic electronics and electromagnetism.

THE IMPACT OF THE DATA DRIVEN ECONOMY ON THE RESEARCH/DEVELOPMENT/ INNOVATION AND THE FUTURE ENTERPRISE

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Baltic&ScanTech Ltd, Sweden

Keywords: Data,Age of Data Driven Economy , AI, Deep learning, Globalization, Disruption, Digital Economy, Workload, Innovation, Discovery, HPC, Modeling and simulation, CERN, An electron Shower, CPU, complex geometry modeling

We are living in an age of disruption and globalization. Data is the world's most valuable resource. It is all about data.Data is the today's capital and the core asset.

In the age of data driven economy what are the best data strategies to do research,development,innovation and for the future enterprise?

Responsible use and management of data are key elements of a digital or a data driven economy.

Good data management practice requires basic protocols to reduce uncertainty and make it manageable, and managed.

Academia, research/development/innovation institutes and the owners of enterprices are constrained in growing compute while are dealing with increasing complexity and larger data sets in the era of data driven economy.

There is a disire to utilize their existing infrastruture for new AI and deep learning workloads to help speed up their innovation and discovery.

As a result, HPC and AI in the data driven economy are converging along three major pillars: converged infrastructure, converged workflows and applications , and enhanced AI performance.

The use case I'll discuss in this article highlights how academia, research/development/innovation institutes and the owners of enterprices can use as a replacement for computional and time-heavy modeling and simulation.

Academia, research/development/innovation institutes and the owners of enterprices already using HPC to turn modeling and simulation can introduce AI to gain insights from their results faster in the new era of data driven economy.

So, now that you have a better idea for the use of AI in the HPC space in the new era of data driven economy (compare with the traditional economy), let's look at a specific use case for high energy physics taht was a joint collaboration with CERN, Sufsara and Intel.

CERN currently uses Monte Carlo simulation for complex physics and geometry modeling.

This heavy computational load consumes up to 50 percent of the worldwide large Hardon Collider Computing Grid power for electron shower simulations.

Since CERN's modeling and simulation is so computational heavy for creating an electron shower, they are looking to use AI to help better allocate their CPU.

PHILOSOPHY PLAYGROUND - USING PHILOSOPHICAL THOUGHT EXPERIMENTS TO CONSTRUCT ART COMPUTER GAMES

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Keywords: Computer games, art games, philosophy, new media, educational games

Computer games can cause engagement through their audiovisual aspects and story—much like a movie would. Another way computer games cause engagement is through the game itself—the gameplay. It is this aspect that features the greatest potential for using computer games as a platform for creating artworks—the interactive aspect of the game, be it the movement of the character, interacting with other artificial persons and entities (such as interactive dialogue and combat) and many forms of interaction with the game's world (from pressing buttons that make pianos fall from the sky, to changing the flow of time).

These interactive aspects, the gameplay, lend the player an ability and freedom to interact with the game as they please. This is based on the concept of play or "paidia" as coined by sociologist Roger Caillois in his 1961 book 'Men, Play and Games'—the way children play, without fixed rules, at their own pace and using purely imagination. Where this can be useful, both educationally and artistically, is in the metaphorical potential of these gameplay elements, mostly known as gameplay mechanics. By using these interactive elements (movement, interaction, combat, dialogue) as the basis of a metaphorical version of some other abstract concept (such as, but not limited to, philosophy), an artist or an educator can create a world in which the player can play and experiment with the philosophical concept and become more familiar with it. This paper will focus on a concept game that explores the philosophy of Soren Kierkegaard and his concept of Anxiety.

To illustrate the methods that artists can use to create art computer games, an analysis is made of one concept game produced by the author entitled 'Anxiety and Freedom, the Game'. The game uses several gameplay metaphors to illustrate and engage the player in the same problems as examined in Kierkegaard's work (Kierkegaard's version of Anxiety, from 'The Concept of Anxiety', 1844).

The paper will first explore the spatial and visual metaphors used to establish the game's world, starting from calm, clean visual aesthetics, that, as the game progresses, turn into tall, complex, vertigo inducing spaces (especially when used in Virtual Reality): these concepts represent

Kierkegaard's views of Anxiety as being the product of a person realising the absurd degree of freedom one has. The gameplay aspects (gameplay mechanics) are built on presenting the player (and after a while forcing them) with choices which they can make by moving through a maze-like structure, that after every corner offers an ever-increasing number of choices. Then, to further illustrate the complexity and different nature of various choices, the paper will look at methods to integrate the player's various responses to the game—such as non-compliance with the games rules and exotic choices, that differ from the maze-like gameplay—dead ends, escape routes, impossible and paradoxical geometry and others.

ARTISTIC EXPERIMENTATION WITH IMAGINARY LANGUAGES AND CODES

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Keywords: Coding, codification, artificial languages, artistic practice, visual poetry.

This paper introduces my artistic practice and my research focus which lies in the area of linguistic codification, involving elements of artificial language creation and visual poetry. The paper firstly describes my own artistic practice and secondly discusses different terminology issues in the area of artistic language (in the sense of linguistic, artist designed writing systems, sometimes termed “pasigraphies”). The research interests detailed in this paper are an artistic interpretation of linguistic code generation and/or new language creation. This process involves researching historical writing systems from different cultures worldwide as a means of inspiration to create new language codes which are subsequently embodied in visual poetry artworks.

Albani & Buonarotti (1994) categorised 'imaginary languages' of which various sub-groupings were identified, one of which included artist-invented languages, children-invented languages, languages invented by spiritual mediums, languages invented by “crazy” poets, and “alienated” inventions of the artificial language field. This paper attempts to answer the question of whether these artistic inventions are created only by people with no deeper intellectual understanding of the process involved, or whether the approach is systematic and analytical. The overall aim of the research is to make a claim that an artistic genre can be identified, based on the themes detailed in this article, and named 'codification art'. Richard Nordquist in *Definition and Examples of Codification in English* makes a working definition of the term codification and this is used as a starting point for the elaboration of the arguments towards the genesis of this new term. The research focus lies at the intersection of three artistic themes: art made with code, linguistic codification art and visual poetry. Various artworks, both historical and contemporary, will be presented as evidence towards the claim for a new categorisation of 'codification art’.

THE USE OF THE MATRIX METHOD IN THE DEVELOPMENT OF THE COMPUTER PROGRAM FOR PSYCHOPHYSIOLOGICAL TESTS BASED ON SOME METHODS OF ARTIFICIAL INTELLIGENCE

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Keywords: artificial intelligence, psychophysiological test, computer program, visual perception, image segmentation

The main idea of research is developing a computer program for calculating and analysing segments in psychophysiological tests, based on some methods of artificial intelligence.

The computer program can be very useful for assessing the development of the psychomotor skills of children and especially children with developmental problems.

Also, to create a program, we will use the recognition system of any object using Raspberry PI. Over 20 million years of evolution, human vision has developed greatly. 30% of human brain neurons work on the processing of visual information, for touch, this indicator is 8%, and for hearing - 3%.

Compared to machines, people have two big advantages: stereoscopic vision and an infinite amount of data for training (over five years of life, a child processes approximately 2.7 billion images at a speed of 30fps).

To stimulate people's performance, scientists divided the task of visual perception into four categories:

1. Classification - labeling the whole image.
2. Localization - the definition of the frame around the object and its description.
3. Object detection - create multiple frames on the image.
4. Image segmentation - creating exact segments containing objects in the image.

Object detection is used in several cases. Although image segmentation provides a more accurate result, its problem is the difficulty of creating training data. A person segments an image 12 times longer than creating frames. Moreover, after detecting an object, it is possible to segment it from the frame.

One such method is the matrix method. The essence of the matrix method is as follows. Each image can be divided into pixels - x and y. Say 600 columns x and 1000 columns y. Each pixel corresponds to a number. It can be different. The simplest option is 1 light, 0-dark. We get a 600x1000 matrix, where some units are located that actually form a picture or frame. If the

image is empty, the matrix is all 1 - light field. Someone held out a line with a pencil. Main tasks:1) check if there is a line? 2) where is it? The device does not know anything, and it needs to find everything. If the matrix is 1 and 0, then it is easier, but it is rare. More often, instead of a unit, numbers with fractions and more. Furthermore, zeros are also not zeros, but smaller fractions. In order to find a line in such a matrix, it is normalized (so that the numbers are not anyhow, but from 0 to 1), then they are multiplied from the original by the XOR principle, i.e., equals are quenched. We get the line if there is one. The weight of the matrix (sum) indicates whether there is a line.

SYSTEM FOR ACADEMIC AND SCIENTIFIC TEXT TYPES AND LINGUISTIC CONSTRUCTIONS IN THE LATVIAN LANGUAGE

Raitis Ralfs Vecmanis[1], Agnese Dubova[1], Diāna Laiveniece[2], Raita Rollande[1]

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Keywords: information system, academic and scientific text types, linguistic constructions of academic and scientific texts, corpus linguistic methods.

Research objective

The aim of the academic and scientific texts types and linguistic constructions system is to assist different groups of people in the creation of scientific texts based on their micro and macrostructure characteristics in the Latvian scientific language.

Problem description

There is currently no unified system in Latvia where anyone can obtain information on how to create academic and research texts and build linguistic constructions for scientific texts. Libraries and websites have a variety of information resources with conflicting information that creates confusion. As a result, the quality of scientific research texts is at stake generally. In order for students and scientists to produce high-quality scientific research texts and linguistic constructions, there is a need for a unified system accessible to everyone. To solve this problem specialists from the field of linguistics and information technology came together to first create a theoretical basis for the creation of academic and research texts and linguistic constructions and then to develop an information system that would make the result accessible to any interested (students, teachers, researchers, etc.).

Methods

The corpus linguistic method was used for the analysis of language construction.

The systems interface is developed using Angular 8 framework. Interface compatibility with and responsiveness to mobile devices is provided by the MDBootstrap framework. The system API is developed using the Node.js environment and the Express.js library. Data storage and maintenance in the system is provided by the PostgreSQL database engine. Docker containerization is used for a simplified management and installation of the system. Git and the Ventspils University of Applied Sciences Gitlab CE instance are used for storing and managing the code.

Results

As a result of this research, data on types of scientific research texts and linguistic constructions has been obtained and the analysis of the obtained data has been performed. Macrostructure and microstructure of different types of scientific texts were studied using corpus linguistics methods to analyze their vocabulary and textual elements, thus promoting the use of high-quality Latvian science language in the national academic environment and preparing the preconditions for further research of scientific discourse.

DESIGN THINKING FOR EDUCATION FOR SUSTAINABLE DEVELOPMENT

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Keywords: sustainability; design thinking; interdisciplinarity; master studies

The complexity of environmental and sustainability challenges is creating an ongoing need for innovative and integrated approaches to address them. Design disciplines have a long history. The method *"design thinking*", originally applied in architecture, engineering and business, leads to new and creative problem solving, thus creating much potential for use in sustainable development planning. While principles of good design are well established, there has been limited integration of design thinking with environmental science, sustainable development planning and education.

This research focuses on how a sustainability approach can be merged with design thinking to develop socially responsible and environmentally sustainable products and services. The case study was carried out in the Master's study course *Sustainable Development Planning*. Some of basic principles and stages of design thinking, such as empathy, creativity, collaboration, responsibility and interdisciplinary approach were tested. The first results of approbated design thinking principles and methods, significant advantages and disadvantages are analysed and the perspective of using this method is discussed.