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Institute of Computational Technologies of SB RAS
National Engineering Academy of the Republic of Kazakhstan
High Performance Computing Centre in Stuttgart
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Abu Dhabi University
Novosibirsk National Research State University
Novosibirsk State Technical University
Siberian State University of Telecommunications and Information Sciences
Institute of Information and Computational Technologies



ТЕЗИСТЕР - ABSTRACTS

Халықаралық конференция
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ақпараттар технологиясы”

СITech2015

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“Computational and Informational
Technologies in Science,
Engineering and Education”



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Institute of Information and Computational Technologies

ABSTRACTS

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in Science, Engineering and Education"

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The book contains abstracts of the participants of the International Conference "Computational and Informational Technologies in Science, Engineering and Education". The proceeding of the Conference will be beneficial for specialists in the field of Mathematics and its applications, as well as for students, undergraduates, doctoral students majoring Computational and Informational Technologies.

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International Scientific
Technologies in Science
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Historically, the conference
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Later it expanded the
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The purpose of the conference
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In different years CITech
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the Novosibirsk Scientific Center
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Unfortunately, some of the
their contribution to science
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The proceeding of the
Mathematics and its applications
students majoring Computational

resentation of Moodle	238	M.N. Kalimoldayev, T.U. Islamgozhayev, A.K. Zholmyrzayev, Sh.S. Mazhitov, <i>Design and development of mobile remote controlled robotic platform</i>	254
T. Orumbaeva,		P. Kisala, W. Wojcik, G. Kashaganova, A. Kalizhanova, N. Kussambayeva,	
in the process of	239	G. Yussupova, <i>Analysis of the possibilities for using a uniform Bragg grating in a tunable dispersion compensator</i>	255
	240		
ev, Combinational		M. Lutovac, P. Spalevic, N. Arsic, <i>Raspberry Pi, Mathematica, and electrical engineering education</i>	257
ology	241		
Makashev., A.Zh.		Y. Molorodov, A. Zelenchuk, <i>The conception and architecture of the Internet portal for the study of thermophysical properties of materials</i>	258
sectoral frame of		N.R. Musabekov, D.T. Kasymova, A.K. Muslimova, A.O. Utegenova,	
"	243	I.T. Utepbergenov, <i>Integrated Approach for Implementing the Virtual Information Infrastructure of the automated process control system</i>	259
технология создания		Mustafin S., Zeinullina A., Mussina Zh.	260
поэтического	243	N. Nagul, <i>Discrete-event systems with state observation properties studying</i>	260
ков, ML-Studio -		K.A. Ozhikenov, R.M. Utebaev, R.S. Ismagulova, A.K. Ozhiken, G.D. Aitzhanova, <i>Automation of data geodynamic monitoring on an oil and gas field</i>	261
медиа лекций	245		
		G.N. Pachshenko, <i>Algorithm for construction of the intellectual control system of the object with inexact parameters and delay on the basis of artificial neural networks</i>	262
		V. Petrovic, A. Grujic, <i>Application of programmable logic controllers for efficient use of photovoltaic panels</i>	263
ATION AND	247	A.G. Poleshchuk, R. Shimansky, <i>Diffraction optical elements for a quality checking of the aspherical mirrors of large telescopes</i>	263
mic monitoring on	248	D. Rakhimova, M. Abakan, <i>The problem of Word sense disambiguation in Machine Translation system of Russian-to-Kazakh languages</i>	264
		O.I. Shirayeva, T.G. Denisova, <i>Investigation of artificially immune system with using of fuzzy logic</i>	266
kina, An approach		С.Н. Астраков, Е.Н. Амиргалиев, <i>Задачи покрытий и упаковок в некоторых приложениях</i>	267
raction problems	249	Д.В. Волков, А.М. Епихин, <i>Архитектура программного комплекса интеллектуального облачного сервиса мониторинга состояния и управления для удаленных распределенных объектов</i>	267
il modeling and	250		
is in multi-agent			
as	251		
a, Level crossing			
presence of Rician	252		
alysis of a Direct			
rt Applications	253		
w, Z. Baibatyr,			
Vehicle License	253		

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The problem of Word sense disambiguation in Machine Translation system of Russian-to-Kazakh languages

Today the problem of the lexical and syntactic ambiguity resolution is a very important issue. We try to solve this problem in our work. So we chose the Rule Based method taking into account all grammatical, morphological, and lexical features of Russian and Kazakh language.

In this work, we offer the method based on Bag of Words (BoW) which solves lexical ambiguity of words [1]. BoW model is one of the ways of representing context vector (CV) for supervised learning technologies. In our model, the sentence represented as a set (multi-set) with its words, disregarding grammar and even word order. The task of lexical analyzer-generation of word and disambiguation in sentence (text) can be easily represented as a task multivalued mapping. Let X and Y - an arbitrary set. A multivalued mapping from the set X into Y is: $F : X \rightarrow \Omega(Y)$, where each input word $x_i \in T$ of text T should be attributed to one of the output values of the classes m_j , $i \in M_i$, where M_i - the set of meanings of the word x_i . F is a representation function of multivalued mappings [2]. Below is the segment tables of multivalued mappings (m -mappings) for ambiguous words (in this case homonyms) $X^m \rightarrow Y^m$, where $X^m = \{a_k\}$, a_k - initial form of ambiguous words that have the k-th value. Y^m - represented as a matrix consisting of elements CV, that are corresponding words in context for each a_k values.

$$(1) \quad Y_{ij}^m = b_{ij}\mu_{ij} \Rightarrow Y_{ij}^m = \{(b_{1j}\mu_{1j}), (b_{2j}\mu_{2j}), (b_{3j}\mu_{3j})\}$$

where b_{1j} - elements of a particular group of CV, $i=1,3$ (where b_1 - verb group, b_2 -noun group, b_3 - adjective group), and for each element is given by the ratio of preference (relativity) μ_{ij} of given element in text, in the following range $0 \leq \mu_{ij} \leq 1$. If such b_{ij} words of was found, then in accordance with its relativity to one or another meaning a_k meanings was selected.

The proposed method of multivalued mappings and solving problems with multi-tasking words were applied to a simple sentence in the system of machine translation from Russian into Kazakh language and was implemented as a software application. The advantage of this method is using method of CV and multivalued mappings. In contrast to the other methods, the method of CV handles all components of the sentence, and not just standing around ambiguous words. Due to this, semantically more complete analysis of the text comes out. This method can be successfully applied in various systems of automatic text processing and semantic search for a variety of natural languages.

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Investigation of artificially immune system with using of fuzzy logic

This article deals with the development of an optimal structure of the immune reaction model organism to medicine based on the methods of fuzzy logic system. At present, the immune system is considered by researchers as a source of ideas and methods for solving various tasks in the field of information processing and analysis, mathematical modeling and information security [1]. Currently, the number of works on the development and application of artificial immune systems is increasing rapidly. The first book about the artificial immune system was published in 1998, edited by Dipankar Dasgupta [1]. The immune system - is a structure in which the mechanisms implemented learning, memory, and associative search to solve the problems of recognition and classification. In particular, the immune system can be trained to recognize the important structures (antigenic peptides); memorizing already encountered the structure and use of the laws of combinatorics within gene libraries for efficient generation of detectors structures (variable regions of antibody molecules) interacting with external antigens and the body's own cells. In response to this antigen is not only at the level of individual recognition units but also at the system level through mutual recognition lymphocyte clones of antigen-antibody reactions. Thus, the behavior of the immune system is determined by the totality of the local network interactions. The immune system is of great interest due to its important role in maintaining the integrity of the organism. The properties of the immune system are a remarkable example of local adaptive processes that implement an effective global response. A number of simulation models that describe the reaction of the various components of the immune defense published [2]. Is expanding the scope of application of new methods for solving applied problems, based on the principles of immunology. These methods have various names: artificial immune systems, are based on the principle of immunity, immunological evaluation. In this article the adequate mathematical model of artificial immune system with using of fuzzy logic is investigated. The results of constructing an optimal structure [3] of the immune mathematical model to simulate different algorithms of special reactions formation to medications, depending on the strategies of infection are received.

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Задачи покрытия

В работе рассмотрен
 введен анализ взаимосвя
 занных задач находить свое
 контроля (сенсорные с
 риалов), в проектирова
 и др. Более того, благо
 большое количество по
 части работы приведен
 основанных на выборе
 ражают структуру круп
 уровень сложности. Эт
 находить модели с наиб
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 поверхности. Созданы а
 выбирать наилучшие ти

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 тельные технологии, 18
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 пленочных слоев при ма
 обработка металлов, 48(1