Recent Advances in Electrical Engineering and Educational Technologies

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Edited by
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## Table of Contents

**Plenary Lecture 1: Application of Paraconsistent Annotated Logic Program EVALPSN to Intelligent Control/Safety Verification**
Kazumi Nakamatsu

**Paraconsistent Annotated Logic Program and Its Application to Intelligent Control Systems**
Kazumi Nakamatsu, Jair M. Abe, Seiki Akama

**How to Improve Positional Accuracy in Redundant Omnidirectional Mobile Robots?**
Yaser Maddahi, S. M. Hosseini Monsef, Nikos E. Mastorakis

**MEMS Microrobot System with Locomotion Rhythm Generator Using Artificial Neural Networks**
Ken Saito, Minami Takato, Yoshifumi Sekine, Fumio Uchikoba

**Using Multimodality and Expressive Avatars in e-Government Interfaces to Increase Usability**
D. Rigas, B. Almutairi

**Development of a Human Movement Monitoring System Based on Wearable Devices**
Xiaochen Zheng, Joaquín Ordieres-Meré

**e-Psychology in Research Level Using Asynchronous e-Learning Platform in Military Environment**
Nikolaos V. Karadimas, Vassia Karamanoli

**Automatic Learning Path Design: Development and Implementation**
Agostino Marengo, Alessandro Pagano, Giulio Monopoli

**High Dynamic Range Video Eye Tracking Dataset**
Yuanyuan Dong, Eleni Nasiopoulos, Mahsa T. Pourazad, Panos Nasiopoulos

**The Analysis of the Physiological Similarities Human**
Hana Talandová, Lukáš Králik, Milan Adámek

**The Role of Expressive Full-Body Avatars and Earcons and Auditory Icons in e-Assessment Interfaces**
D. Rigas, A. Algahtani

**Collaborative Decisions within Business Intelligence Context: A GDSS Prototype**
George A. Rigopoulos, Nikolaos V. Karadimas

**Proposal of Model for Security Management Integrated System**
Lukas Králik, Roman Senkerik
Computer Based BIA Method in Preschool Education
Dragan Martinović, Mirko Dejić, Danimir Mandić, Vladan Pelemiš, Momčilo Pelemiš, Darijan Ujsasi

A Study on Ontologies and Their Classification
Thabet Slimani

Malaysia Dengue Detection Model Using Frequent Outlier
Zalizah Awang Long

Connection Management System Based on MIH and MIP over NS-3
Juan C. Chaparro-Marroquín, Roberto Bustamante-Miller

Introducing Social Awareness to Next Generation Wireless Networks
Pavlos Kosmides, Konstantinos Demestichas, Angelos Rouskas, Evgenia Adamopoulou, Miltiades Anagnostou

Voice Processing for Sobriety Test: Its Scope and Application
Myung-Sook Kim, Myung-Jin Bae

Speaker Recognition System Based on AR-MFCC and SAD Algorithm with Prior SNR Estimation and Adaptive Threshold over AWGN channel
Riadh Ajgou, Salim Sbaa, Said Ghendir, Ali Chamsa, A. Taleb-Ahmed

Towards an Amazigh UNL Dictionary
I. Taghbalout, F. Ataa Allah, M. Elmarraki

Optimization of Web Technologies for Mobile Devices
M. Krbeček, V. Veselá

Tic Information Services through Process Management and Massive Professional Communities
Fernando Prieto Bustamante, Yaneth P. Caviativa, Yoan Manuel Guzman, Víctor Manuel Castro Rodríguez

Cyber Physics System on Railway Traffic
Lan Dong, Dongyan Zhang

Informatics Teaching Methodology in Improving Informatics Students’ Competencies
Danimir Mandić, Gordana Jotanovic, Goran Jausevac, Ljubisa Vladasic, Aleksandra Mandic

Rule-Based Recommendation for Supporting Student Learning-Pathway Selection
Abdelrahman Osman Elfaki, Khaled M. Alhawiti, Yahya M. AlMurtadha, Osman Ahmed Abdalla, Asim Abdallah Elshiekh

Twenty Years of Informatics Teaching Methods in Slovakia
Ivan Brodenec
Comparative Analysis of Web Animation Creation Methods
V. Veselá, M. Krbeček, Z. Prokopová

Handel-C Implementation on FPGA of Real Time Motion Detection
K. Sehairi, C. Benbouchama, F. Chouireb

Remote Control of a Positioning System
Florin Ravigan, Niculäe Boteanu, Laurentiu Alboteanu, Eugen Gheorghe Subțirelu

Approach Based on Multi-Agent Systems and Ontologies for Interoperability Between Different Systems of Port Information
Mehdi Abid, Benayad Nsiri, Yassine Serhane

Microembolus Classification Using MFCC and LPC Feature Extractions
Najah Ghazali, Haryati Jaafar, Dzati Athiar Ramli

Selection of Artificial Data of Minority for Better Data Mining
Hyontai Sug, Douglas D. Dankel II

A Study of the Software Development Using Agile
Divya Prakash Shrivastava

Half-Bridge Converter Based VAr Compensation of Single-Phase R-L Load
K. Subramanian, M. Kowsalya

Pervasive Universal Gateway for Medical Devices
Sérgio Oliveira, Carlos Filipe Portela, Manuel Filipe Santos

Investigating the Relationship between Social Media Usage and Students’ Grades in Saudi Arabia: A Mixed Method Approach
Basit Shahzad, Esam Alwagait, Sophia Alim

A Human-Machine Interaction System for the Recognition and Synthesis of Arabic Digits
Tebbi Hanane, Hamadouche Maamar, Azzoune Hamid

Standardization of Electronic Health Record EHR Interoperability Unified of Colombian Health Care
Fernando Prieto Bustamante, Yaneth P. Caviativa, Yoan Manuel Guzman, Victor Manuel Castro Rodríguez

Human Identification Based on Ear Recognition
S. Gangaram, S. Viriri

Medical Image Compression by Region of Interest Based on SPIHT and Global Thresholding Using Huffman Coding
A. Seddiki, D. Guerchi
Plenary Lecture 1

Application of Paraconsistent Annotated Logic Program EVALPSN to Intelligent Control/Safety Verification

Prof. Kazumi Nakamatsu
School of Human Science and Environment
University of Hyogo
JAPAN
E-mail: nakamatu@shse.u-hyogo.ac.jp

Abstract: Paraconsistent logic is well known as a formal logic that can deal with contradiction in the framework of logical system consistently. One of paraconsistent logics called annotated logic has been proposed by Prof. Newton da Costa, and its logic program has also been proposed by Prof. V.S. Subrahmanian et al. later as a tool of dealing with knowledge bases. Some paraconsistent annotated logic programs with strong negation have been developed for dealing with non-monotonic reasoning such as default reasoning, defeasible deontic reasoning, plausible reasoning, etc. by Kazumi Nakamatsu. Recently He has proposed a paraconsistent annotated logic program called Extended Vector Annotated Logic Program with Strong Negation (EVALPSN), which can deal with conflict resolving, defeasible deontic reasoning, plausible reasoning, etc. The EVALPSN reasoning function has been applied to various intelligent controls and safety verification systems such as pipeline valve control, traffic signal control, railway interlocking safety verification, etc. In this lecture, some of these applications of EVALPSN with some simulation systems will be introduced. Moreover, a special EVALPSN that can deal with before-after relations between processes (time intervals), which has been named bf(before-after) -EVALPSN has been developed. It has been shown that bf-EVALPSN can be applied to real-time process order control. It will also be introduced how to apply bf-EVALPSN to intelligent real-time process order control and safety verification with examples.

Brief Biography of the Speaker: Kazumi Nakamatsu received the Ms. Eng. and Dr. Sci. from Shizuoka University and Kyushu University, Japan, respectively. He is a full Professor at School of Human Science and Environment, University of Hyogo, Japan. His research interests encompass various kinds of logic and their applications to Computer Science, especially paraconsistent annotated logic programs and their applications. He has developed some paraconsistent annotated logic programs called ALPSN(Annotated Logic Program with Strong Negation), VALPSN(Vector ALPSN), EVALPSN(Extended VALPSN) and bf-EVALPSN (before-after EVALPSN) recently, and applied them to various intelligent systems such as a safety verification based railway interlocking control system and process order control. He is an author of over 150 papers and book chapters, and edited 7 books published by prominent publishers.
Kazumi Nakamatsu has chaired various international conferences, workshops and invited sessions, and he has been a member of numerous international program committees of workshops and conferences in the area of Artificial Intelligence and Computer Science. He serves as Editor-in-Chief of the International Journal of Reasoning-based Intelligent Systems by Inderscience Publishers (UK) and an editorial board member of many international journals. He has contributed numerous invited lectures at international workshops, conferences, and academic organizations. He also is a recipient of some conference and paper awards. He is a member of Japan AI Society, IEEE, etc.