

2013 6th International Conference on Human System Interactions

(HIS 2013)

**Sopot, Poland
6-8 June 2013**



**IEEE Catalog Number: CFP1321D-POD
ISBN: 978-1-4673-5635-0**

Table of contents

Introduction	2
Regular Tracks and Special Session Description	3
Committees	4
Reviewer List	5
Keynote lectures	
1. Andrzej Materka, P. Poryzła: <i>High-speed Noninvasive Brain-Computer Interfaces</i>	7
2. Jerzy W. Grzymała-Busse: <i>Generalized Probabilistic Approximations</i>	13
3. Andrzej Czyżewski, Piotr Dalka, Łukasz Kosikowski, Bartosz Kunka, Adam Kupryjanow, Michał Lech, Piotr Ody: <i>Multimodal Human-Computer Interfaces Based on Advanced Video and Audio Analysis</i>	18
Regular Track: Human Machine Interaction	
1. Marianna Parzych, Agata Chmielewska, Tomasz Marciniak, Adam Dąbrowski, Agnieszka Chrostowska and Michał Klincewicz: <i>Automatic people density maps generation with use of movement detection analysis</i>	26
2. Andrzej Rutkowski, Michał Meina and Michał Chlebiej: <i>Human pose fusion for scalable kinetic interfaces</i>	32
3. Radosław Katarzyniak, Wojciech Lorkiewicz, Grzegorz Popek: <i>Intuitive Approach to Knowledge Integration</i>	40
4. Marcin Jamro, Bartosz Trybus: <i>IEC 61131-3 Programmable Human Machine Interfaces for Control Devices</i>	48
5. Rogério Campos-Rebelo, Anikó Costa, Luís Gomes: <i>Events for modeling of Human-System Interaction with IOPT Petri net</i>	56
6. Krzysztof Pancierz. Semantic Relationships and Approximations of Sets: <i>An Ontological Graph Based Approach</i>	62
7. Muhammad Yusro, Kun Mean Hou, Kalamullah Ramli, Dodi Sudiana, Edwige Pissaloux, Hong Ling Shi: <i>SEES: Concept and Design of a Smart Environment Explorer Stick</i>	70
8. Ali Sengül, Mohssen Hosseini, Mohamed Bouri, Zdzisław Kowalczyk, Hannes Bleuler: <i>Movement Perception with the use of a Motorized Delta Armrest and Virtual Reality</i>	78
9. Giacomo Tartari, Daniel Stødle, John Markus Bjørndalen, Phuong Ha, Otto Anshus: <i>Global Interaction Space for User Interaction with a Room of Computers</i>	84
10. Anna Wróblewska, Paweł Kapłański, Paweł Zarzycki, Iwona Ługowska: <i>Semantic Rules Representation in Controlled Natural Language in FluentEditor</i>	90

11. Daisuke Chugo, Kenji Shiotani, Yuki Sakaida, Sho Yokota, Hiroshi Hashimoto: <i>An Automatic Adjustable Backrest for a Posture Coordination of a Seated Patient on a Wheelchair</i>	97
12. Dumidu Wijayasekara, Milos Manic: <i>Human Machine Interaction via Brain Activity Monitoring</i>	103
13. Lassaad Ben Ammar, Adel Mahfoudhi: <i>Usability Driven Model Transformation</i>	110
14. Steven Bruce Ferrer, Cristobal Ochoa-Luna, Mohammad Habibur Rahman, Maarouf Saad, Philippe Archambault: <i>HELIOS: The human machine interface for MARSE robot</i>	117
15. Ramon Blanco-Gonzalo, Luis Diaz-Fernandez, Oscar Miguel-Hurtado, Raul Sanchez-Reillo: <i>Usability Evaluation of Biometrics in Mobile Environments</i>	123
16. Aitzol Astigarraga, Manex Agirrezabal, Elena Lazkano, Ekaitz Jauregi and Basilio Sierra: <i>Bertsobot: the first minstrel robot</i>	129
17. Eduardo López-Arce Vivas, Alejandro García-González, Iván Figueroa, Rita Fuentes: <i>Discrete Wavelet Transform and ANFIS Classifier for Brain-Machine Interface based on EEG</i>	137
18. Marek Miłosz, Małgorzata Plechawska-Wojcik, Magdalena Borys, Maciej Laskowski: <i>Quality Improvement of ERP System GUI Using Expert Method: a Case Study</i>	145
19. Jennifer Bützler, Christina Bröhl, Nicole Jochems, Christopher M. Schlick: <i>Age Differentiated Usability Evaluation of Project Management Software</i>	153
20. Michaela Bačíková, Jaroslav Porubán: <i>Ergonomic vs. Domain Usability of User Interfaces</i>	159
21. Silke Holzmüller-Laue, Bernd Göde, Kerstin Thurow: <i>An Overall Process-driven Approach of Human Task Support within Life Science Automation</i>	167
22. Madhat Alsoos and Ammar Joukhadar: <i>Posture Independent Model for Hand Detection and Tracking</i>	175
23. Kęstas Rimkus, Audrius Bukis, Arūnas Lipnickas, Saulius Sinkevičius: <i>3D Human Hand Motion Recognition System</i>	180
24. Pawel Czarnul: <i>Design of a Distributed System using Mobile Devices and Workflow Management for Measurement and Control of a Smart Home and Health</i>	184
25. Jakub Flotyński: <i>Harvesting of Semantic Metadata from Distributed 3D Web Content</i>	193
26. Lee Ostrom: <i>Developing Risk Models for Complex Systems</i>	201
27. Dorota Kamińska, Tomasz Sapiński, Adam Pelikant: <i>Comparison of Perceptual Features Efficiency for Automatic Identification of Emotional States from Speech</i>	210
28. Sho Yokota, Kyouzuke Nagai, Keisuke Morishita, Makoto Mori, Daisuke Chugo and Hiroshi Hashimoto: <i>The Assistive Walker using Hand Haptics - The Design of the Prototype</i>	214
29. Mariusz Oszust, Marian Wysocki: <i>Polish Sign Language Words Recognition with Kinect</i>	219
30. Mirosław Hajder, Janusz Kolbusz, Tomasz Bartczak: <i>Effective Method for Optimizing Hierarchical Design Process for Interactive Systems</i>	227
31. Mirosław Hajder, Janusz Kolbusz, Tomasz Bartczak: <i>Cost Models for Life-Cycle Phases of Information Systems</i>	231
32. Mirosław Hajder, Janusz Kolbusz, Tomasz Bartczak: <i>Undirected Graph Algebra Application for Formalization Description of Information Flows</i>	235

33. Łukasz Adrjanowicz, Mariusz Kubanek, Janusz Bobulski: *Single Camera Based Pose Estimation with Dissimilarity Measurement* 241
34. Mohsen Shafeie, Nika Zolfaghari, Kristiina M. Valter McConville: *Abdominal Muscles Behavior and Motion Sickness During Paired Visual Input with Roll Motion* 247

Regular Track: Artificial Intelligence

1. Ghaith Manita: *Consensus Function based on Multi-layer networks technique* 252
2. Alexander Rotshtein, Hanna Rakytyanska: *Expert Rules Refinement by Solving Fuzzy Relational Equations* 257
3. Katarzyna Grzesiak-Kopeć, Maciej Ogorzałek: *Intelligent 3D Layout Design with Shape Grammars* 265
4. Jerzy Balicki, Waldemar Korłub, Henryk Krawczyk, Jacek Paluszak: *Genetic Programming with Negative Selection for Volunteer Computing System Optimization* 271
5. Javier Vales-Alonso, Pablo Lopez-Matencio Perez, Juan Veiga-Goitan, Pedro Baños-Guirao and Juan José Alcaraz Espín: *An Effort Control System for Training Elite Team-Sport Athletes* 279
6. Mirosław Sobotka, Antoni Grzanka: *Visual data on tongue and lips in phonemes classification* 287
7. Paweł Przybysz, Włodzimierz Kasprzak: *The generation of letter-to-sound rules for grapheme-to-phoneme conversion* 292
8. Andrew Schumann: *Unconventional Logic for Massively Parallel Reasoning* 298
9. Radu-Emil Precup, Mircea-Bogdan Radac, Emil Petriu, Claudia-Adina Dragos, Stefan Preitl, Alexandra-Iulia Stinean: *Data-Driven Performance Improvement of Control Systems for Three-Tank Systems* 306
10. Dan Petru Cristian, Constantin Barbulescu, Stefan Kilyeni, Attila Simo: *Particle Swarm Optimization Techniques. Power Systems Applications* 312
11. Michael Pukish, Shumin Wang, Bogdan Wilamowski: *Segmentation of Cerebral Cortex MRI Images with Artificial Neural Network (ANN) Training* 320
12. Rimah Amami, Dorra Ben Ayed, Nouredine Ellouze: *Adaboost with SVM using GMM Supervector for Imbalanced Phoneme Data* 328
13. Kevin McCarty, Milos Manic, Allan Gagnon: *A Fuzzy Framework with Modeling Language for Type 1 and Type 2 Application Development* 334
14. Piotr Szwed: *Application of Fuzzy Ontological Reasoning in an Implementation of Medical Guidelines* 342
15. Karol Draszawka, Julian Szymański: *Thresholding strategies for Large Scale Multi-Label Text Classifier* 350
16. Marek Krótkiewicz, Krystian Wojtkiewicz: *Introduction to Semantic Knowledge base: Linguistic Module* 356
17. Peter Nauth: *Improvement of Assistive Robot Behaviour by Experience-based Learning* 363
18. Zdzisław Hippe: *Logic of Human-System-Interaction in Planning Complex Strategies for Chemical Syntheses* 368

19. Tomas Potuzak: <i>Feasibility Study of Optimization of a Genetic Algorithm for Traffic Network Division for Distributed Road Traffic Simulation</i>	372
20. Abir Smiti, Zied Elouedi: <i>Soft DBSCAN: Improving DBSCAN Clustering Method using Fuzzy set Theory</i>	380
21. Aleksander Sokołowski, Tomasz Pardela: <i>Fourier transforms in melanoma image classification</i>	386
22. Jerzy Raszka, Lech Jamroz: <i>Application of genetic algorithms and max-plus system formalism in optimization of discrete system processes</i>	390
23. Paweł Cudek, Andrzej Burda, Zdzisław Hippe: <i>ProfileSEEKER – Early Warning System for Predicting Economic Situation of Small and Medium Enterprises</i>	398
24. Tomasz Golonek: <i>Analog Circuits Testing by Means of Walsh-Hadamard Spectrum of Supply Current Transient State Monitoring</i>	401
25. Florin Solomonesc, Constantin Barbulescu, Stefan Kilyeni, Attila Simo: <i>Genetic Algorithms. Power Systems Applications</i>	407
26. Wiesław Paja, Mariusz Wrzesień: <i>Melanoma Important Features Selection Using Random Forrest Approach</i>	415
27. Teresa Mroczek: <i>A New Tool for Data Analysis Using Symbolic Methods</i>	419

Regular Track: Education and Training

1. Anna Bobkowska: <i>Visual dimensions of modeling languages in interdisciplinary perspective</i>	422
2. Laura Ostrom, Lee Ostrom: <i>Technology Education Requirements for Physicians</i>	428
3. Nithin Vijayendra, Meiliu Lu: <i>A Web-based ETL Tool for Data Integration Process</i>	434
4. Lidia Jackowska-Strumiłło, Paweł Strumiłło, Jacek Nowakowski, Piotr Tomczak: <i>Interactive question based learning technology and clickers: Fundamentals of Computer Science course case study</i>	439
5. Allen Milewski, Cemile Serce, Kathy Swigger: <i>Quantitative and Qualitative Analysis of Globally Distributed Team Collaboration in Design and Development of Software</i>	443

Regular Track: Telemedicine and e-Health

1. Jaspaljeet Singh Dhillon, Burkhard Wuensche, Christof Lutteroth: <i>Accessible Telehealth - Leveraging Consumer-level Technologies and Social Networking Functionalities for Senior Care</i>	451
---	-----

Regular Track: Sociological and Psychological Aspects of HSI

1. Leonid Kompanets, Damian Kurach, Piotr Milczarski: <i>Creation of the Fuzzy Three-level Adapting BrainThinker</i>	459
2. Raoul Textoris, Tullio Tanzi: <i>How to define and use safety indicators to implement an efficient prevention policy</i>	466

Special Session: Electronic Systems Aiding the Blind in Mobility and Travel

1. Hotaka Takizawa, Shotaro Yamaguchi, Mayumi Aoyagi, Nobuo Ezaki, Shinji Mizuno: *Kinect Cane: An Object Recognition Aid for the Visually Impaired* 473
2. Karol Matusiak, Piotr Skulimowski, Pawel Strumiłło: *Object Recognition in a Mobile Phone Application for Visually Impaired Users* 479
3. Piotr Korbel, Piotr Skulimowski, Piotr Wasilewski: *A Radio Network for Guidance and Public Transport Assistance of the Visually Impaired* 485
4. Jerzy Wiciak, Bartłomiej Borkowski, Dorota Czopek: *A System for Identification of Dangerous Spots and POIs for the Blind and Visually Impaired* 489

Special Session: Measuring and Understanding Biosignal

1. Yohei Tomita, Yasue Mitsukura: *Hemodynamic characteristics for improvement of EEG-BCI performance* 495
2. Hiroyuki Kobayashi, Yasuhiro Tatsukami: *A Prototype Design for Wireless EMG Capturing System with Stimulation Feedback* 501
3. Takuya Shimazu, Keiko Kasakawa, Satoshi Suzuki: *Impression Analysis for Robot Behavior Using Brain Monitoring* 507
4. Piotr Przystup, Adam Bujnowski, Jacek Rumiński, Jerzy Wtorek: *A Multisensor Detector of a Sleep Apnea for Using at Home* 513

Special Session: Affective Computing

1. Michał Wróbel: *Emotions in the Software Development Process* 518
2. Mariusz Szwoch: *FEEDB: a Multimodal Database of Facial Expressions and Emotions* 524
3. Agata Kołakowska, Agnieszka Landowska, Mariusz Szwoch, Wioleta Szwoch, Michał Wróbel: *Emotion Recognition and Its Application in Software Engineering* 532
4. Agnieszka Landowska: *Affect-awareness Framework for Intelligent Tutoring Systems* 540
5. Agata Kołakowska: *A Review of Emotion Recognition Methods Based on Keystroke Dynamics and Mouse Movements* 548
6. Szwoch Wioleta: *Using Physiological Signals for Emotion Recognition* 556

Special Session: Technologies Enhancing Wellbeing for Older People

1. Piotr Augustyniak: *Adaptive Architecture for Assisted Living Systems* 562
2. Farshid Amirabdollahian, Rieks Op Den Akker, Sandra Bedaf, Richard Bormann, Heather Draper, Vanessa Evers, Gert Jan Gelderblom, Carolina Gutierrez Ruiz, David Hewson, Ninghang Hu, Iolanda Iacono, Kheng Lee Koay, Ben Krose, Patrizia Marti, Herve Michel, Helene Prevot-Huille, Ulrich Reiser, Joe Saunders, Tom Sorell and Kerstin Dautenhahn: *Accompany: Acceptable robotiCs COMPAnions for AgeiNg Years - Multidimensional Aspects of Human-System Interactions* 570

3. Silvia Coradeschi, Amedeo Cesta, Gabriella Cortellessa, Luca Coraci, Javier Gonzalez, Lars Karlsson, Francesco Furfari, Amy Loutfi, Andrea Orlandini, Filippo Palumbo, Federico Pecora, Stephen von Rump, Ales Štimec, Jonas Ullberg, Britt Ötslund: *GiraffPlus: Combining Social Interaction and Long Term Monitoring for Promoting Independent Living* 578
4. Glenda Cook, Jeremy Ellman, Barbara Klein: *Everyday Usage of Home Telecare Services in England* 586
5. Barbara Klein, Sebastian Reutzel, Holger Roßberg, Glenda Cook: *Can Telecare Contribute to an Independent Life at Home with 100? A Glance to the UK and Initial Experiences of the German LOEWE Field Test on Age Appropriate Sensor Based Assistance in Real Estate* 594
6. Chris Soraghan, Sonja Hermann, Gerard Boyle: *Design and Older People's Real Issues: Experiences of an Engineer Assessing Technology in the User's Home* 600
7. Wendy Moyle, Cindy Jones, Marie Cooke, Siobhan O'Dwyer, Billy Cho Yin Sung, Suzie Drummond: *Social Robots Helping People with Dementia to Achieve Wellbeing: Assessing Efficacy of Social Robots in the Nursing Home Environment* 608
8. Glenda Cook, Cathy Bailey, Wendy Moyle: *The Impact of ICT-based Telecare Technology on Quality of Life of People with Dementia: Review of the Literature* 614

Special Session: Intelligent User Interfaces for Healthcare Applications

1. Hideyuki Sawada, Yu Nakamura, Yuto Takeda, Keiji Uchida: *Micro-vibration Array Using SMA Actuators for the Screening of Diabetes* 620
2. Tomasz Kocejko, Jerzy Wtorek: *Gaze Tracking in Multiple-display Environment* 626

Special Session: Vision-based Ambient Intelligence for Mobile Agents

1. Van-Dung Hoang, Kang-Hyun Jo, My-Ha Le: *Planar Estimation using Omnidirectional Camera and Laser Rangefinder* 632
2. Justin Nguyen, Burkhard Wuensche, Patrice Delmas, Christof Lutteroth, Wannes van der Mark: *High Resolution 3D Content Creation using Unconstrained and Uncalibrated Cameras* 637
3. Takaya Oyama, Eri Yoshida, Yoshinori Kobayashi, Yoshinori Kuno: *Tracking Visitors with Sensor Poles for Robot's Museum Guide Tour* 645
4. Danilo Caceres Hernandez, Van-Dung Hoang, Kang-Hyun Jo: *Iterative Vanishing Point Estimation Based on DBSCAN for Omnidirectional Image* 651
5. Yoon Suk Kwak, Soon Ki Jung: *Recognition of Visual Signals and Firing Positions for Virtual Military Training Systems* 656