

DEPARTMENT OF INTELLIGENT SYSTEMS

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The Department of Intelligent Systems develops new methods and techniques for intelligent computer systems, with applications in the areas of the information society, computer science and informatics, and network communication systems. The main research areas are ambient intelligence, computational intelligence, agent and multi-agent systems, and language and speech technologies. The department collaborates closely with the Faculty of Computer and Information Science of the University of Ljubljana on the joint research program "Artificial Intelligence and Intelligent Systems", led by Prof. Ivan Bratko. The department also collaborates closely with industry and contributes significantly the use of intelligent systems in products and services.



Head:
Prof. Matjaž Gams

Intelligent systems simulate intelligence so that a typical user perceives them as truly intelligent. In reality, these systems use complex mechanisms and implement them on digital computers to imitate human behavior as well as possible, exploiting raw, exponentially growing computer power.

Ambient intelligence is an increasingly established research area introducing technology into our everyday environment in a friendly way that is undemanding for the user. The two key topics of ambient intelligence we work on are (1) telemedicine and elderly care, and (2) smart buildings. On the topic of telemedicine, we successfully completed the European project **CHIRON**, which is concerned with monitoring chronic heart-disease patients at home. In the past year the project conducted an observational study with real patients, and our department helped analyse the gathered data. We used the CHIRON activity-recognition technology, which utilizes wearable sensors, to win the international **EvAAL** competition (Evaluating AAL Systems through Competitive Benchmarking). The competition took place in a living laboratory in Velancia, Spain, where an actress performed a sequence of activities, and the competitors had to recognize them with their own equipment. We joined the FP7 project **COMMODITY12**, which is concerned with monitoring diabetes patients. The role of our department is to analyse the patients' lifestyle with the sensors they use. This means that we will have to recognize their activities and estimate the energy expenditure. While we already have experience with such tasks from the CHIRON project, recognizing high-level activities, such as work, exercise and eating, will be a new challenge for us. Human energy expenditure was estimated with an advanced context-based AI method and presented at the prestigious UbiComp conference. In the **ELKOV22** project we collaborate with the Development Center Intech-Les to develop the Intelligent e-Doorman System, which was successfully presented at the Slovenian Innovation Forum. The goal of the system is to utilize intelligent computer methods to offer the services of a human doorman, thus improving the security, comfort and energy efficiency. The e-Doorman is installed on a door with an electro-mechanical lock, sensors, a microcontroller and a tablet computer that serves as the user interface. It uses natural language to communicate with the users, it can learn the users' habits and automatically recognize them, it can detect break-in attempts and other unusual events, and it has a wide range of additional useful functions. In the past year, three pieces of **doctoral research** were completed: on the detection of unusual and suspicious behaviour of people, on the detection of diseases of the elderly, and on combining expert knowledge and machine learning (for the purpose of ambient intelligence).

Computational intelligence is a study of stochastic search, optimization and learning methods, inspired by physical and biological systems. Research in this area at the Department of Intelligent Systems focuses on evolutionary computation methods. We study extensions of evolutionary algorithms for multi-objective optimization and their speedup, and apply these algorithms in engineering design and optimization problems. In doctoral research projects, we develop a method for the visualization of multi-dimensional fronts of non-dominated solutions in multi-objective optimization, an algorithm for the discovery of optimal car-driving strategies with respect to the traveling time, fuel consumption and driving comfort, and optimization based on

The department's activity-recognition technology, which uses wearable accelerometers, has won the international EvAAL competition (Evaluating AAL Systems through Competitive Benchmarking).



Figure 1: The winning team at the EvAAL international activity-recognition competition, and a few pictures from the competition.

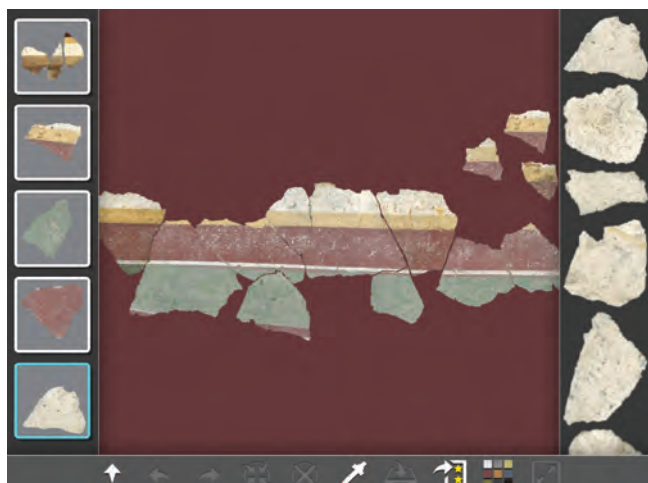


Figure 2: *e-Pedius*, a mobile and web application for crowdsourced reassembly of wall paintings

agent decision-making architectures and agent-based simulation. The European project ACCUS is aimed at developing an integration and coordination platform for urban systems to build applications across urban systems, provide adaptive and cooperative control for urban subsystems, and to optimize the combined performance. The system will be implemented in Gdansk and Ljubljana. A similar system is studied within the domestic project OPUS, where

The 7th Framework Program project MIRABEL resulted in a computer infrastructure to efficiently balance between the generation and consumption of electrical energy, and supporting the increasing amount of energy from renewable sources.

the focus is on subsystems within a smart house. In the area of agent-based simulation, the project EUSAS is focused on the development of a new approach to mission training for low level units (security, police force, etc.) facing asymmetric threats in an urban environment. The developed tools can be used to discover the common agent strategy by knowing only low-level agent behaviour and possessing basic domain knowledge. The discovered strategic action descriptions are presented to the user in the form of graph paths, agent actions, roles and corresponding rules. Meaningful behaviour

patterns are later used in behaviour cloning, where software agents reproduce the observed human behaviour in a specific domain. The clone is tested in the simulator under all circumstances, thus revealing weak spots and later interactively enabling faster human learning. In the field of **speech and language technologies** we work on speech synthesis, semantic analysis of text and question answering. Together with the Amebis company, we develop a new speech synthesizer for Slovene. Special attention is paid to the requirements of elderly, handicapped and visually impaired people. In the past year, we labelled a phonetically rich and balanced speech database for corpus-based speech synthesis using automatic speech-recognition methods. The speech database was recorded in cooperation with the national television and radio, RTV Slovenia. We have established a free text-to-speech conversion service.

Focus points of developmental and research potential of the department are also being expressed over successfully developed, integrated and deployed solutions, available on major digital platforms and applicable to a wide population of users. The methods used in typical applied projects combine procedures of intelligent agents, statistical methods and machine learning, and they serve as a base for user interfaces on telephones, pads or desktop computers. Projects' services are developed for all key mobile platforms, i.e., Android, iOS, Windows 8 and BlackBerry, and through classic web clients. In the past year, the department obtained and successfully carried out for four innovative projects concerned with the development of e-services and mobile applications for public and private non-profit organizations:

e-Turist (<http://www.e-turist.si/>) is an application for preparing tourist itineraries adapted to individual users' interests. It takes into account the location, the available time and the opening hours of the attractions. The itineraries are prepared with the help of a recommender system that evaluates the relevance of attractions for each tourist with the help of expert knowledge and the ratings entered in the past by visitors with similar tastes.



Figure 3: Opening of the 16th International Multiconference Information Society – IS 2013 at the Jožef Stefan Institute.

The application helps the users to navigate during the trip, and provides them with written and spoken descriptions of the attractions.

e-Asistent (<http://www.projekt-asistent.si>) is an intelligent assistant capable of communication in natural language that aims to help the user when searching for information on a web page. The assistant platform can be quickly installed on web pages, e.g., of municipalities and of various associations, so that the general base is adapted within a few days to the target content. The service also accepts the user feedback with comments and answer quality, which is in turn assessed and reported to the contracting authority. E-Asistent is implemented at the Slovene Federation of Pensioners' Associations (ZDUS) and 10 municipalities, the plan in 2014 is to apply it on 100 municipalities. A similar system Svizec is applied at the Education, Science and Culture Trade Union of Slovenia (SVIZ).

e-Pedius (<http://e-pedius.si/>) is a mobile and web application named after the Roman painter Quintus Pedius. It is a solution that supports crowd-sourcing in assembling the fragments of wall paintings. The restoration of wall paintings from fragments of archaeological sites is difficult due to a large number of fragments, their damage and missing parts, hence it usually requires years of manual expert labour. The new solution e-Pedius is accessible to the wider public, including non-specialists, who can use it to reassemble fragments into new compositions, continue the work of other users, and rate the compositions. The solution is designed as a mobile game in which the users gain points for their achievements, and are encouraged to collaborate with other users.

e-Govorec (<http://dis.ijs.si/e-govorec>) is a mobile application for the voice interpretation of various Slovenian digital texts. The service enables providers with a wide range of e-content to dynamically deliver information in the spoken form of Slovenian language. e-Govorec comes with an integrated synthesizer of speech and is freely available to any user. The application is built with an ear for groups of people with special needs, such as visually impaired and the elderly.

From 7 to 11 October 2013, the 16th **International Multiconference Information Society – IS 2013** took place at the Jožef Stefan Institute. It consisted of nine independent conferences with 182 papers. Four conference awards were given: for exceptional contribution to the development and promotion of the information society, for current achievements in the field of information society, and the information strawberry and lemon for the best and worst public information-society services. At the main innovation fair in Slovenia we were the only institution presenting tree systems at the final event.

In 2013, the achievements of the department were 12 times presented on national TV, indicating attractive research and development.

Some outstanding publications in the past year

1. Depolli, M., Trobec, R., Filipič, B.: Asynchronous master-slave parallelization of differential evolution for multiobjective optimization. *Evolutionary Computation*, 21 (2013), 2, 261–291
2. Dovgan, E., Javorski, M., Tušar, T., Gams, M., Filipič, B.: Comparing a multiobjective optimization algorithm for discovering driving strategies with humans. *Expert Systems with Applications*, 40 (2013), 7, 2687–2695
3. Kozina, S., Gjoreski, H., Gams, M., Luštrek, M.: Three-layer activity recognition combining domain knowledge and meta-classification. *Journal of Medical and Biological Engineering* 33 (2013), 4, 406–414
4. Gjoreski, H., Kaluža, B., Gams, M., Milič, R., Luštrek, M.: Ensembles of multiple sensors for human energy expenditure estimation. *The 2013 ACM International Joint Conference on Pervasive and Ubiquitous Computing, UbiComp*, (2013), 359–362
5. B. Kaluža.: *Instant Weka How-to*. Packt Publishing, 2013

Awards and appointments

1. Matjaž Gams, Hristijan Gjoreski, Simon Kozina, Mitja Luštrek: 1st place at the international activity-recognition competition, EvAAL 2013 (Evaluating AAL Systems through Competitive Benchmarking), Norrköping, Sweden, The AAL Open Association, RAREFall

Organization of conferences, congresses and meetings

1. 22nd Slovene Workshop on Nature-Inspired Algorithms, AVN, Šmarna gora, Slovenia, 21. 5. 2013
2. 5th Jožef Stefan International Postgraduate School Students Conference, Jožef Stefan Institute, Ljubljana, Slovenia, 23. 5. 2013

ACCUS smart-city system will design and implement applications for Ljubljana and Gdansk. In a way a similar system OPUS designed for intelligent houses is being developed with the company Robotina. Intelligent control enables a 3 to 20% decrease in costs.

3. Co-organization of the student workshop at the conference GECCO 2013 (Genetic and Evolutionary Computation Conference), Amsterdam, The Netherlands, 6.-10. 7. 2013
4. Workshop for municipalities on the usage of the e-service Asistent, 25. 7. 2013
5. Workshop for municipalities on the usage of the e-service Asistent, 26. 9. 2013
6. 16th International Multiconference Information Society, IS 2013, 7.-11. 10. 2013; independent conferences:
 - Intelligent systems
 - Facing demographic challenges
 - Collaboration, software and services in information society
 - Cognitive sciences
 - Data mining and data warehouses
 - Education in information society
 - Human-computer interaction in information society
 - Cognitonics
 - Matcos 2013
7. Workshop for municipalities on the usage of the e-service Asistent, 18. 11. 2013

Patent granted

1. Gregor Černe, Mitja Bizjak, Bogdan Filipič, Tea Tušar, Erik Dovgan, A system for offer selection and request formation in demand response and distributed production of electrical energy, SI24057 (A), Urad RS za intelektualno lastnino, 30.10.2013.
2. Matjaž Gams, Rok Piltaver, Erik Dovgan, Andrej Planina, Gašper Pintarič, Bogdan Pogorelc, Intelligent surveillance system and procedure for detection of unusual behaviour, SI23855 (A), Urad RS za intelektualno lastnino, 28.2.2013.

INTERNATIONAL PROJECTS

1. 7FP - MIRACLE, MIRABEL; Micro-Request-Based Aggregation, Forecasting and Scheduling of Energy Demand, Supply and Distribution
European Commission
Prof. Bogdan Filipič
2. 7FP - IntellAct; Intelligent Observation and Execution of Actions and Manipulation
European Commission
Prof. Matjaž Gams
3. 7FP - Xperience; Robots Bootstrapped through Learning from Experience
European Commission
Prof. Matjaž Gams
4. 7FP - Commodity12; Continuous Multi-Parametric and Multi-Layered Analysis of Diabetes Type 1&2
European Commission
Dr. Mitja Luštrek
5. EUSAS; European Urban Simulation for Asymmetric Scenarios
EADS N.V., Defence and Security Systems
Prof. Matjaž Gams

7. Virtual Assistant for Municipalities and Societies
Prof. Matjaž Gams
8. ARTEMIS, CHIRON; Cyclic and Person-Centric Health Management: Integrated Approach for Home, Mobile and Clinical Environments
Dr. Mitja Luštrek
9. Adaptive Cooperative Control in Urban (Sub)Systems
Prof. Matjaž Gams
10. COgnitive & Perceptive CAMeraS: COPCAMS
Prof. Bogdan Filipič
11. Optimizing the Management of Energy Efficient Smart Buildings
Dr. Tomaž Šef
12. Research on Adaptive Predictive Domain Models
Dr. Boštjan Kaluža

RESEARCH PROGRAM

1. Artificial Intelligence and Intelligent Systems
Prof. Matjaž Gams

R&D GRANTS AND CONTRACTS

1. Advanced Modelling and Simulation of Liquid-Solid Processes
Prof. Bogdan Filipič
2. Simulation and Optimization of Casting, Rolling and Heat Treatment Processes for Competitive Production of Topmost Steels
Prof. Bogdan Filipič
3. Open Communication Platform for Service Integration: CC OPCOMM
Prof. Matjaž Gams
4. E-Reader in Slovene for the Blind and Visually Impaired
Dr. Tomaž Šef
5. Crowdsourcing Support for Reassembly of Wall Painting Fragments
Prof. Bogdan Filipič
6. Electronic Mobile Tourist Guide
Dr. Mitja Luštrek

NEW CONTRACTS

1. Research of Intelligent Algorithms Applicability for Sensor Data Processing on Embedded Devices
Elgoline, d. o. o.
Prof. Matjaž Gams
2. Research of Intelligent Algorithms Applicability for Sensor Data Processing on Embedded Devices
Store Steel, d. o. o.
Prof. Bogdan Filipič
3. Intelligent Methods for Prediction of Calibration Timing
Špica International, d. o. o.
Prof. Matjaž Gams
4. Analysis and Evaluation of Advanced Spoken Language Technologies for Smart Buildings
Amebis, d. o. o., Kamnik
Dr. Tomaž Šef
5. Industrial Research aimed at Upgrading the eCampus Learning Management System B2, d. o. o.
Prof. Bogdan Filipič
6. User-Oriented Business Reporting
Result, d. o. o.
Prof. Matjaž Gams
7. Critical Analysis and Evaluation of Multiobjective Optimization and Machine Learning Methods for Intelligent Home Services
Robotina d. o. o.
Dr. Tomaž Šef
8. Analysis of Shopping Behavior of Customers in Online Stores
Creatim Ržišnik Perc, d. o. o.
Dr. Mitja Luštrek

VISITORS FROM ABROAD

1. Yves Lesteven, University of Paris Sud XI, Paris, France, 7. 4.-6. 7. 2013
2. Lucas Drai, Etienne Bohrer, University of Paris Sud XI, Paris, France, 3. 6.-31. 8. 2013
3. Martin Gjoreski, Faculty of Computer Science and Engineering, Univerzitet Sv. Kiril in Metodij, Skopje, Macedonia, 1.-31. 7. 2013
4. Ondrej Fikar, Faculty of Electrical Engineering - FEL, Plzen, Plzen, Czech Republic, 2.-31. 7. 2013
5. Wojciech Edward Smietana, Faculty of Computing and Engineering, University of Ulster, Belfast, Great Britain, 14. 8.-30. 9. 2013
6. Prof. Ronald Sladky, Center for Medical Physics and Biomedical Engineering, Medical University of Vienna, Austria, 7.-11. 10. 2013
7. Xavier Labanard, Hadji Bouchelaghem, University of Paris Sud XI, Paris, France, 26. 10. 2013- 5. 1. 2014

STAFF

Researchers

1. Prof. Ivan Bratko*
2. Asst. Prof. Aleš Dobnikar*
3. Prof. Bogdan Filipič
4. **Prof. Matjaž Gams, Head**
5. Dr. Mitja Luštrek
6. Dr. Domen Marinčič*
7. Dr. Tomaž Šef

Postdoctoral associates

8. Dr. Andraž Bežek*, left 01.07.13
9. Dr. Matija Drobnič*, left 01.02.13
10. Dr. Anton Gradišek
11. Dr. Matej Guid*
12. Dr. Boštjan Kaluža
13. Dr. Aleksander Pivk*
14. Dr. Vedrana Vidulin

Postgraduates

15. Robert Blatnik, M. Sc.
16. Božidara Cvetković, B. Sc.
17. Erik Dovgan, B. Sc.
18. Tomaž Kompara*, B. Sc.
19. Simon Kozina, B. Sc.

20. Dr. Jana Krivec*
21. Damjan Kužnar, B. Sc.
22. Dr. Violeta Mirchevska
23. Miha Mlakar, B. Sc.
24. Rok Piltaver, B. Sc.
25. Dr. Bogdan Pogorelc, left 01.09.13
26. Aleš Tavčar, B. Sc.
27. Tea Tušar, M. Sc.
28. Jernej Zupančič, B. Sc.

Technical officers

29. Mitja Kolbe*, B. Sc., left 01.07.13
30. Blaž Mahnič, B. Sc.
31. Gašper Pintarič*, B. Sc.

Technical and administrative staff

32. Vesna Koricki Špetič, B. Sc.
33. Mitja Lasič
34. Liljana Lasič
35. Lana Zemljak

Note:

* part-time JSI member

BIBLIOGRAPHY

ORIGINAL ARTICLE

1. Marko Bohanec, Martin Žnidaršič, Vladislav Rajkovič, Ivan Bratko, Blaž Zupan, "DEX methodology: three decades of qualitative multi-attribute modeling", *Informatica (Ljublj.)*, vol. 37, no. 1, pp. 49-54, 2013.
2. Božidara Cvetković, Boštjan Kaluža, Radoje Milič, Mitja Luštrek, "Towards human energy expenditure estimation using smart phone inertial sensors", In: Ambient intelligence: 4th International Joint Conference, Aml 2013, Dublin, Ireland, December 3-5, 2013: proceedings, *Lect. Notes Comput. Sci.*, vol. 8309, pp. 94-108, 2013.
3. Božidara Cvetković, Simon Kozina, Boštjan Kaluža, Mitja Luštrek, "Energy expenditure estimation DEMO application", In: Ambient intelligence: 4th International Joint Conference, Aml 2013, Dublin, Ireland, December 3-5, 2013: proceedings, *Lect. Notes Comput. Sci.*, vol. 8309, pp. 281-286, 2013.
4. Matjaž Depolli, Roman Trobec, Bogdan Filipič, "Asynchronous master-slave parallelization of differential evolution for multiobjective optimization", *Evol. comput.*, vol. 21, no. 2, pp. 261-291, 2013.
5. Sara Dolci, Vincenzo Ieraldi, Anton Gradišek, Zvonko Jagličić, Maja Remškar, Tomaž Apih, Mario Cifelli, Guido Pampaloni, Carlo Alberto Veracini, Valentina Domenici, "Precursors of magnetic resonance imaging contrast agents based on cystine-coated iron-oxide nanoparticles", *Current physical chemistry*, vol. 3, no. 4, pp. 493-500, 2013.
6. Erik Dovgan, Matija Javorski, Tea Tušar, Matjaž Gams, Bogdan Filipič, "Comparing a multiobjective optimization algorithm for discovering driving strategies with humans", *Expert syst. appl.*, vol. 40, no. 7, pp. 2687-2695, 2013.
7. Bogdan Filipič, Risto Vesanen, Erkki Laitinen, "Scalar vs. vector approach to bi-objective resource allocation in spatially distributed networks", *International journal of innovative computing and applications*, vol. 5, no. 3, pp. 191-197, 2013.
8. Iztok Fister, Marjan Mernik, Bogdan Filipič, "Graph 3-coloring with a hybrid self-adaptive evolutionary algorithm", *Computat. optimiz. appl.*, vol. 54, iss. 3, pp. 741-770, 2013.
9. Matjaž Gams, "Alan Turing, Turing machines and stronger", *Informatica (Ljublj.)*, vol. 37, no. 1, pp. 9-14, 2013.
10. Anton Gradišek, Tomaž Apih, Valentina Domenici, Vladimíra Novotná, Pedro J. Sebastião, "Molecular dynamics in a blue phase liquid crystal: a ¹H fast field-cycling NMR relaxometry study", *Soft matter*, vol. 9, no. 45, pp. 10746-10753, 2013.
11. Anton Gradišek, Dorthe Ravnsbæk, Stanislav Vrtnik, Andraž Kocjan, Janez Lužnik, Tomaž Apih, Torben R. Jensen, Alexander V. Skripov, Janez Dolinšek, "NMR study of molecular dynamics in complex metal borohydride LiZn₂(BH₄)₅", *The journal of physical chemistry. C, Nanomaterials and interfaces*, vol. 117, no. 41, pp. 21139-21147, 2013.
12. Vida Groznik, Matej Guid, Aleksander Sadikov, Martin Možina, Dejan Georgiev, Veronika Kragelj, Samo Ribarič, Zvezdan Pirtošek, Ivan Bratko, "Elicitation of neurological knowledge with argument-based machine learning", *Artif. intell. med.*, vol. 57, no. 2, spec. iss., pp. 133-144, 2013.
13. Matej Guid, Ivan Bratko, "Search-based estimation of problem difficulty for humans", In: Artificial intelligence in education: AIED 2013: 16th International Conference, Memphis, TN, USA, July 9-13, 2013: proceedings, *Lect. Notes Comput. Sci.*, vol. 7926, pp. 860-863, 2013.
14. Tadej Janež, Jure Žabkar, Martin Možina, Ivan Bratko, "Learning faster by discovering and exploiting object similarities", *Int. j. adv. robot. syst. (Online)*, vol. 10, pp. 1-18, 2013.
15. Simon Kozina, Hristijan Gjoreski, Matjaž Gams, Mitja Luštrek, "Three-layer activity recognition combining domain knowledge and meta-classification", *J. med. biol. eng.*, vol. 33, no. 4, pp. 406-414, 2013.
16. Mitja Luštrek et al. (16 authors), "Epitope predictions indicate the presence of two distinct types of epitope-antibody-reactivities determined by epitope profiling of intravenous immunoglobulins", *PLoS one*, vol. 8, no. 11, pp. e78605-1- e78605-15, 2013.
17. Aleksander Pivk, Olegas Vasilecas, Diana Kalibatiene, Rok Rupnik, "On approach for the implementation of data mining to business process optimisation in commercial companies", *Technol. econ. dev. econ. (Spausd.)*, vol. 19, no. 2, pp. 237-256, June 2013.
18. Bogdan Pogorelc, Matjaž Gams, "Detecting gait-related health problems of the elderly using multidimensional dynamic time warping approach with semantic attributes", *Multimedia tools and applications*, vol. 66, no. 1, pp. 95-114, 2013.
19. Bogdan Pogorelc et al. (11 authors), "Ambient bloom: new business, content, design and models to increase the semantic ambient media experience", *Multimedia tools and applications*, vol. 66, no. 1, pp. 7-32, 2013.

20. Matej Pregelj, Peter Jeglič, Andrej Zorko, Oksana Zaharko, Tomaž Apih, Anton Gradišek, Matej Komelj, Helmuth Berger, Denis Arčon, "Evolution of magnetic and crystal structures in the multiferroic FeTe₂O₅Br", *Phys. rev., B, Condens. matter mater. phys.*, vol. 87, no. 14, pp. 144408-1-144408-8, 2013.
21. Héctor Solar, Erik Fernández, Gennaro Tartarisco, Giovanni Pioggia, Božidara Cvetković, Simon Kozina, Mitja Luštrek, Jure Lampe, "A non invasive, wearable sensor platform for multi-parametric remote monitoring in CHF patients", *Health technol. (Internet)*, vol. 3, no. 2, str. 99-109, 2013.
22. Vedrana Vidulin, "Searching for credible relations in machine learning", *Informatica (Ljublj.)*, vol. 37, no. 3, pp. 355-356, 2013.

PUBLISHED CONFERENCE CONTRIBUTION

1. Carlos Cavero Barca, Juan Mario Rodríguez, Paolo Emilio Paddu, Mitja Luštrek, Božidara Cvetković, Maurizio Bordone, Eduardo Soudah, Aitor Moreno, Pedro de la Peña, Alberto Rugnone, "Advanced Medical Expert Support Tool (A-MEST): EHR-based Integration of multiple risk assessment solutions for congestive heart failure patients", In: *XIII Mediterranean Conference on Medical and Biological Engineering and Computing 2013: [also] MEDICON 2013, 25-28 September 2013, Seville, Spain*, (IFMBE proceedings, vol. 41), Laura Maria Roa Romero, ed., Heidelberg [etc.], Springer, cop. 2014, pp. 1334-1337.
2. Božidara Cvetković, Boštjan Kaluža, Hristijan Gjoreski, Mitja Luštrek, "Hybrid recommender system for personalized POI selection", In: *Zbornik 16. mednarodne multikonference Informacijska družba - IS 2013, 7.-11. oktober 2013 [Ljubljana, Slovenija]: zvezek A: volume A*, Matjaž Gams, ed., et al, Ljubljana, Institut Jožef Stefan, 2013, pp. 19-22.
3. Božidara Cvetković, Mitja Luštrek, "Estimation of human energy expenditure using inertial sensors and heart rate sensor", In: *Zbornik, 5. študentska konferenca Mednarodne podiplomske šole Jožefa Stefana = 5th Jožef Stefan International Postgraduate School Students Conference*, 23. maj 2013, Ljubljana, Slovenija, Nejc Trdin, ed., et al, Ljubljana, Mednarodna podiplomska šola Jožefa Stefana, 2013, pp. 116-125.
4. Gregor Čepin, Tea Tušar, Bogdan Filipič, "Iskanje podobnih enobarvnih fragmentov pri množičnem sestavljanju stenskih poslikav", In: *Zbornik dvaindvajsete mednarodne Elektrotehniške in računalniške konference ERK 2013, 16.-18. september 2013, Portorož, Slovenija*, (Zbornik ... Elektrotehniške in računalniške konference ERK ...), Baldomir Zajc, ed., Andrej Trost, ed., Ljubljana, IEEE Region 8, Slovenska sekcija IEEE, 2013, zv. B, pp. 73-76.
5. Erik Dovgan, Damjan Kužnar, Matjaž Gams, "Analiza možnosti nadgradnje obstoječih sistemov za kalibracijo naprav z inteligentnimi metodami za napovedovanje rokov kalibracije", In: *Zbornik 16. mednarodne multikonference Informacijska družba - IS 2013, 7.-11. oktober 2013 [Ljubljana, Slovenija]: zvezek A: volume A*, Matjaž Gams, ed., et al, Ljubljana, Institut Jožef Stefan, 2013, pp. 31-34.
6. David Aleksander Fabjan, Vedrana Vidulin, "Long-term-care and intelligent IT in a changing demographic landscape", In: *Soočanje z demografskimi izzivi: zbornik 16. mednarodne multikonference Informacijska družba - IS 2013, 7.-8. oktober 2013, Ljubljana, Slovenija: zvezek B: proceedings of the 16th International Multiconference Information Society - IS 2013, October 7th-8th, 2013, Ljubljana, Slovenia: volume B*, Janez Malačič, ed., Matjaž Gams, ed., Ljubljana, Institut Jožef Stefan, 2013, pp. 9-12.
7. Ondřej Fikar, Boštjan Kaluža, Matjaž Gams, "An overview of multiagent platforms", In: *Zbornik 16. mednarodne multikonference Informacijska družba - IS 2013, 7.-11. oktober 2013 [Ljubljana, Slovenija]: zvezek A: volume A*, Matjaž Gams, ed., et al, Ljubljana, Institut Jožef Stefan, 2013, pp. 35-38.
8. Bogdan Filipič, Tea Tušar, "Challenges of applying optimization methodology in industry", In: *GECCO '13: proceeding of the Fifteenth Annual Conference on Genetic and Evolutionary Computation Conference, Amsterdam, Netherlands, July 06-10, 2013*, New York, ACM, 2013, pp. 1103-1104.
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