The 5th ACM International Conference on PErvasive Technologies Related to Assistive Environments
PETRA 2012

Conference Program

June 6-8, 2012
Heraklion, Crete, Greece

Organized by

The University of Texas at Arlington, Arlington, Texas, USA

With sponsorship from:

ARRI: Automation & Robotics Research Institute
HERACLEIA Human Centered Computing Laboratory at UTA, USA
The National Science Foundation (NSF), USA
Computer Science and Engineering Department, UTA, USA
University of Central Greece (Computer Science and Biomedical Informatics Dept), GREECE
University of the Aegean, GREECE
Technological Educational Institution of Athens (Department of Informatics) GREECE
DEMOKRITOS National Center for Scientific Research (NCSR), GREECE
Foundation of the Hellenic World (FHW), GREECE
Ionian University, GREECE
College of Engineering, University of Texas at Arlington, USA
Institute of Computer Science (ICS) of the Foundation for Research and Technology
Fulbright Foundation, Greece

Conference Proceedings

ACM - Association for Computing Machinery

Dear Participant,

Welcome to PETRA 2012 Conference, the 5th ACM International Conference on PErvasive Technologies Related to Assistive Environments, June 6-8, 2012 in Crete, Greece.

The PETRA Conference has as its mission to bring together diverse disciplines and experts in different areas of computer technology in order to address human-centric challenges and improve the quality of life. Whether it is to improve the potential of a person in the work environment with better training tools, or help the elderly age in place with unobtrusive technologies, fundamentally new computer science and engineering approaches are needed.

People's living environments are particularly important in an increasingly crowded and complex world where the need for inclusiveness and connectivity with the rest of the world is key. From smart energy recommendation tools, to game-driven therapy for cognitive or motor disabilities such as cerebral palsy, PETRA will introduce the participant to exciting and transformational new applications of computer technology.

For example, providing for state of the art Healthcare of the future requires solutions into lowering the costs while improving care, as is the case with Alzheimer's, Parkinson's and other disabilities or traumas.

PETRA (which means "stone" in Greek) also reflects the needs of the domestic environment, or "Oikos" as it was known in ancient Greece, but from a technological perspective. PETRA addresses the fact that, as people grow older; they will increasingly rely on technology to be able to stay in their homes.

PETRA WORKSHOPS

W1 ABRA: Affect and Behaviour Related Assistance in Support For the Elderly

W2 SN2AE: Social networks and sensor networks in assistive environments

W3 ResEnv: Workshop on Robotics in Assistive Environments

FIRST DAY: June 6

		Room 1	Room 2
DAY ONE -- JUNE 6	09:00-10:30	**Conference Opening** **Fillia Makedon, Conference Chair** *Session Chair: Margrit Betke* *A1. Keynote Lecture* – **Markerless 2D/3D tracking of human hands:** *Antonis A. Argyros, University of Crete, University of FORTH-ICS, Greece*	
	10:30-11:00	**Coffee Break (PETRA NSF Doctoral Consortium Meeting)**	
	11:00-12:40	*Session B: Signal and Image Processing for Ambient Intelligence and Pervasive Computing* *Session Chair: Ilias Maglogiannis* B.1. **Near Real-time Human Silhouette and Movement Detection in Indoor Environments Using Fixed Cameras**, *Argirios Christodoulidis,, Kostas Delibasis,, Ilias Maglogiannis* B.2. **Audio-Visual Speech Recognition using Depth Information from the Kinect in Noisy Video Conditions,** *Georgios Galatas, Gerasimos Potamianos, Fillia Makedon* B.3. **Myoelectric Transradial Prosthesis Prototype with Real-time Single-grasp Capability** , *Fred Clark jr., Gloria Reinish* B.4. **Privacy Preserving Neural Networks in Iris Signature Feature Extraction,** *Egidijus Paliulis, Manolis Maragoudakis, Alexandros Panteli*	*Session C: Tools, Infrastructures, Architectures and Techniques for Deploying Pervasive Applications in Assistive Environments* *Session Chair: Peter Christian* *C.1.* **Role and Quality of Communication in Collaborative Training for Multiple Sclerosis Patients**, *Anastasiia Beznosyk, Peter Quax, Karin Coninx, Wim Lamotte* *C.2.* **A Survey of Query-By-Humming Similarity Methods**, *Alexios Kotsifakos, Panagiotis Papapetrou, Jaakko Hollmén, Dimitrios Gunopulos, Vassilis Athitsos* *C.3.* **Finding representative objects using link analysis ranking**, *Panagiotis Papapetrou, Tatiana Chistiakova, Jaakko Hollmen, Vana Kalogeraki, Dimitrios Gunopulos* *C.4.* **On-Demand Security Service,** *Jiafeng Zhu, Jingji Zhen, Xinwen Zhang, Zhengyi Le* *C.5.* **Plantar Pressure Sensing Using Loop Antenna Sensors**, *Irshad Mohammad, Haiying Huang*
	12:40-14:00	**Lunch Break**	

FIRST DAY: June 6

		Room 1	Room 2
DAY ONE -- JUNE 6	14:00-15:20	*Session D: Cognitive Systems and Pattern Analysis Tools for Assistive Environments* *Session Chair: Georgios N. Yannakakis* **D.1. Assistive Systems in Production Environments: Exploring Motion Recognition and Gamification**, *Oliver Korn, Albrecht Schmidt, Thomas Hörz* **D.2. Designing a mobile recommender system**, *Vana Kalogeraki, Nikos Nakas* **D.3. Needs & Motivations of Senior Travellers for AAL,** *Ozge Subasi, Eva Reithner* **D.4. How Busy is my Supervisor?** *Ahmed Nait aicha, Gwenn Englebienne, Ben Kröse*	**W1: Workshop On Affect and Behaviour Related Assistance in Support For the Elderly:** *Workshop chairs: Peter Christian, Bieber Gerald, Karpouzis Kostas* **W1.1. A Discussion of Using Mental Models in Assistive Environments** *Mario Aehnelt, Christian Peter, Petra Müsebeck* **W1.2. A Sociable Robotic Aide for Medication Adherence**, *Michael Gonzales, Laurel Riek* **W1.3. Ambient Interaction by SmartWatches**, *Gerald Bieber, Bodo Urban, Thomas Kirste* **W1.4. Creating and Benchmarking a New Dataset for Physical Activity Monitoring**, *Attila Reiss, Didier Stricker*
	15:20-15:50	**Coffee Break**	
	15:50-17:10	*Session E: Pervasive Systems for the Aging Society* *Session Chair: Sarantos Kapidakis* **E.1. Redesigning Web Sites for Older Adults**, *Evelina Patsoule, Panayiotis Koutsabasis* **E.2. On an Advanced ICT-enabled System for the Social Inclusion of the Elderly,** *Tero Kivimäki, Konstantinos Liolis, Ulcay Yildizoglu, Lasse Kaila, Antti-matti Vainio* **E.3. Requirement of AAL systems – Older persons' trust in sensors and characteristics of AAL technologies,** *Frederick Steinke, Tobias Fritsch, Daniel Brem, Svenja Simonsen* **E.4. The Role of Tea Parties to Elicit Technology Requirements to Support the Mobility of Older Adults,** *Lynne Coventry, Emma Jones*	**W1: Workshop On Affect and Behaviour Related Assistance in Support For the Elderly:** *Workshop chairs: Peter Christian, Bieber Gerald, Karpouzis Kostas* **W1.5. Fall-detection Simulator for Accelerometers with In-hardware Preprocessing**, *Sebastian Fudickar, Christian Karth, Philipp Mahr, Bettina Schnor* **W1.6. Seniors in Charge of ICT Innovation**, *Eva Waterworth, John Waterworth, Christian Peter, Soledad Ballesteros* **W1.7. The AGNES System for Ambient Social Interaction**, *Christian Peter, Kreiner Andreas, Martin Schröter, Gerald w. Bieber, John Waterworth* **W1.8. The Role of ICT and Networking in Healty Aging**, *Soledad Ballesteros, Christian Peters, Eva Waterworth, John Waterworth*
	21:00	**Welcome cocktail party (PETRA NSF Doctoral Consortium Meeting –Vangelis Metsis (Mentor))**	

SECOND DAY: June 7

		Room 1	Room 2
DAY TWO – – JUNE 7	09:00-10:40	*Session F: Robotic Devices, HCI and Multimodal Interfaces I* *Session Chair: Antonis A. Argyros* **F.1.** **A Survey of Assistive Computing Devices for Cerebral Palsy Patients**, *Christopher Mcmurrough, Shahina Ferdous, Alexandros Papangelis, Angie Boisselle, Fillia Makedon* **F.2.** **Smart Insole: A Wearable System for Gait Analysis,** *Wenyao Xu, Majid Sarrafzadeh* **F.3.** **A Game System For Remote Rehabilitation Of Cerebral Palsy Patients**, *Alexandros Papangelis, Giannis Mouchakis, Angela Boisselle, Dimitrios Kosmopoulos, Vangelis Karkaletsis* **F.4.** **SmartGlove for Upper Extremities Rehabilitative Gaming Assessment,** *Ming-chun Huang, Wenyao Xu, Yi Su, Belinda Lange, Chien-yen Chang*	*Session I: Data Modeling and Information Management for Pervasive Assistive Environments* *Session Chair: Magy Seif El-Nasr* **I.1.** **SIPE: A Sensor Information Processing Engine for Wellness Management Applications**, *Andreas Savvides, Brendan Kohler, Meenakshi Chaterjee, Savvas Papaioannou, Sokratis Kartakis* **I.2.** **Towards a Semi-Automatic Personal Digital Diary - Detecting Daily Activities from Smartphone Sensors**, *Sebastian Hammerl, Thomas Hermann, Helge Ritter* **I.3.** **A Groupware-based Web Application for Health Care Tasks Planning**, *Fouzi Lezzar, Abdelmadjid Zidani, Atef Chorfi* **I.4.** **Comparing Metadata Quality in the Europeana Context** *Sarantos Kapidakis* **I.5.** **User Activities Outlier Detection System Using Principal Component Analysis and Fuzzy Rule-Based System,** *Sawsan Mahmoud, Ahmad Lotfi, Caroline Langensiepen*
	10:40-11:10	\multicolumn{2}{c}{**Coffee Break (PETRA NSF Doctoral Consortium Meeting)**}	
	11:10-12:40	\multicolumn{2}{l}{*Session H: Plenary - Keynote Lectures* *Session Chair: Fillia Makedon* **Empowering Assistive Environments with Advanced Game Technology** *Georgios N. Yannakakis, Associate Professor Center for Computer Games Research, IT University of Copenhagen* ***How Can Social and Cooperative Games Be Leveraged to Enhance Quality of Life Applications*** *Magy Seif El-Nasr, College of Arts, Media, and Design College of Computer and Information Sciences Northeastern University*}	
	12:40-14:00	\multicolumn{2}{c}{**Lunch Break**}	

		Room 1		Room 2
DAY TWO -- JUNE 7	14:00-15:20	*Session G: Robotic Devices, HCI and Multimodal Interfaces II* *Session Chair: Vangelis Metsis* **G1.** **Implementation of Interactive Arm Playback Behaviors of Social Robot Zeno For Autism Spectrum Disorder Therapy**, *Nahum Torres, Nathan Clark, Isura Ranatunga, Dan Popa* **G2.** **Realistic Humanlike Robots for Treatment of ASD, Social Training, and Research; Shown to Appeal to Youths with ASD, Cause Physiological Arousal, and Increase Human-to-Human Social Engagement,** *David Hanson, Daniele Mazzei, Carolyn Garver, Arti Ahluwalia, Danilo De rossi* **G3.** **Low-cost Head Position Tracking for Gaze Point Estimation** *Christopher Mcmurrough, Jonathan Rich, Vangelis Metsis, An Nguyen, Fillia Makedon* **G4.** **Collision-free Trajectory Generation on Assistive Robot Neptune**, *Isura Ranatunga, Dan Popa*	14:00-16:10	**W2:** *SN2AE:* **Social Networks and Sensor Networks in Assistive Environments** *Workshop Chairs: Panagiotis Papapetrou, Jaakko Hollmén* **Invited Talk:** **Reliable Real-time Human-Centered Sensor Middleware,** *Vana Kalogeraki, College of Arts, Media, and Design Department of Informatics, Athens University of Economics and Business* *W2.1.* **Benchmarking Link Analysis Ranking Methods in Assistive Enviornments** *Konstantinos Georgatzis, Panagiotis Papapetrou* *W2.2.* **Dictionary Data Structures for Smartphone Devices**, *Vana Kalogeraki* *W2.3.* **Fast Variable Selection for Memetracker Phrases and Twitter Hashtags Time Series Prediction**, *Yoan Miche, Tatiana Chistiakova, Anton Akusok, Alberto Guillén, Rui Nian* *W2.4.* **Mixture modeling of gait patterns from sensor data**, *Jaakko Hollmén*
	15:20-16:20	**Special Session J: European Projects** *USEFIL* **Session Chair:** *Vangelis Karkaletsis* **USEFIL user and system requirements and pilot cases,** *Dr. Homer Papadopoulos* **Analysis of the state of the art technologies, systems and methods related to USEFIL,** *Dr. Vangelis Karkaletsis*		
	16:20-17:20	**Poster and DISCO Session** **Combined with Coffee Break**		
	20:30	**Gala Dinner**		

THIRD DAY: June 8

		Room 1	Room 2
DAY THREE – – JUNE 8	09:00-10:20	**W3:** *RESENV:* **Robotics in Assistive Environments** **Workshop Chair:** *Stefano Scheggi* *W3.1.* **A Comparative Study of Calibration Methods for Kinect-style cameras**, *Aaron Staranowicz, Gian-luca Mariottini* *W3.2.* **RoDiCA: a Human-Robot Interaction System for Treatment of Childhood Autism Spectrum Disorders**, *Isura Ranatunga, Nahum Torres, Rita Patterson, Nicoleta Bugnariu, Matt Stevenson* *W3.3.* **Vibrotactile Haptic Feedback for Human-robot Interaction in Leader-follower Tasks**, *Stefano Scheggi, Francesco Chinello, Domenico Prattichizzo*	*Session K:* **Smart Homes and Intelligent Environments** *Session Chair: Jaakko Hollmén* **K.1.** **Active Life Home: a Portal-Based Home Care Platform**, *Petri Vuorimaa, Panu Harmo, Matti Hämäläinen, Timo Itälä, Raimo Miettinen* **K.2.** **Guidelines to Efficient Smart Home Design for Rapid AI Prototyping: A Case Study,** *Kevin Bouchard, Bruno Bouchard, Abdenour Bouzouane* **K.3.** **Smart Homes for People with Alzheimer's Disease : Adapting Prompting Strategies to the Patient's Cognitive Profile,** *Jessica Lapointe, Bruno Bouchard, Julie Bouchard, Audrey Potvin, Abdenour Bouzouane* **K.4.** **User Centered Approach for Home Environments Designing,** *Michele Germani, Silvia Ceccacci, Maura Mengoni*
	10:20-10:50	**Poster Session** **Combined with Coffee Break**	
	10:50-12:20	*Session L: Plenary - Keynote Lectures* *Session Chair:* *Ilias Maglogiannis* **Using Near-Infrared Light to Image how Rehabilitation Strategies Rewire the Brain** *Georgios Alexandrakis, Assistant Professor Department of Biomedical Engineering, University of Texas at Arlington* *Searching in sequences: Problems, Techniques and Applications for Assistive Environments* *Dimitrios Gunopulos, National and Kapodistrian University of Athens*	
	12:20-12:30	**Conference Closing**	

Accepted Posters

- **P.1.** **A Social Network Framework for the Carolina Software** Aniello Murano, Salvatore Cuomo, Francesco Piccialli, Ennio Del giudice
- **P.2.** **Light-ECV: An Intelligent Lightweight Framework for Embedded Computer Vision Applications** Agwad El-sayed, Mohamed Elhelw
- **P.3.** **Implementation of Wireless Sensor Networks for Environmental Monitoring of Data Centers** Marianna Vallejo, Eric Becker, Vangelis Metsis
- **P.4.** **A survey on Multi person Identification and Localization,** *Shahina Ferdous, Vangelis Metsis, Kapil Vyas, Fillia Makedon*

Discovery and Ongoing Work "DISCO"

- **D.1.** **Detection of Tumor Cells from Image Analysis of Transient Morphological Changes** Mohammed Mahmood, Young-tae Kim, Samir Iqbal
- **D.2.** **Geospatial data in library collections** Ifigenia Vardakosta, Sarantos Kapidakis
- **D.3.** **Physic: A Domestic Robot for Medication Adherence** Michael Gonzales, Laurel Riek
- **D.4.** **Towards Assistive Workplace Environments at Manufacturing Shop Floor Level** Mario Aehnelt
- **D.5.** **Using Google facets as implicit feedback for query expansion in database searching** Anna Mastora, Sarantos Kapidakis
- **D.6.** **Living for All Kitchen – LAK Developing the Connected Kitchen for Connected People** F.P. Fanizza, A.M. Tonello, D.D'Alessandro, P. Lucchini, M.Lutman, M.Capobianco

Steering Committee
Fillia Makedon - *University of Texas at Arlington, USA* Ilias Maglogiannis - *University of Central Greece, Greece* Grammati Pantziou - *Technological Educational Institution of Athens, Greece* Vangelis Karkaletsis - *National Centre for Scientific Research "Demokritos", Greece*
Conference Chair
Fillia Makedon - *University of Texas at Arlington, USA*
Program Committee
Margrit Betke (Chair) - *Boston University, USA* Ilias Maglogiannis (Co-Chair) - *University of Central Greece, Greece* Grammati Pantziou (Co-Chair) - *TEI of Athens (Department of Informatics), Greece* Hamid Aghajan - *Stanford University, USA* Margherita Antona - *Foundation for Research and Technology, Greece* Vassilis Athitsos - *University of Texas at Arlington, USA* Dinesh K. Bhatia - *The University of Texas at Dallas, USA* Gerald Bieber - *Fraunhofer Institute for Computer Graphics, Rostock, Germany* Nikolaos Bourbakis - *Wright State University, USA* Guanling Chen - *University of Massachussetts at Lowell, USA* Domenico Cotroneo - *University of Napoli Federico II, Italy* Christos Douligeris - *University of Piraeus, Greece* Olga Dreeben - *University of North Texas Health Science Center, USA* Pier Luigi Emiliani - *Institute of Applied Physics "Nello Carrara" (IFAC), Italy* Krzysztof Gajos - *Harvard University, USA* Dimitris Grammenos - *Foundation for Research and Technology-Hellas (FORTH)* Heng Huang - *University of Texas at Arlington, USA* Maura Daly Iversen - *Northeastern University, USA* Roozbeh Jafari - *The University of Texas at Dallas, USA* Michelle Johnson - *Medical College of Wisconsin, USA* Sarantos Kapidakis - *Ionian University, Greece* Mathias Kolsch - *Naval Postgraduate School, Monterey, CA, USA* George Kontaxakis - *Technical University of Madrid, Spain* Yiannis Laouris - *Chair of the Cyprus Neuroscience & Technology Institute* Charles Owen - *Michigan State University, USA* Christian Peter - *Fraunhofer Institute for Computer Graphics, Rostock, Germany* Dan Popa - *The University of Texas at Arlington* Balakrishnan Prabhakaran - *University of Texas at Dallas, USA* Majid Sarrafzadeh - *UCLA, USA* Andreas Savvides - *Yale University, USA* Li Shen - *Indiana University, USA* Hartmut Strese - *VDI/VDE-IT, Germany* Evimaria Terzi - *Boston University, USA*

Organizing Committee Chairs

Rong Zhang (Co-Chair) - *University of Texas at Arlington, USA*
Eric Becker – University of Texas at Arlington, USA
Spyros Kantarelis - *Ionian University, Greece*
Vangelis Metsis - *University of Texas at Arlington, USA*

Workshop Chair

Dimitrios Kosmopoulos - *National Centre for Scientific Rsearch "Demokritos", Greece*

Conference Web Support and e-Proceedings

Rong Zhang - Unive*rsity of Texas at Arlington, USA*
Vangelis Metsis - *University of Texas at Arlington, USA*
Eric Becker - *University of Texas at Arlington, USA*

NSF Doctoral Consortium Faculty

Fillia Makedon - *University of Texas at Arlington, USA*
Vangelis Metsis- *University of Texas at Arlington, USA*
Heng Huang - *University of Texas at Arlington, USA*
Maura Iversen - *Harvard Medical School, USA*
Gian-Luca Mariottini - *University of Texas at Arlington, USA*