The 14th ACM International Conference on PErvasive Technologies Related to Assistive Environments

PETRA 2021

Conference Program

June 29 – July 1, 2021
Virtual Conference

Organized by

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

With sponsorship from:

The National Science Foundation (NSF), USA
The College of Engineering, University of Texas at Arlington (UTA), USA
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Conference Proceedings

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LETTER FROM THE CONFERENCE CHAIR

Dear Friends and Colleagues,

On behalf of the Program Committee and the Organizing Committees, I welcome you to the ***14th ACM International Conference on PErvasive Technologies Related to Assistive Environments*, PETRA 2021,** taking place June 29 – July 01, 2021. This year the conference will be virtual due to the COVID-19 pandemic. Originally to take place on the majestic island of Corfu, travel uncertainties and travel restrictions made us decide to conduct it virtually again for the second year in a row.

As PETRA is an interdisciplinary conference with focus on pervasive technologies that improve the quality of life and enhance human experience and performance, the 14th PETRA will take place virtually and in real-time using the interactive platform called **Underline**.

In spite of its virtual occurrence, PETRA 2021 has 113 submissions from 27 countries and 120 registrations. Paper acceptance included 27 full papers, 7 short papers, 10 poster and Late Breaking Report (LBR) papers and 9 demo papers and ten workshops. Like all previous years, the US National Science Foundation (NSF) has supported the conference with a ***Doctoral Consortium (DC) award*** that enabled the DC committee to offer support to 20 student authors, from different universities, 3 of them female. In addition, several accepted papers have undergraduate student coauthors, supported by the REU (**R**esearch **E**xperiences for **U**ndergraduates) NSF program. This year, PETRA 2021 distinguishes papers with six types of awards: *Best Technical Paper, Best Paper for Novelty, Best Student Paper, Best Poster Paper, Best Demo Paper, and Best Workshop Paper.*

This year, the conference theme of **"***PErvasive Technologies Related to Assistive Environments***"** takes a special meaning at this unique time in a world that is gripped by a pandemic crisis and as scientific results introduce new assistive technologies designed to meet emerging human needs. Indeed, many of PETRA's AI based methods show compelling social applications to help build, stone by stone (*PETRA means stone in Greek*), new ways of life to survive in an increasingly challenging world. Results range from basic research in computer vision, machine learning, data mining, human robot interaction, and big data, to engineering applications in robotics, sensors, devices, wearables and software solutions that address physical, cognitive, and mental human performance and monitoring. The conference addresses the needs of both healthy individuals and persons with special needs, such as providing safe in-home care for the elderly, or persons with Dementia, Alzheimer's, Parkinson's, chronic arthritis, PTSD, low vision, autism, COPD, Traumatic Brain Injury, and other conditions.

We hope that PETRA 2021 provides its participants a scientific impetus and stimulant to address the diverse human needs that the COVID-19 health crisis has brought, as well as new opportunities to showcase new research and to network. We truly appreciate your participation and look forward to seeing you all in person in **PETRA 2022**!

Wishing you a happy and safe summer,

Fillia Makedon
2021 PETRA Conference Chair
makedon@uta.edu

Invited Speakers

Antonis Argyros is a Professor of Computer Science at the Computer Science Department (CSD), University of Crete (UoC) and a researcher at the Institute of Computer Science (ICS), Foundation for Research and Technology-Hellas (FORTH) in Heraklion, Crete, Greece. Since 1999, as a member of the Computational Vision and Robotics Laboratory (CVRL) of ICS-FORTH, he has been involved in several European and national RTD projects on computer vision, pattern recognition, image analysis and robotics. His current research interests fall in the areas of computer vision and pattern recognition, with emphasis on the analysis of humans in images and videos, human pose analysis, recognition of human activities and gestures, 3D computer vision, as well as image motion and tracking. He is also interested in applications of computer vision in the fields of robotics and smart environments. In these areas, he has published several research papers in scientific journals and refereed conference proceedings and has delivered invited talks in international events, universities and research centers. Antonis Argyros has served in the organizing and program committees of several international vision, graphics and robotics conferences and in the editorial boards of computer vision, image analysis and robotics journals.

Dean J. Krusienski received the B.S., M.S., and Ph.D. degrees in electrical engineering from The Pennsylvania State University, University Park, PA, USA. He conducted postdoctoral research in the Brain-Computer Interface Laboratory, Wadsworth Center of the New York State Department of Health. He is currently a Professor and Graduate Program Director in the Department of Biomedical Engineering at Virginia Commonwealth University (VCU), Richmond, VA, USA, where he directs the Advanced Signal Processing in Engineering and Neuroscience (ASPEN) Lab. His research interests include brain–computer interfaces, neural signal analysis, machine-learning, and applications to virtual/augmented reality. His lab has received support from NSF, NIH, and NIA/NASA.

Magda Tsolaki was born in Thessaloniki, Greece and studied Medicine and Theology at the Aristotle University of Thessaloniki (AUTh). Afterwards, she initiated her collaboration with AUTh in 1982 as scientific collaborator and a year later received her specialty as a Neuropsychiatrist and her PhD. She has been a Professor of Neurology since 2010, and currently she was the Head of the 1st University Department of Neurology (2017-2020) where she was committed to her clinical, educational and research work. Since November 2020 she is working also at Euromedica General Clinic. In 2004, she was invited as a visiting professor at the Boston University, Massachusetts, USA. She has founded the Greek Alzheimer Association in 1995 and the Greek Federation of Alzheimer's Disease (AD) in 2007, in which she is up to today the Chair, while also being the scientific director of two Public Dementia Units (founded by her in 2007 and 2009) for outpatients with Neurodegenerative diseases and their caregivers. The last five years she was invited to join as a member the Greek National Observatory for Dementia. She has given more than 656 lectures throughout Greece. She has participated in more than 60 funded research programmes and 31 funded clinical trials. In total, she has received 73 awards. Dr. Magda Tsolaki has been the main author of many Books (60), many abstracts in Greek (531) and International (489) Conferences, she is the first author or co-author in many Papers in Greek (285) and International Journals (496 - 403 in PubMed), (h-index=80 and more than 30.000 Citations in Google Scholar). She has participated as invited speaker in more than 105 meetings-conferences in English and 256 in Greek Language. Furthermore, she has been a reviewer for Conferences and Journals (430) and has organised 27 national and 5 international conferences on AD. Finally, she was one of the three or seven advisory members for 32 doctoral theses-completed. Pr. Tsolaki is married with four children and ten grandchildren.

Conference Day 1: **June 29, 2021**

08:00-08:25 (CDT)	**Conference Opening** **Fillia Makedon**, **Conference Chair**, *University of Texas Arlington, USA*		
08:30-09:30 (CDT)	**Invited Talk** **Presenter: Antonis Argyros,** *University of Crete, Greece* **Title:** ***Computer vision methods for capturing and interpreting human motion*** **Session Chair: Vassilis Athitsos**		
09:30-09:45 (CDT)	**Break**		
09:45-11:30 (CDT)	*Session A*	*Session B*	*Session C*
	Session A: ***Accessibility Tools, Methods & Applications*** **Session Chair: Michalis Papakostas** **A-1 Products-6K: A Large-Scale Groceries Product Recognition Dataset.** (20 min) Kostas Georgiadis, Giorgos Kordopatis-Zilos, Fotis Kalaganis, Panagiotis Migkotzidis, Elisavet Chatzilari, Valasia Panakidou, Kyriakos Pantouvakis, Savvas Tortopidis, Symeon Papadopoulos, Spiros Nikolopoulos and Ioannis Kompatsiaris **A-2 An Empirical Study of User Perception of Audio Stimuli in Relation to a Cartesian Space.** (20 min) Ira Woodring and Charles Owen **A-3 Tactile Heatmaps: A Novel Visualisation Technique for Data Analysis with Tactile Charts.** (20 min) Christin Engel, Emma Franziska Müller and Gerhard Weber **A-4 Classification of Mild Cognitive Impairment by Fusing Neuroimaging and Gene Expression Data.** (20 min) Yanjun Lyu, Xiaowei Yu, Lu Zhang and Dajiang Zhu **A-5 Automated ROP Diagnostic System based on Comparisons and U-Net Segmentation.** (15 min) Peng Tian, Jennifer Dy, Deniz Erdogmus, Susan Ostmo, J. Peter Campbell, Michael F. Chiang and Stratis Ioannidis	**Session B:** ***Wearable Systems and Monitoring Devices*** **Session Chair: Ming Li** **B-1 mobiLLD: Exploring the Detection of Leg Length Discrepancy and Altering Gait with Mobile Smart Insoles.** (20 min) Denys J.C. Matthies, Don Samitha Elvitigala, Annis Fu, Deborah Yin and Suranga Nanayakkara **B-2 GymSoles++: Combining Google Glass with Smart Insoles to Improve Body Posture when Performing Squats.** (20 min) Don Samitha Elvitigala, Denys J.C. Matthies, Chamod Weerasinghe and Suranga Nanayakkara **B-3 Design of a Flexible Template Approach for Characterising Health Activity Habits Using Step Count Data.** (20 min) Nathan Poultney and Anthony Maeder **B-4 Physical Comfort of Occupational Exoskeletons: Influence of Static Fit on Subjective Scores.** (20 min) Matteo Sposito, Tommaso Poliero, Christian Di Natali, Stefano Toxiri, Sara Anastasi, Francesco Draicchio, Luigi Monica, Darwin G. Caldwell, Elena De Momi and Jesús Ortiz **B-5 A cloud-based pervasive application for monitoring oxygen saturation and heart rate using fuzzy-as-a-service.** (20 min) Bhavesh Pandya, Amir Pourabdollah and Ahmad Lotfi	**Session C:** ***Reasoning systems and machine learning*** **Session Chair: Ismini Lourentzou** **C-1 DIY-PressMat: A Smart Sensor Mat for Posture Detection Applicable for Bed-exit Intention Detection, Pressure Ulcer Prevention, and Sleep Apnea Mitigation.** (15 min) Denys J.C. Matthies, Marian Haescher, Wencke Chodan and Gerald Bieber **C-2 A Novel Privacy-Preserving Approach for Physical Distancing Measurement Using Thermal Sensor Array.** (20 min) Abdallah Naser, Ahmad Lotfi and Joni Zhong **C-3 Handwriting features based detection of fake signatures.** (15 min) Anton Akusok, Leonardo Espinosa-Leal, Kaj-Mikael Björk, Renjie Hu and Amaury Lendasse **C-4 Accelerating Human-Agent Collaborative Reinforcement Learning.** (15 min) Fotios Lygerakis, Maria Dagioglou and Vangelis Karkaletsis **C-5 Structurally Guided Channel Attention Networks: SGCA-Net.** (15 min) Veysi Yildiz, Jennifer Dy, J. Peter Campbell, Susan Ostmo, Michael F. Chiang, Stratis Ioannidis and Deniz Erdoğmuş. **C-6 Person Re-Identification in a Car Seat: Comparison of Cosine Similarity and Triplet Loss based approaches on Capacitive Proximity Sensing data.** (20 min) Rus Silvia, Moritz Nottebaum and Arjan Kuijper

11:30-12:00 (CDT)	**Break**		
12:30-14:30 (CDT)	*Workshop W1*	*Workshop W2*	*Workshop W3*
	Workshop W1: *AI and Digital Technologies in Coronavirus Pandemic and Beyond (COVID19)* **Workshop Chair: Ashwin Ramesh Babu, Fotios Lygerakis** **W1-1 FitFone: Tracking Home Workout in Pandemic Times.** (20 min) Denys J.C. Matthies, Thorleif Harder, Franz Bretterbauer, Viktoria Ginter and Horst Hellbrück **W1-2 Prediction of COVID-19 infection based on symptoms and social life using machine learning techniques.** (20 min) Stefanos Zervoudakis, Emmanouil Marakakis, Haridimos Kondylakis and Stefanos Goumas **W1-3 Map Visualization using Spatial and Spatio-Temporal Data: Application to COVID-19 Data.** (20 min) Mohammad A. Shaito and Ramez Elmasri **W1-4 CO2 Meter: A do-it-yourself carbon dioxide measuring device for the classroom.** (20 min) Thomas Dey, Ingo Elsen, Alexander Ferrein, Tobias Frauenrath, Michael Reke and Stefan Schiffer **W1-5 Towards Verifiable COVID-19 Aerosol Disinfection using Ultraviolet Light with a Mobile Robot.** (20 min) Alan G. Sanchez and William D. Smart **W1-6 Web Scraping of COVID-19 News Stories to Create Datasets for Sentiment and Emotion Analysis.** (20 min) Poojitha Thota and Elmasri Ramez	**Workshop W2: *Innovative technological solutions for PAin and MEntal health issues (PAME)*** **Workshop Chair: Yiannis Koumpouros** **W2-1 Design, method and apparatus of a computerized cognitive gamified training program targeting to maintain and improve cognitive health in older adults.** (20 min) Kitty Kioskli and Eva Danassi **W2-2 A highly user-centered design approach for developing a mobile health app for pain management (PainApp).** (20 min) Yiannis Koumpouros **W2-3 A Hierarchical Ontology for Dialogue Acts in Psychiatric Interviews.** (20 min) Aristeidis Bifis, Maria Trigka, Sofia Dedegkika, Panagiota Goula, Constantinos Constantinopoulos and Dimitrios Kosmopoulos **W2-4 Assistive Technologies for Supporting Wellbeing of Older Adults.** (20 min) Ioanna Dratsiou, Oscar Villacañas, Sara Cooper, Pavlos Isaris, Manex Serras, Luis Unzueta and Victor Fernandez-Carbajales **W2-5 Visual Analysis of Emotions Using AI Image-Processing Software: Possible Male/Female Differences between the Emotion Pairs "Neutral"–"Fear" and "Pleasure"–"Pain".** (20 min) Hermann Prossinger, Tomáš Hladký, Jakub Binter, Silvia Boschetti and Daniel Říha	**Workshop W3: *Workshop on Robotics and Sensors for Rehabilitation and Assisted Therapy (RoSe)*** **Workshop Chair: Lisa-Marie Faller, Daniela Krainer, Lukas Wohofsky, Markus Vincze** **W3-1 Interfacing with Robots without the use of Touch or Speech.** (20 min) Addison Clark and Ishfaq Ahmad **W3-2 Development of A Customized Rehabilitation Device Using Additive Manufacturing.** (20 min) Khaled Ibrahim and Lisa-Marie Faller **W3-3 Benchmarking Force Control Algorithms.** (20 min) Rudy Vicario, Andrea Calanca, Eldison Dimo, Noè Murr, Matteo Meneghetti, Rafael Ferro, Enrico Sartori and Thiago Boaventura **W3-4 Robotic device for wrist and finger exercise.** (20 min) Ana Mandeljc, Aleksander Rajhard, Marko Munih and Roman Kamnik **W3-5 Barcode-based Navigation Concept for Autonomous Wheelchairs and Walking Frames.** (20 min) Gerald Bieber, Niklas Antony, Dimitri Kraft, Bernd Hoelle, Dennis Blenke and Peter Herrmann **W3-6 Capacitive Proximity and Tactile Perception Towards Continuous Patient Monitoring.** (20 min) Hubert Zangl and Christian Schoeffmann
14:30-14:45 (CDT)	**Break**		
14:45-16:00 (CDT)	**Welcome Reception (Networking)**		

8:00-9:00 (CDT)

Invited Talk

Presenter: Dean J. Krusienski, ***Virginia Commonwealth University, USA***

Title: ***Recent Progress in Invasive and Noninvasive Brain-Computer Interfaces***

Session Chair: Ming Li

9:00-9:15 (CDT)

Break

9:15-11:00 (CDT)

Workshop W4

Workshop W4: *Pervasive Intelligence in Engineering (PerInt)*

Session Chairs: Nikolaos Doulamis, Anastasios Doulamis

W4-1 Towards Self-Explaining Ambient Applications. (20 min) Börge Kordts, Bennet Gerlach and Andreas Schrader

W4-2 Building Extraction from RGB Satellite Images using Deep Learning: A U-Net Approach.(20 min) Anastasios Temenos, Eftychios Protopapadakis, Anastasios Doulamis and Nikos Temenos

W4-3 Machine Learning Tools to Assess the Impact of COVID-19 Civil Measures in Atmospheric Pollution (20 min) Ioannis Kavouras, Maria Kaselimi, Eftychios Protopapadakis and Nikolaos Doulamis

W4-4 Deep learning models for COVID-19 infected area segmentation in CT images. (20 min) Athanasios Voulodimos, Eftychios Protopapadakis, Iason Katsamenis, Anastasios Doulamis and Nikolaos Doulamis

W4-5 Multi-Class Confusion Matrix Reduction method and its application on Net Promoter Score classification problem. (20 min) Ioannis Markoulidakis, George Kopsiaftis, Ioannis Rallis and Ioannis Georgoulas

Workshop W5

Workshop W5: *AI and Sensor-Supported Integrated care Solutions (ASSIST)*

Session Chair: Kosmas Dimitropoulos

W5-1 Dementia Wandering Recognition using Classical Machine Learning and Deep Learning Techniques with Skeletal Trajectories. (20 min) Bulat Khaertdinov, Yusuf Can Semerci and Stylianos Asteriadis

W5-2 GAN-Based Data Augmentation For Improving The Classification Of EEG Signals. (20 min) Sudhanva Bhat and Enrique Hortal

W5-3 Improving Effectiveness of a Coaching System Through Preference Learning. (20 min) Martin Žnidaršič, Aljaž Osojnik, Peter Rupnik and Bernard Ženko

W5-4 Towards Real-time Generalized Ergonomic Risk Assessment for the Prevention of Musculoskeletal Disorders. (20 min) Dimitrios Konstantinidis, Kosmas Dimitropoulos and Petros Daras

W5-5 A study on the Effect of Occlusion in Human Activity Recognition. (20 min) Ilias Giannakos, Eirini Mathe, Evaggelos Spyrou and Phivos Mylonas

Workshop W6

Workshop W6: *Learning by Observing Humans in Interaction with their Environment (HumanInteract)*

Session Chairs: Markus Vincze, Antonis Gasteratos, Antonis Argyros

W6-1 Risk-Averse Biased Human Policies with a Robot Assistant in Multi-Armed Bandit Settings. (20 min) Michael Koller, Timothy Patten and Markus Vincze

W6-2 A Deep Learning Approach to Recognize Cognitive Load using PPG Signals. (20 min) Francesca Gasparini, Alessandra Grossi and Stefania Bandini

W6-3 Smoothing of human movements recorded by a single RGB-D camera for robot demonstrations. (20 min) Maria Dagioglou, Athanasios C. Tsitos, Aristeidis Smarnakis and Vangelis Karkaletsis

W6-4 Learning Long-Term Behavior through Continuous Emotion Estimation. (20 min) Ioannis Kansizoglou, Evangelos Misirlis and Antonios Gasteratos

W6-5 Towards Improved and Interpretable Action Quality Assessment with Self-Supervised Alignment. (20 min) Konstantinos Roditakis, Alexandros Makris and Antonis Argyros

11:00-11:30 (CDT)	**Break**		
11:30-13:15 (CDT)	*Workshop W4*	*Workshop W7*	*Workshop W9*
	Workshop W4: *Pervasive Intelligence in Engineering (PerInt)* **Session Chairs: Nikolaos Doulamis, Anastasios Doulamis** **W4-6 Man Overboard: Fall detection using spatiotemporal convolutional autoencoders in maritime environments.** (20 min) Nikolaos Bakalos, Iason Katsamenis and Athanasios Voulodimos **W4-7 Bioinformatics systems for monitoring and mitigating epidemics: The STAMINA Paradigm.** (20 min) Nikolaos Bakalos, Maria Kaselimi, Anastasios Doulamis and Nikolaos Doulamis **W4-8 AdaReNet: Adaptive Reweighted Semi-supervised Active Learning to Accelerate Label Acquisition.** (20 min) Ismini Lourentzou, Daniel Gruhl, Alfredo Alba, Anna Lisa Gentile, Petar Ristoski, Chad Deluca, Steve Welch and Chengxiang Zhai **W4-9 Route Planning and Navigation Aid for Blind and Visually Impaired People.** (20 min) Panagiota Chatzina and Damianos Gavalas	**Workshop W7: *Affect-Aware Virtual Reality for Therapeutic Intervention and Training (AffectVR)*** **Session Chairs: Vangelis Metsis** **W7-1 Preliminary Analysis on Interaction Characteristics with Auditive Navigation in Virtual Environments.** (20 min) Christina Oumard, Julian Kreimeier and Timo Götzelmann **W7-2 On the development of augmented reality based exergames for assessing human activity and cognition on mobile devices.** (20 min) Dionysios Koulouris, Andreas Menychtas and Ilias Maglogiannis **W7-3 vIIIS: A Vocational Intelligent Interactive Immersive Storytelling Framework to Support Task Performance.** (20 min) Sanika Doolani, Callen Wessels and Fillia Makedon	**Workshop W9: *Artificial Intelligence in Smart Healthcare Informatics (AISHI)*** **Session Chairs: Maher Abujelala** **W9-1 X-ray Image Classification Using Two-step DenseNet Classifiers.** (20 min) Diullei M. Gomes and Isah A. Lawal **W9-2 An Exploration of Machine Learning Methods for Predicting Post-stroke Aphasia Recovery.** (20 min) Sha Lai, Anne Billot, Maria Varkanitsa, Emily J. Braun, Brenda Rapp, Todd B. Parrish, Ajay S. Kurani, James Higgins, David Caplan, Cynthia K. Thompson, Swathi Kiran, Margrit Betke and Prakash Ishwar **W9-3 Estimation of Heart Rate Variability Measures Using Apple Watch and Evaluating Their Accuracy.** (20 min) Ahmad Turki, Kan Ding, Rong Zhang, Ming Li, Kathleen Bell and Khosrow Behbehani
		Workshop W8	*Workshop W10*
		Workshop W8: *Cybersecurity in Healthcare: From device design to Healthcare in Practise (SecureCare)* **Session Chairs: Lynne Coventry** **W8-1 CPIQ - A Privacy Impact Quantification for Digital Medical Consent.** (20 min) Arno Appenzeller, Thomas Kadow, Erik Krempel and Jürgen Beyerer **W8-2 Promoting Cybersecurity Culture Change in Healthcare.** (20 min) Dawn Branley-Bell, Lynne Coventry and Elizabeth Sillence	**Workshop W10: *Approaches to Monitor and Predict Cognitive and Physical Fatigue (QuantifyFatique)*** **Session Chairs: Varun Kanal** **W10-1 A Preliminary Experimental Outline to Train Machine Learning Models for the Unobtrusive, Real-Time Detection of Acute Physiological Stress Levels during Training Exercises.** (20 min) André Jeworutzki, Jan Schwarzer, Kai von Luck, Susanne Draheim and Qi Wang **W10-2 CareCam: Concept of a new tool for Corporate Health Management.** (20 min) Dimitri Kraft, Kristof van Laerhofen and Gerald Bieber
13:15-13:30 (CDT)	**Break**		

13:30-14:30 (CDT)	*Session P*
	Session P: Posters and Late Breaking Reports **P-1 Telerehabilitation Platform REHA2030: Visualization of training statistics for patient and therapist.** Lukas Wohofsky, Daniela Krainer and Peter K. Schubert **P-2. A Deep Hybrid Architecture for Human Activity Recognition.** Sofia Stylianou-Nikolaidou, Ioannis Vernikos, Eirini Mathe and Evaggelos Spyrou **P-3 A Simulated Environment For Traversability Estimation Experiments In Field Robotic Applications.** Christos Sevastopoulos and Stasinos Konstantopoulos **P-4 Build-and-Touch: A Low-Cost, DIY, Open-Source Approach Towards Touchable Virtual Reality.** Pascal Karg, Julian Kreimeier and Timo Götzelmann **P-5 The Landscape of Accessibility Tools Requiring SL Resources.** Eleni Efthimiou and Stavroula-Evita Fotinea **P-6 FutureMe: Negotiating Learning Goals with your Future Learning-Self Avatar.** Konstantinos Tsiakas, Deborah Cnossen, Tim Muyrers, Danique Stappers, Romain Toebosch and Emilia Barakova **P-7 Sequential Late Fusion Technique for Multi-modal Sentiment Analysis.** Debapriya Banerjee, Fotios Lygerakis and Fillia Makedon **P-8 MINA: A Multitasking Intelligent Nurse Aid Robot.** Harish Ram Nambiappan, Krishna Chaitanya Kodur, Maria Kyrarini, Nicholas Gans and Fillia Makedon **P-9 Designing a Vocational Immersive Storytelling Training and Support System to Evaluate Impact on Working and Episodic Memory.** Sanika Doolani, Callen Wessels and Fillia Makedon **P-10 Detection of physical strain and fatigue in industrial environments using visual and non-visual sensors.** Konstantinos Papoutsakis, Thodoris Papadopoulos, Michalis Maniadakis, Manolis Lourakis, Maria Pateraki and Iraklis Varlamis
14:30-15:30 (CDT)	**Networking Event**

8:00-9:00 (CDT)	**Invited Talk** **Presenter: Magda Tsolaki,** *Aristotle University of Thessaloniki, Makedonia, Greece* **Title:** ***Our Experience with New Technology for Brain Stimulation of Patient with Cognitive Decline*** **Session Chair: Dajiang Zhu**		
9:00-9:15	**Break**		
9:15-11:15 (CDT)	*Session E*	*Session F*	*Session G*
	Session E: Assistive Robotic Systems and HRI **Session Chair:** Konstantinos Tsiakas **E-1 NOVELTI2.0: Enhanced Assistive Robot Navigation with Low Throughput Interfaces.** (20 min) Rui Luo, Dmitry A. Sinyukov and Taşkın Padır **E-2 Learning to Map Degrees of Freedom for Assistive User Control: Towards an Adaptive DoF-Mapping Control for Assistive Robots.** (20 min) Felix Ferdinand Goldau and Udo Frese **E-3 Learning Visuomotor Policies with Deep Movement Primitives.** (20 min) Michail Theofanidis, Asil Kaan Bozcuoğlu, Michael Neumann, Joe Cloud, Maria Kyrarini, Fillia Makedon, and Michael Beetz **E-4 Reflecting upon Participatory Design in Human-Robot Collaboration for People with Motor Disabilities: Challenges and Lessons Learned from Three Multiyear Projects.** (20 min) Stephanie Arevalo Arboleda, Max Pascher, Annalies Baumeister, Barbara Klein and Jens Gerken **E-5 Toward Personal Affordable Exoskeletons With Force Control Capabilities.** (15 min) Andrea Calanca, Eldison Dimo, Enrico Sartori, Rudy Vicario, Noè Murr, Matteo Meneghetti, Davide Costanzi, Rafael Ferro, Thiago Boaventura, Emanuele Palazzi, Luca Luzi and Rocco Vertechy **E-6 A robotic edutainment framework for designing child-robot interaction scenarios.** (20 min) Niki Efthymiou, Panagiotis P. Filntisis, Gerasimos Potamianos and Petros Maragos	**Session F: Multimodal Interfaces and HCI** **Session Chair:** Vangelis Metsis **F-1 Automated system to measure Tandem Gait to assess executive functions in children.** (15 min) Mohammad Zaki Zadeh, Ashwin Ramesh Babu, Ashish Jaiswal, Maria Kyrarini, Morris Bell and Fillia Makedon **F-2 Self-Supervised Human Activity Recognition by Augmenting Generative Adversarial Networks.** (20 min) Mohammad Zaki Zadeh, Ashwin Ramesh Ramesh Babu, Ashish Jaiswal, Maria Kyrarini and Fillia Makedon **F-3 An Adaptive Workflow Architecture for Digital Assistance Systems** (20 min) Hendrik Oestreich, Yannick da Silva Bröker and Sebastian Wrede **F-4 Towards an accessible e-training platform for the ageing well of people with Cerebral Palsy and their caregivers: the case of CP-Ageing project.** (20 min) Theodosia V. Livanidou, Antonis S. Billis, Evangelos T. Stamkopoulos, Gertrudis F. Romero, Sandra M. Molina and Panagiotis D. Bamidis **F-5 9PM: A Novel Interactive 9-Peg Board for Cognitive and Physical Assessment.** (20 min) Maher Abujelala, Varun Kanal, Akilesh Rajavenkatanarayanan and Fillia Makedon **F-6 Autonomous Wheelchair Indoor-Outdoor Navigation System through Accessible Routes.** (20 min) Loiy Habhab, Urvish Trivedi, Redwan Alqasemi and Rajiv Dubey	**Session G: Activity Recognition & Human Tracking** **Session Chair:** Vassilis Athitsos **G-1 TSAR: a Time Series Assisted Relabeling Tool for Reducing Label Noise.** (20 min) Gentry Atkinson and Vangelis Metsis **G-2 A case study on occupational back-support exoskeletons versatility in lifting and carrying** (20 min) Tommaso Poliero, Matteo Iurato, Matteo Sposito, Christian Di Natali, Stefano Toxiri, Sara Anastasi, Francesco Draicchio, Luigi Monica, Darwin Caldwell, Vittorio Sanguineti and Jesús Ortiz **G-3 Weakly-supervised hand part segmentation from depth images.** (20 min) Mohammad Rezaei, Farnaz Farahanipad, Alex Dillhoff, Ramez Elmasri and Vassilis Athitsos **G-4 A pipeline for Hand 2-D Keypoint Localization using Unpaired Image to Image Translation.** (20 min) Farnaz Farahanipad, Mohammad Rezaei, Alex Dillhoff, Farhad Kamangar and Vassilis Athitsos **G-5 Privacy preserving getup detection.** (20 min) Jennifer Lumetzberger, Ali A. Raoofpour and Martin Kampel **G-6 Experiences with using persuasive technology in a diet trial for older adults.** (20 min) Laura van der Lubbe, Michel Klein, Marjolein Visser, Hanneke Wijnhoven and Ilse Reinders

11:15-11:45 (CDT)	**Break**
11:45-12:45 (CDT)	*Session D* **Session D: Demo Session** **D-1 Attacking Audio Event Detection Deep Learning Classifiers with White Noise.** Rodrigo dos Santos, Ashwitha Kassetty and Shirin Nilizadeh **D-2. Manifolk: A 3D TSNE Visualizer.** Krishna Kodur, Ashwin Babu and Fillia Makedon **D-3 End-User Framework for Robot Control.** Kaustubh Rajpathak, Krishna Kodur, Maria Kyrarini and Fillia Makedon **D-4 Smart toilet seat configuration for more autonomy using an AI-based 3D depth sensor.** Jennifer Lumetzberger, Peter Mayer, Martin Kampel and Paul Panek **D-5 Towards Independent Navigation with Visual Impairment: A Prototype of a Deep Learning and Smartphone-based Assistant.** Bineeth Kuriakose, Raju Shrestha and Frode Eika Sandnes **D-6 Methods of identifying touched areas have been wiped properly.** Dongho Koo, Yeon Hee Rho, Hua Lo, Nicholas Ames, Yuntao Wang and John Raiti **D-7 Natural Language Processing and Sentiment Analysis for Verbal Aggression Detection; A Solution for Cyberbullying during Live Video Gaming.** Natalia Stepanova, Wesley Muthemba, Ross Todrzak, Michael Cross, Nicholas Ames and John Raiti **D-8 WoTEdu: A Multimodal Interactive Storytelling System.** Mortaza Alinam, Luca Ciotoli and Ilaria Torre **D-9 Making Healthy Air More Affordable: A Smart Air Purifier with Filter Availability Detection.** Dongbin Bai, Qian Zhao, Yitong Shen, Yue Yu, Nicholas Ames, John Raiti, Julian Marshall and Yuntao Wang
12:45-13:00 (CDT)	**Break**
13:00-13:30 (CDT)	**Best Paper Awards and Closing Ceremony**
13:30-14:30 (CDT)	**Doctoral Consortium Session (Networking Event)**

Organizing and Technical Arrangements Committee

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