HSI 2014

7th International Conference on Human System Interaction

June 16-18, 2014

UNINOVA

IEEE

FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

ICS

Welcome to HSI'2014

It is our pleasure to welcome all participants to HSI'2014, the 7th International Conference on Human System Interaction, 16-18 June 2014, Costa da Caparica, Portugal.

HSI'2014 is organized by UNINOVA, and technically co-sponsored by the IEEE Industrial Electronics Society (IEEE-IES) and by the Faculty of Sciences and Technology of Nova University of Lisbon.

UNINOVA [Institute for the Development of New Technologies] is a private not-for-profit Research Organization admitted in 1988 as a full member of IASP [International Association of Science Parks] in recognition of the outstanding activities and initiatives pursued by the institute in close co-operation with Portuguese industry and Faculty of Sciences and Technology of Nova University of Lisbon. The main theme of UNINOVA is to pursue scientific research, technical development, high level training and the creation of technological innovation centres, support to the emergence of technology-based companies (spin-offs) and technology-based small size companies. The scientist and researcher staff is working closely with the national industry and universities.

HSI'2014 features an excellent technical program. We are fortunate to benefit from having four invited speakers from academia and industry: Imre Rudas, António Câmara, Francisco Godinho, and Miguel Sales Dias. One tutorial is scheduled to happen in the first day, clearly addressing hot topics on the bridges of industry and academia.

The quality of the program is a combination of quality submissions and diligent work of the members of the International Program Committee. We would like to acknowledge all authors of submitted papers and all members of the Program Committee and additional Reviewers, who dedicated their time to the review of the submitted papers.

Last, but not the least, we would like to acknowledge the contribution of all members of the several committees that contribute to putting together such exciting program. We are also grateful to all members of the Local Organizing Committee who generously has spent their time to help in the organization of the event.

The success of any conference depends on the quality of the program and participation of people. We thank you all for being here. We trust that you will find the technical program intellectually stimulating and your stay in Lisbon and Caparica really enjoyable.

June, 2014

Luís Gomes and *Jerzy Wtorek, General Co-Chairs*

Anikó Costa, Hideyuki Sawada, Milos Manic, Pawel Strumillo, Technical Program Committee Co-Chairs

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Special Session 1 - Design and Analysis of Control Systems

Remigiusz Wisniewski (Poland)
Marek Wegrzyn (Poland)
Marian Adamski (Poland)

Special Session 2 - Technology Assessment (TA) of Human-Robot Interaction (HRI)

António B. Moniz (Germany)
José Barata (Portugal)

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Plenary Talks

Keynote 1

Date/Time: Monday, 16 June 2014 / 09:30-10:30

Title: The Risings Prospects of Cloud Robotics

Speaker: Prof. Imre J. Rudas - Óbuda University, Budapest, Hungary

Abstract: Cloud Robotics is an emerging field within robotics, currently covering various application domains and robot network paradigms. Cloud Robotics was born from the merger of cloud technologies and robotics. Cloud technology-based computing—or simply Cloud Computing—is one of the most dynamically growing areas of Info-Communication Technologies (ICT). The presentation summarizes the basics of cloud computing, namely the main idea, the definition, the cloud model composed of essential characteristics, service models and deployment models. The next part provides a structured, systematic overview of the numerous definitions, concepts and technologies linked to Cloud Robotics and cloud technologies in a broader sense. It also presents a roadmap for the near future, describing development trends and emerging application areas. Cloud Robotics may have a significant role in the future as an explicitly human-centered technology, capable of addressing the dire needs of our society. Finally some cloud robotics projects are discussed. The last part of the presentation summarizes the results and ideas of a new generation internet and Cloud Technology based Virtual Collaboration Arena (VirCA) developed in Hungary and some of its application possibilities in Cloud Robotics. VirCA provides a platform where users can build, share and manipulate 3D content, and collaboratively interact with real-time processes in a 3D context, while the participating hardware and software devices can be spatially and/or logically distributed and connected together via IP network. The 3D content and processes in VirCA can be synchronized with the real world, which allows the combination of reality and virtual world in the collaboration arena.

Keynote 2

Date/Time: Tuesday, 17 June 2014 / 11:30-12:30

Title: Interaction via telepresence

Speaker: António Câmara - Nova University of Lisbon, Portugal

Abstract: Smart Lamp is a smart phone augmented lamp. Ziphius is a remotely operated aquatic drone. Both enable the remote control of cameras, using smartphones or tablets, for telepresence applications. The planned development of additional sensors and actuators in those devices is discussed. The challenges of designing the interfaces for these devices have led to non-trivial solutions that are presented in this talk.

Keynote 3

Date/Time: Wednesday, 18 June 2014 / 11:00-12:00

Title: Increasing Digital TV accessibility through Multiple Platforms

Speaker: Francisco Godinho - School of Science and Technology of University of Trás-os-Montes and Alto Douro, Portugal

Abstract: Access to information from any device, anywhere and by anyone are requirements of universal accessibility. The transmission and reception of digital television on multiple platforms - TV, Web, Mobile, designed for the general population, are at the same time creating new access opportunities and challenges for people with special needs. This communication demonstrates how the flexibility provided by multiple TV platforms are increasing the accessibility of this medium of communication for people with disabilities, both with regard to content access as news ways of human-TV interaction.

Keynote 4

Date/Time: Wednesday, 18 June 2014 / 12:00-13:00

Title: Natural and Multimodal Human-Computer Interaction: current experiments and future trends

Speaker: Miguel Sales Dias – Microsoft, Portugal

Abstract:

Tutorial

Date/Time: Monday, 16 June 2014 / 16:30-18:00

Title: Computational Intelligence Based Human-Machine Interfaces – from Large Data Sets to 3D Touch and Thought Control

Speaker: Milos Manic

Abstract: Technology advancements in how we interact with machines, computers, smart phones and tablets have introduced paradigms that were inconceivable a decade ago. Humans command smartphones and tablets via touch, gestures, and voice, vehicles use tactile control to communicate with drivers, and motion/depth sensing devices enable interactive gaming across the Internet. This tutorial will illustrate projects from various commercially available devices (3D touch device - Novint Falcon, EEG Neuroheadset - Emotive) to more expensive immersive visualization environments (Computer Assisted Virtual Environments – CAVE). It will also be demonstrated how augmented reality (visual/tactile) simulators can be produced (driving simulator). Examples of funded projects will entail:

· Immersive visualization interaction - 3D Visual and interactive data mining,

· Brain activity monitoring – control of mobile robots via thought,

· 3D force-feedback tactile HMI – “drive by touch” teleoperation (control mobile robots, remote welding of nuclear waste),

· Augmented reality HMIs – tactile, immersive visualization driving simulators,

· Rich displays – OpenGL based, roll-up visualization on tablets (building energy management systems),

· Depth perception input devices (kinect) – motion recognition.

Pre-requisites: None

Target audience: Audience with interests in utilizing low-cost, off the shelf HMI interfaces with applications in energy, rehabilitation, robotics, and gaming.

Program Overview

Day	Morning	Afternoon
June 16	• Registration • Opening Session • Keynote 1 The Risings Prospects of Cloud Robotics - Prof. Imre J. Rudas • Session M1A “Telemedicine and e-Health – I” • Session M1B “Human Machine Interaction - I ”	• Session M2A “Human Machine Interaction - II” • Session M2B (Special Section 1) “Design and Analysis of control Systems - I” • Tutorial Computational Intelligence Based Human-Machine Interfaces – from Large Data Sets to 3D Touch and Thought Control – Prof. Milos Manic • Welcome Reception
June 17	• Registration • Session T1A “Human Machine Interaction - III” • Session T1B (Special Section 1) “Design and Analysis of control Systems - II” • Keynote 2 Interaction via telepresence - Prof. António Câmara	• Session T2A “Human Machine Interaction - IV” • Session T2B (Special Section 1) “Design and Analysis of control Systems - III” • Session T3A “Human Machine Interaction - V” • Session T3B (Special Section 2) “Technology Assessment of Human-Robot Interaction” • Conference Dinner
June 18	• Session W1A “Telemedicine and e-Health – II” • Session W1B “Education and Training” • Keynote 3 Increasing Digital TV accessibility through Multiple Platforms - Prof. Francisco Godinho • Keynote 4 Natural and Multimodal Human-Computer Interaction: current experiments and future trends - Prof. Miguel Sales Dias	• Session W2A “Human Machine Interaction - VI” • Farewell Coffee

Monday, June 16, 2014

Session	Title
8:30 - 9:00 **Room:** **Caparica A**	Registration
9:00 – 09:30 **Room:** **Caparica B**	Opening Session
09:30 – 10:30 **Keynote 1** **Room:** **Caparica B**	The Risings Prospects of Cloud Robotics *Prof. Imre J. Rudas - Óbuda University, Budapest, Hungary*
10:30 – 11:00	Coffee Break
11:00-12:30 **Session M1A: Telemedicine and e-Health - I** **Room:** **Caparica B**	Development of a Five Degrees of Freedom Master/Slave Robot for Teleoperated Laparoscopic Surgical Operations *Guillaume Fau, Takuya Matsunaga, Kouhei Ohnishi*
	Designing Motivational Games for Stroke Rehabilitation *Nauman Shah, Farshid Amirabdollahian, Angelo Basteris*
	Use of re-attempts measure for evaluating device test results of children with neurological impairments *Hock Gan, Ray Frank, Farshid Amirabdollahian, Austen Rainer, Rob Sharp*
11:00-12:30 **Session M1B: Human Machine Interaction - I** **Room:** **Almada**	Recognizing Groups of Visitors for a Robot Museum Guide Tour *Atsushi Kanda, Masaya Arai, Ryota Suzuki, Yoshinori Kobayashi, Yoshinori Kuno*
	Interactions with recognized objects *Jacek Ruminski, Adam Bujnowski, Jerzy Wtorek, Martin Biallas, Alexey Andrushevich*
	Emotional Business Intelligence *Sacha Helfenstein, Olena Kaikova, Oleksiy Khriyenko, Vagan Terziyan*
12:30-14:00	Lunch
14:00-16:00 **Session M2A: Human Machine Interaction - II** **Room:** **Caparica B**	Self-Organizing Maps Based Thought Recognition via EEG Brain Activity Monitoring *Kasun Amarasinghe, Dumidu Wijayasekara, Milos Manic*
	Head movement compensation algorithm in multi-display communication by gaze *Tomasz Kocejko, Jerzy Wtorek, Jacek Ruminski, Adam Bujnowski, Ewa Bylinska*

	Empirical Models for Horizontal Saccadic Eye Movements *Raul Tello Rato, Luis Brito Palma, Arnaldo Guimarães Batista*
	Idiosyncratic repeatability of calibration errors during eye tracker calibration *Katarzyna Harezlak, Pawel Kasprowski, Mateusz Stasch*
14:00-16:00 **Session M2B (SS1): DACS Design and Analysis of control Systems - I** **Room:** **Almada**	Output Events for Human-System Interaction Modeling *Rogério Campos-Rebelo, Anikó Costa, Luís Gomes*
	Application of Comparability Graphs in Decomposition of Petri Nets *Remigiusz Wisniewski, Andrei Karatkevich, Marian Adamski, Daniel Kur*
	Deadlock detection in Petri nets: one trace for one deadlock? *Andrei Karatkevich, Iwona Grobelna*
	Decomposition, validation and documentation of control process specification in form of a Petri net *Iwona Grobelna, Monika Wisniewska, Remigiusz Wisniewski, Michal Grobelny, Piotr Mróz*
16:00 – 16:30	Coffee Break
16:30-18:00 **Tutorial** **Room:** **Caparica B**	Computational Intelligence Based Human-Machine Interfaces – from Large Data Sets to 3D Touch and Thought Control *Milos Manic*
18:30-20:00	Welcome Reception

Tuesday, June 17, 2014

Session	Title
8:30 - 9:00 **Room:** **Caparica A**	Registration
09:00-11:00 **Session T1A: Human Machine Interaction - III** **Room:** **Caparica B**	Finger Posture Estimation using 3D Medial Axes *Yun Ouedraogo, Yoshimitsu Aoki*
	Tactile Pad for the Presentation of Tactile Sensation from Moving Pictures *Hideyuki Sawada, Potsawat Boonjaipetch*
	Java Wrapper for Xsens Motion Capture System SDK *Piotr Kopniak*
	Assessment of Vocational Aptitude of Man-machine Systems Operators *Igor Petukhov, Liudmila Steshina*

09:00-11:00 **Session T1B (SS1):** **DACS Design and Analysis of control Systems - II** **Room:** **Almada**	Design of Moore Finite State Machine with Coding Space Stretching *Larysa Titarenko, Olena Hebda, Alexander Barkalov*
	Hardware Reduction for RAM-based Moore FSMs *Malgorzata Kolopienczyk, Alexander Barkalov, Larysa Titarenko*
	Translation UML diagrams into Verilog *Grzegorz Bazydlo, Marian Adamski, Lukasz Stefanowicz*
	Fuzzy Logic Based Force-Feeback for Obstacle Collision Avoidance of Robot Manipulators *Dumidu Wijayasekara, Milos Manic*
11:00 – 11:30	Coffee Break
11:30 – 12:30 **Keynote 2** **Room:** **Caparica B**	Interaction via telepresence *Prof. António Câmara – Nova University of Lisbon, Portugal*
12:30-14:00	Lunch
14:00-16:00 **Session T2A: Human Machine Interaction - IV** **Room:** **Caparica B**	Combination of Fourier and wavelet transformations for detection of speech emotions *Mariusz Ziółko, Pawel Jaciów, Magdalena Igras*
	Performance analysis of HMI system based on PCA *Rui Manuel Antunes, Luis Brito Palma, Fernando Vieira Coito, Hermínio Duarte-Ramos*
	Driving Behavior Prompting Framework for Improving Fuel Efficiency *Dumidu Wijayasekara, Milos Manic, David Gertman*
	Research in the Semiconductor Factory: Insights into Experiences and Contextual Influences *Daniela Wurhofer, Roland Buchner, Manfred Tscheligi*
14:00-16:00 **Session T2B (SS1):** **DACS Design and Analysis of control Systems - III** **Room:** **Almada**	Adapting a Cheap Game Controller as a Natural 3D Input *Nurazlin Zainal Azmi, Geoff Wyvill, Alistair Knott*
	FPGA-based Embedded Logic Controllers *Marek Wegrzyn, Marian Adamski, Andrei* Karatkevich, *Alfredo Rosado Munoz*
	Aspects of Selection of SM Components with the Application of the Theory of Hypergraphs *Lukasz Stefanowicz, Marian Adamski*
	Dual Synthesis of Petri Net Based Dependable Logic Controllers for Safety Critical Systems *Arkadiusz Bukowiec, Jacek Tkacz, Marian Adamski, Remigiusz Wisniewski*

16:00-16:30	Coffee Break
16:30-17:30 **Session T3A: Human Machine Interaction - V** **Room:** **Caparica B**	A Database Driven Memetic Algorithm for Fuzzy Set Optimization *Kevin McCarty, Milos Manic*
	An Automatic Depressurization Assistance based on an Unconscious Body Motion of a Seated Patient on a Wheelchair *Daisuke Chugo, Kenji Shiotani, Yu Sakamoto, Yuki Sakaida, Sho Yokota, Hiroshi Hashimoto*
16:30-18:00 **Session T3B (SS2):** **Technology Assessment of Human-Robot Interaction** **Room:** **Almada**	Technology assessment approach to human-robot interactions in work environments *Antonio Moniz, Bettina Krings*
	Robotic Systems in Health Care *Gerald Stollnberger, Christiane Moser, Elke Beck, Cornelia Zenz, Manfred Tscheligi, Dorota Szczesniak-Stanczyk, Marcin Janowski, Wojciech Brzozowski, Andrzej Wysokinski*
	Technology Assessment in Robotic Systems Design using PAPRIKA *Lars Dalgaard*
19:00-23:00	Conference Dinner

Wednesday, June 18, 2014

Session	Title
8:30 - 9:00 **Room:** **Caparica A**	Registration
09:00-10:30 **Session W1A: Telemedicine and e-Health - II** **Room:** **Caparica B**	Human-computer interactions in speech therapy using a blowing interface *Jacek Ruminski, Adam Bujnowski, Jerzy Wtorek*
	Interaction with medical data using QR-codes *Krzysztof Czuszynski, Jacek Ruminski*
	Technical Evaluation of and Clinical Experiences with the SCRIPT Passive Wrist and Hand Orthosis *Serdar Ates, Beatriz Leon, Angelo Basteris, Sharon Nijenhuis, Nasrin Nasr, Patrizio Sale, Alfredo Cesario, Farshid Amirabdollahian, Arno Stienen*
09:00-10:30 **Session W1B: Education and Training**	An Internet Remote Laboratory to Teach Industrial Automation *Mário J.G.C. Mendes, Luis Martins*
	Haptic simulation of rheological objects with Verlet integration *Masakazu Yamaoka, Shun Ido*

Room: Almada	Virtual Reality technology used as a learning tool in Civil Engineering training *Alcinia Zita Sampaio, Luis Viana*
10:30 – 11:00	Coffee Break
11:00 – 12:00 **Keynote 3** **Room: Caparica B**	Increasing Digital TV accessibility through Multiple Platforms *Prof. Francisco Godinho - University of Trás-os-Montes and Alto Douro, Portugal*
12:00 – 13:00 **Keynote 4** **Room: Caparica B**	Natural and Multimodal Human-Computer Interaction: current experiments and future trends *Prof. Miguel Sales Dias – Microsoft, Portugal*
13:00-14:30	Lunch
14:30-16:00 **Session W2A: Human Machine Interaction - VI** **Room: Caparica B**	Global Path Planning for Autonomous Vehicle based on Road Map Images *Van-Dung Hoang, Danilo Cáceres Hernández, Joko Hariyono, Kang-Hyun Jo*
	Laser Based Obstacle Avoidance Strategy for Autonomous Robot Navigation Using DBSCAN for Versatile Distance *Danilo Cáceres Hernández, Van-Dung Hoang, Kang-Hyun Jo*
	Safety properties modelling *Tullio Tanzi, Raoul Textoris, Ludovic Apvrille*
16:00 – 16:30	Farewell Coffee

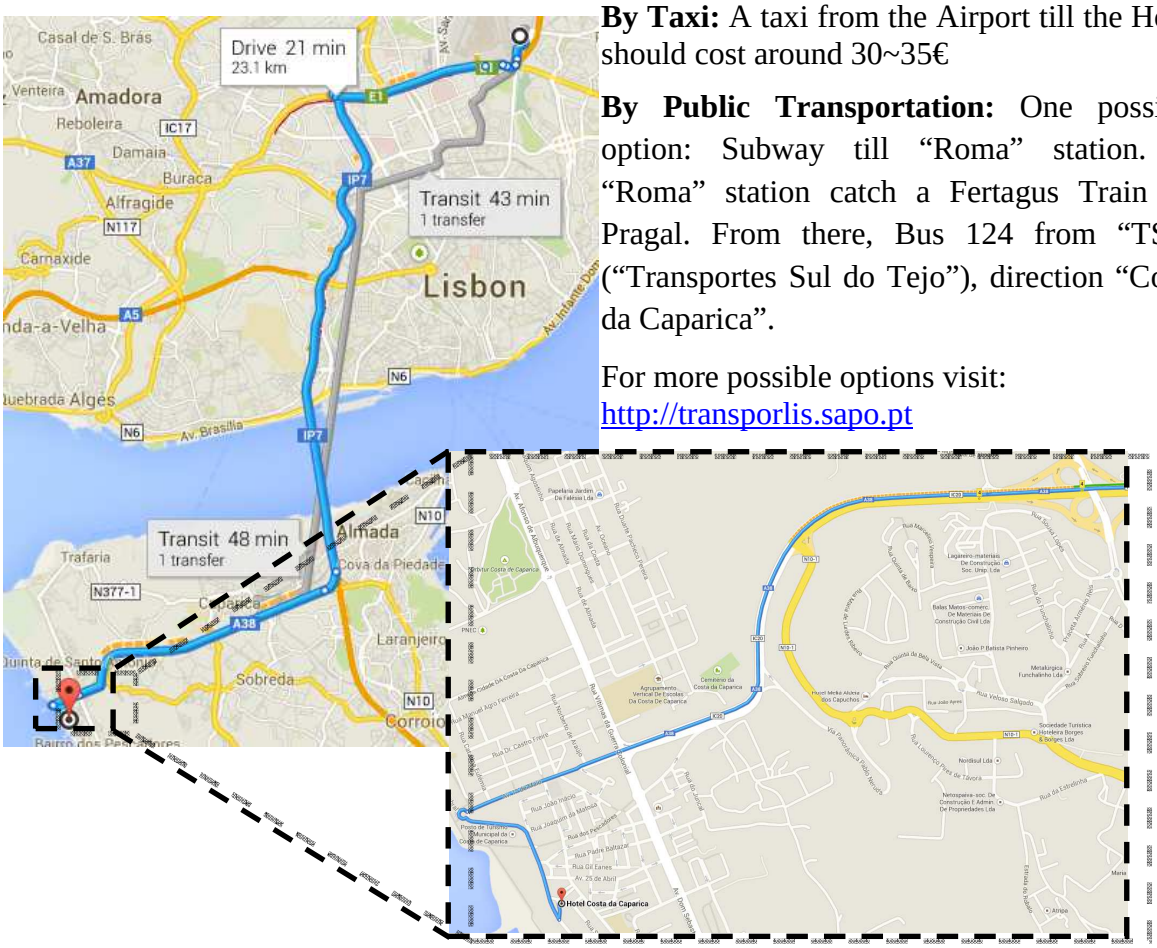
Conference Venue & Activities

The conference will be held at Hotel Costa da Caparica in Caparica, south of Lisbon, the capital of Portugal. Lisbon has a population of one million inhabitants, is a modern city, which has a lot to offer both in terms of history, culture and social life. It stands on the westernmost point of the European continent, where the Tagus River flows into the Atlantic Ocean. Its Atlantic climate, with some Mediterranean influences, is probably the mildest of all European capitals.

Address:

Av. General Humberto Delgado, nº47
2829-506 Costa de Caparica
Almada – Portugal
(38.641357º N 9.23667º W)
Tel: (351) 212 918 900
Fax: (351) 212 910 687
E-mail: geral@hotelcostacaparica.pt
WWW: http://www.hotelcostacaparica.pt

How to get there (from Airport)



By Taxi: A taxi from the Airport till the Hotel should cost around 30~35€

By Public Transportation: One possible option: Subway till "Roma" station. In "Roma" station catch a Fertagus Train till Pragal. From there, Bus 124 from "TST" ("Transportes Sul do Tejo"), direction "Costa da Caparica".

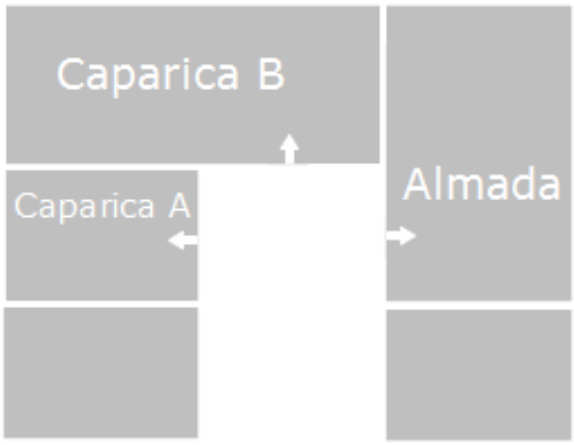
For more possible options visit:
http://transporlis.sapo.pt

Conference Rooms

The conference will take place in the ground floor of the Hotel Costa da Caparica. The Hotel has 352 rooms including 12 suites and 7 especially equipped rooms for handicapped and private balconies with magnificent views.

The conference takes place in three rooms:

- Room Caparica A
- Room Caparica B
- Room Almada



The **Conference administrative** functions will be held at room **Caparica A**. Rooms **Caparica B** and **Almada** will be used for oral presentations. **Plenary sessions** will take place in room **Caparica B**.

Meals are included in the registration fee. They take place at the conference venue, with the exception of Welcome Reception and Conference Diner.

Coffee-breaks will be held at the conference rooms hall / “Bar Jardim” whereas the lunches will take place at the eighth floor of the hotel, in a restaurant called Atlântida.

Social Events Venues

Welcome Reception Location

"Dragão Vermelho Restaurant Lounge Bar" is located in front of the Conference Hotel. Placed at the Costa da Caparica beach, it is a good place to relax and enjoy the magnificent view and the sunset.

Address: Avenida General Humberto Delgado, Pavilhão 17, Costa da Caparica

Conference Dinner Location

With a splendid view over Lisbon, the Christ the King statue (Cristo Rei in Portuguese), is a catholic monument dedicated to the Sacred Heart of Jesus Christ. Clearly using the Brazilian Christ the Redeemer as an inspiration, it was built in 1959 symbolizing the gratitude the Portuguese were spared the effects of World War II. The existence of a panoramic tent in its gardens allows the realization of social events. We choose this location for our conference dinner considering the magnificent view over our capital city,.

Adress: Tenda Panorâmica, Avenida Cristo Rei, 2800 Almada (38.678581º N -9.171333º W)

Bus leaves from hotel at 19:00h and returns at 23:00h

HSI' 2014 Program Overview

	16 June		17 June		18 June	
	Caparica B	Almada	Caparica B	Almada	Caparica B	Almada
8:30	Registration		Registration		Registration	
9:00	Opening Session		T1A Human Machine Interaction - III	T1B Design and Analysis of control Systems - II	W1A Telemedicine & e-Health - II	W1B Education and Training
9:30	Invited Speaker Imre Rudas					
10:00						
10:30	Coffee-break				Coffee-break	
11:00	M1A Temedicine & e-Health - I	M1B Human Machine Interaction - I	Coffee-break		Invited Speaker Francisco Godinho	
11:30			Invited Speaker António Camara			
12:00					Invited Speaker Miguel Sales Dias	
12:30	lunch		lunch			
13:00					lunch	
13:30						
14:00	M2A Human Machine Interaction - II	M2B Design and Analysis of control Systems - I	T2A Human Machine Interaction - IV	T2B Design and Analysis of control Systems - III		
14:30					W2A Human Machine Interaction - VI	
15:00						
15:30						
16:00	Coffee-break		Coffee-break		Farewell Coffee	
16:30	Tutorial Milos Manic Computational Intelligence Based Human-Machine Interfaces – from Large Data Sets to 3D Touch and Thought Control		T3A Human Machine Interaction - V	T3B Technology Assessment of Human-Robot Interaction		
17:00						
17:30						
18:00						
18:30	Welcome Reception					
19:00			Conference Dinner 19:00 - 23:00			
19:30						
20:00						