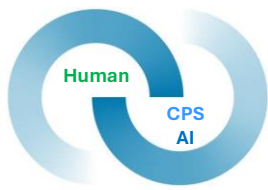




CTS: The next stage

In the context of the ongoing evaluation of R&D units by FCT, CTS prepared its application including the strategic plan for 2025-2029, which can be summarized as:



“For the period 2025-2029 CTS aims to make substantial scientific & technological contributions to the development of a new generation of human-AI-centric, collaborative, safe, sustainable, and resilient cyber-physical systems (CPS).

In recent years, rapid progress in cyber-physical systems has been marked by an exponential increase in connectivity among objects, systems, organizations, and individuals, resulting in hyper-connected systems of systems. Concurrently, the maturation of AI technologies has led to the gradual integration of intelligence and autonomy across these systems, introducing a "social perspective" wherein complex CPS are viewed as collaborative networks of autonomous systems.

A significant challenge now lies in understanding the role of humans in relation to these systems and designing intelligent systems that symbiotically interact with humans, thereby enhancing quality of life and societal value. Encouraging developments are evident in various research areas such as collaborative robotics and human-AI collaboration. However, there is a pressing need to leverage such research directions within the context of complex CPS, focusing on behavior modeling, architecture design, collaboration mechanisms, and practical validation of solutions, alongside the introduction of novel performance indicators. Accordingly, we aspire to cultivate a new generation of CPS comprising:

- Human-centric CPS advancements, facilitated by effective human-AI collaboration where the roles, capabilities, and collaboration mechanisms of collectives of human and intelligent (sub-)systems are comprehensively understood and leveraged.
- Secure and resilient CPS infrastructures and components capable of addressing escalating cyber threats. This entails integrating self-healing capabilities, fostering trust and transparency (e.g., AI explainability, dealing with misinformation, ethics in AI) to facilitate technology acceptance. Exploring insights from nature is a promising avenue to pursue.
- Systems aligned with sustainability objectives, encompassing energy efficiency considerations, sustainable manufacturing models (e.g., industrial symbiosis, circular economy), and robust distributed systems monitoring. Given the volatile, uncertain, complex, and ambiguous (VUCA) nature of our times, the next generation of complex CPS should demonstrate resilience or transformative resilience capabilities in the face of unforeseen disruptions. An even higher aspiration is to develop antifragility approaches aimed at systems that fortify themselves post-attacks/disruptions. The VUCA context further underscores the imperative for all geographical regions to strengthen their technological sovereignty.
- A holistic approach to systems design. The success of such complex CPS hinges on considering the multiple abstraction layers of the systems, spanning from smart electronic devices/sensors to collaborative networks of systems-of-systems.

STRATEGIC SCIENTIFIC GOALS

CTS will pursue its vision by leveraging its strengths and aligning with global research trends and emerging technologies. The center commits to the following strategic goals:

- **G1. Establish a solid foundation for human-centric CPS**

Beyond traditional human-systems interfaces, we aim to explore human-systems/ AI collaboration, to enhance quality of life and foster value creation aligned with trends of Society 5.0 and cyber-physical-social-systems. This entails role sharing, mutual introspection, collaborative decision-making, and high levels of interaction between humans and intelligent systems.

- **G2. Contribute significantly to the development of safe & secure CPS technologies**

Focusing on safe infrastructures, devising new approaches to protect CPS from cyber threats, and creating self-healing mechanisms. At a strategic level, we aim to enhance technological sovereignty.

- **G3. Foster sustainable and resilient CPS solutions**

Addressing societal challenges in line with the sustainability goals of the UN Agenda 2030, CTS aims to develop CPS that can withstand unforeseen disruptions, moving towards resilience, transformative resilience, and antifragility.

- **G4. Cultivate multi-disciplinary integration across all levels of technology development**

CTS is committed to fostering seamless integration and shared understanding across diverse disciplines, from electronic & embedded systems to sensors and actuators, communication systems, systems-of-systems, and collaborative networks.

Editorial

In the realm of academic pursuits and groundbreaking research, the achievements of our community continue to shine brightly. We are proud to spotlight two remarkable theses that exemplify the dedication and intellectual rigor of our scholars. Paula Graça has made significant strides in her research on Collaborative Business Ecosystems. Her thesis argued that collaboration is essential for business success in a competitive world, proposing a framework to assess and improve collaboration within business ecosystems. Kankam has also delivered groundbreaking research in the field of collaborative renewable energy ecosystems. He proposed Collaborative Energy Ecosystems with Cognitive Household Digital Twins to improve efficiency and sustainability in Renewable Energy Communities through collaborative energy management.

We are also thrilled to announce that a group of students from the Instituto Superior de Engenharia de Lisboa (ISEL) has achieved third place at the prestigious Digital Health Summit 2023, under the scope of the 4th edition of the H-INNOVA (Health Innovation Hub Call for Projects), which took place in Funchal, Madeira from 29th to 30th of November 2023.

Innovation extends beyond individual achievements to collaborative projects that address global challenges. Amongst the several European projects where CTS collaborates, one has just finished (IMPACTOUR) and another just started (Herit4Ages).

The Herit4Ages project aims to demonstrate that it is possible to improve the overall performance of heritage buildings while preserving their architectural and cultural identity. Given that the spectrum of heritage buildings is very broad, and those protection laws may allow for different levels of intervention, the project aims to develop a set of solutions that can be replicated in different parts of Europe.

The IMPACTOUR project developed an innovative and easy-to-use methodology and tool to measure and assess the impact of Cultural Tourism (CT) on European economic and social development and providing CT stakeholders with strategic guidance so that policies and practices on CT can be improved.

Looking ahead, we are excited to announce the upcoming DoCEIS 2024 (Doctoral Conference on Computing, Electrical and Industrial Systems). Scheduled to take place on July 3rd-5th 2024, this conference will bring together doctoral students, researchers, and industry experts to share their latest findings and discuss emerging trends in the field of Technological Innovation for Human-Centric Systems. In conjunction we will held YEF-ECE 2024 (International Young Engineers Forum on Electrical and Computer Engineering), on July 5th, particularly dedicated to young engineers. This event will be a unique opportunity for them to connect with each other enabling experience's sharing and to become internationally active.

As we celebrate these milestones and look forward to future endeavours, we remain committed to fostering an environment of academic excellence and innovation. The achievements of our students and researchers not only contribute to the advancement of knowledge but also have a profound impact on society.

João Martins, CTS Communication Officer

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These challenges delineate the research agenda for CTS in the forthcoming period.

Addressing such systems requires contributions from multiple knowledge areas. CTS covers a broad spectrum of expertise, which is bolstered in this proposal within the realms of AI, telecommunications, and signal processing by the inclusion of a group of new integrated members, formerly associated with another center. This offers the opportunity to embrace a more holistic perspective and to further integrate this diversity of knowledge into a truly interdisciplinary approach.

CTS will pursue its R&D activities with a commitment to address societal challenges at local and international levels. This commitment is evident in keeping a balance between fundamental research aimed at achieving scientific excellence and applied research focused on developing, validating, and demonstrating results across various industry and service sectors. Aligning with both local and global strategic development agendas is essential for maximizing impact. CTS activities will prioritize the internalization of value creation processes, fostering a broader understanding of related phases, actors, and mechanisms. This enhanced awareness, combined with extensive experience collaborating with industry and other organizations, will facilitate the implementation of more systematic knowledge transfer processes, thereby enhancing CTS's position in the value innovation chain.

In addition, CTS places a strong emphasis on training young researchers and students. This commitment is demonstrated through ongoing support for doctoral students, particularly those associated with the PhD programs in Electrical and Computer Engineering at FCT-NOVA and Informatics at Lusofona, as well as advanced training for post-doc researchers.

CTS typically hosts an annual population of 80-100 PhD students, at different stages of their doctoral training. This effort involves provision of access to research facilities, involvement in research projects, facilitating involvement in international networks, and training in both technical and soft skills. Post-docs training strategy focuses on building research management & project leadership skills, guided by personal career development plans rooted in strong ethical and RRI principles, with a clear understanding of the value creation processes. CTS continues committed to supporting a large number of MSc students from various engineering fields offered by FCT-NOVA and other participating institutions, particularly in the completion of their master's theses.

For the next phase, CTS aims to maintain and strengthen its active involvement in the international scientific community by enhancing participation in relevant networks, technical committees, and boards. While its members have already attained prominent positions and significant recognition in certain areas, there is now a concerted effort to pursue more integrated institutional recognition of CTS as a leading center for integrated human-AI cyber-physical systems.”

For this next phase, the CTS team includes 56 integrated members and 35 other collaborators with PhD, in addition to 70-100 PhD students.

We look forward to exciting new achievements in the next generation of human-centric, collaborative, safe, sustainable, and resilient Cyber-Physical Systems.

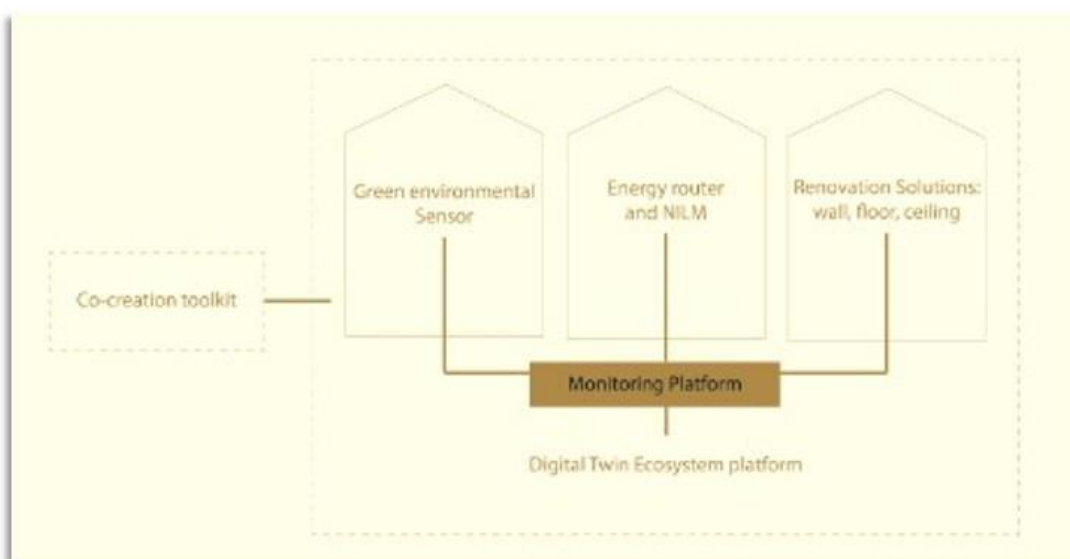
Luis Camarinha-Matos, Director of CTS

PROJECT NEWS

Participation in Horizon Europe Project Herit4Ages

CTS members integrate the Herit4Ages consortium (UNIVERSITY COLLEGE, FUNDACION CENTRO TECNOLOGICO DE INVESTIGACION MULTISECTORIAL, TESELA, IDP; FSMLR, UNINOVA, UNIVERSITA DI BOLOGNA, FENIX, IBS, CMF, WARSZAWSKI INSTYTUT TECHNOLOGICZNY, POLITECHNIKA WARSZAWSKA), leading WP5 (Energy sustainable integration solutions). The project aims to demonstrate that it is possible to improve the overall performance of heritage buildings while preserving their architectural and cultural identity. Given that the spectrum of heritage buildings is very broad and those protection laws may allow for different levels of intervention; the project aims to develop a set of solutions that can be replicated in different parts of Europe. The concept comes from the idea that our heritage must be protected, last for ages and must be able to adapt to environmental, economic and societal challenges and changes. The resilience of cultural built environments must offer similar opportunities to new buildings, e.g., offer good comfort and a healthy environment for users while being affordable and accessible. They must also be connected to IoT functionalities and help achieve EU and global decarbonisation targets.

More info at <https://www.herit4ages.eu>



H2020 IMPACTOUR project comes to a successful closing

H2020 IMPACTOUR project (coordinated by CTS members) has come to an end, however its legacy will remain. The established IMPACTOUR community remains active and efforts are being developed to commercially exploit the IMPACTOUR TOOL. The EU-funded <https://www.impactour.eu/> (IMPACTOUR) project aimed to promote sustainable cultural tourism strategies across Europe. For this purpose, the consortium undertook systematic comparison of pan-European information related to cultural tourism, including strategies that influenced urban and regional transformation, successful and unsuccessful implementation models and innovative techniques.

Undoubtedly, one of the project's most notable achievements lies in its collaborative approach, including the participation of <https://www.impactour.eu/pages/about-pilot-sites> (32 pilot sites) around Europe, where only five were project partners. The project fosters a participatory approach and facilitates information exchange among stakeholders. The establishment of the IMPACTOUR community, fostering discussions beyond project boundaries, became a cornerstone for knowledge-sharing and societal engagement in sustainable cultural tourism development.

Central to IMPACTOUR's objectives was the creation of a user-friendly IMPACTOUR TOOL to measure the impact of cultural tourism on European economic and social development. It was designed and developed to provide recommendations for the stakeholders site managers based on their site characterisations and their objectives to achieve a greater positive impact of cultural tourism. The IMPACTOUR tool emerged as a dynamic instrument empowering stakeholders in the realm of Cultural Tourism, whether from the public or private sphere. Its innovative functionality facilitates the envisioning and exploration of hypothetical scenarios involving new or existing strategies and policies. Through a rigorous "what-if" analysis of these scenarios, a comprehensive grasp of European Cultural Tourism's ramifications was attained. This invaluable insight enabled a precise evaluation and strategic guidance, complemented by a monitoring mechanism that tailors recommendations according to user-defined ambition levels.



In summation, the IMPACTOUR project represented a pioneering leap in the domain of cultural tourism analysis, destination management and policy development. By harnessing the synergy between cutting-edge methodologies, rich cultural tourism data, and a collaborative stakeholders community, this initiative promises to reshape how the stakeholders approach decision-making, policy formulation, and sustainable development.

CTS-ISEL team wins 3rd place at DIGITAL HEALTH SUMMIT 2023

The URIPRO project, developed by the Master's students in Biomedical Engineering, Ana Moreno, Raquel Pedro, Ana Correia and with the support of Professor Alessandro Fantoni (DEETC/ISEL and CTS/ISEL) won 3rd place at the DIGITAL HEALTH SUMMIT 2023 in the Students category.

URIPRO aims to create a simple optoelectronic sensor that detects the presence of proteins in urine, depending on the absorbance or ability of the compounds to absorb radiation with a wavelength of 280 nanometers.

This optoelectronic system provides continuous and constant monitoring of the person's state of health, making it possible to prevent and/or control dehydration in elderly populations, where travel is a daily difficulty, in cases of individuals with a history of chronic and acute kidney disease who wish to monitor their state of health, and finally, in the military market, more specifically in special forces where it is difficult to access and monitor the individual's health.



Ana Moreno, Raquel Pedro, Ana Correia and professor Alessandro Fantoni (from left to right)

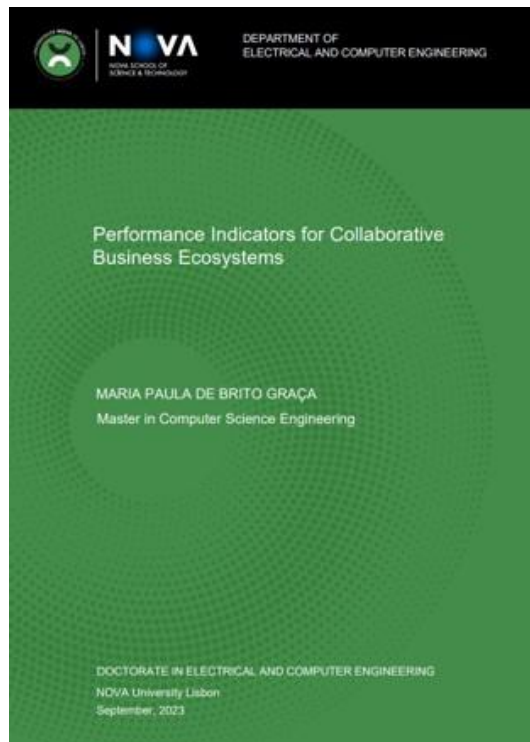
PhD Theses

Thesis: Performance Indicators for Collaborative Business Ecosystems

PhD Candidate: Maria Paula Graça

Supervisor: Luis M. Camarinha-Matos

NOVA School of Science and Technology, 13 Dec 2023



Today, in a rapidly changing world facing significant challenges, fostering collaboration to enhance our resilience against disruptive factors, such as the recent pandemic, is crucial. In the business realm, sustainable collaboration is critical for companies when coping with a highly competitive and aggressive global market environment and becoming more resilient to attacks or disruptive events. Sustainable collaboration is the ability to create a resilient and adaptable collaborative process capable of maintaining effectiveness and positive long-term outcomes.

On the other hand, the continued growth of technology, globalisation and market competitiveness has highlighted the importance of collaboration for business success with a focus on business ecosystems. As a result, many approaches have emerged aimed at modelling and analysing them. A business ecosystem is a long-term strategic collaborative network of organisations that promotes common business processes, provides interoperable collaboration infrastructures, and facilitates trust-building among its members.

An essential aspect in this context is evaluating the collaboration performance among organisations in the ecosystem to identify potential earnings and promote the sustainability of the collaboration. However, despite the benefits of collaboration widely mentioned in the literature, adequate performance indicators still lack to measure such benefits for business ecosystems. To this end, aiming to emphasise the importance of collaboration among organisations, we adopted the term Collaborative Business Ecosystem (CBE) to represent a long-term strategic collaborative network that aims to help its members be prepared to engage in

collaborative business opportunities. It is expected that the measurement of collaboration in a CBE can influence the organisations' behaviour to evolve towards better performance, thus contributing to the sustainability of the CBE.

To guide our work and address the abovementioned gap, we adopted the design science research (DSR) method, following the three DSR cycles and steps. Anchored in the state-of-art of the most related research areas, we proposed a novel design artefact in the form of a simulation model, the Performance Assessment and Adjustment Model (PAAM), composed of a set of Performance Indicators adequate to assess collaboration in a CBE, and an Influence Mechanism to induce an influencing factor on the organisations to improve their behaviour, thus contributing to the ecosystem performance and collaboration sustainability. For evaluating PAAM, several simulation scenarios were established, representing a CBE shaped with actual data from three IT organisations operating in the same business ecosystem. The final validation involved a focus group of managers from the organisations who provided the data by participating in workshops and filling in a questionnaire on their "usefulness, ease of use and intention to use" PAAM. The validation showed that PAAM could reflect real-life collaboration situations when fuelled by actual data from the IT industry or other industry sectors.

Finally, the results were disseminated in peer-reviewed international conference proceedings and journals. This work contributes to scientific knowledge with a performance assessment framework comprising a set of performance indicators adequate to evaluate the collaboration in a CBE and an influence mechanism to study how these indicators can influence the organisations' behaviour to improve the CBE performance and collaboration sustainability.



Thesis: A Contribution to Collaborative Renewable Energy Ecosystems

PhD Candidate: Kankam Adu-Kankam

Supervisor: Luis M. Camarinha-Matos

NOVA School of Science and Technology, 4 Jun 2024

The notions of Collaborative Energy Ecosystem (CEE) and Cognitive Household Digital Twins (CHDTs) are proposed as two complementary and prospective concepts that could contribute to the efficient organization and management of emerging Renewable Energy Communities (RECs). The CEE concept was derived from the merger of principles and concepts from the disciplines of Collaborative Networks and Virtual Power Plants and is proposed as a representation of a REC, where members approach energy conservation (generation and consumption) from a collaborative point of view. The notion of CHDTs is also proposed as a digital twin representation of the constituent households of a CEE. It is further suggested that CHDTs could have the form of software agents within the cyber space and could be designed to possess some autonomous and cognitive capabilities which could enable them to play complimentary roles as decision-making agents within the corresponding physical households. The decisions of these agents are expected to promote collaborative behaviours that could increase the survivability and sustainability of the CEE. In this thesis, we use software simulation to demonstrate the feasibility of the CEE and CHDT concepts. We further show that through the cognitive capabilities of CHDTs, behaviours such as collaborative generation and consumption of energy could be achieved. Other behaviours, such as mutual influence and the ability to adopt some form of social innovation, are also shown. We adopted the Design Science Research Method by developing a software model (an artifact) of the CEE and its constituent CHDTs using a multi-paradigm simulation technique that involves the integration of System Dynamics, Agent-Based, and Discrete Event simulation techniques on a single platform. The thesis's outcome suggests that these concepts could be useful for managing the sustainability of CEEs or RECs.



PhD in Electrical and Computer Engineering

FCT-NOVA in collaboration with CTS

New candidates:

Application period: 3-28 Jun 2024

<https://sites.fct.unl.pt/doutoramento-engenharia-electrotecnica-computadores/pages/candidates>



The 15th Advanced Doctoral Conference on Computing, Electrical, and Industrial Systems (DoCEIS 2024) aims to serve as a central hub, bringing together Ph.D. students, professors, researchers, engineers, and specialists from various countries around the topic of Technological Innovation for Human Centric Systems.

Human-Centric Systems in the electrical and computer engineering field focus on developing technologies that prioritize human needs, comfort, and usability. These systems integrate advanced sensors, intuitive user interfaces, and intelligent algorithms to create environments and devices that are intuitive and responsive to human actions. Applications may range from smart homes and wearable health monitors to collaboration between Human-AI in industrial contexts. This aligns with the principles of Industry 5.0 and Society 5.0, bridging the gap between cutting-edge technology and everyday human experiences, ensuring that advancements contribute positively to both industry and society.

Preliminary Program

Day 1 – Wednesday 3 Jul 2024

09:00 – 09:30 Opening session

09:30 – 10:30 Keynote 1

Emerging Skill Requirements and Training Needs within Manufacturing Companies in the Transition to Industry 5.0
Maria Gustavsson – Professor at the Department of Behavioural Sciences and Learning, Linköping University, Sweden

10:30 – 11:00 Coffee break

11:00 – 13:00 Session A

A – Collaborative Systems

- **A Human-AI Centric Performance Evaluation System for Collaborative Business Ecosystems**
Paula Graça, Luís M. Camarinha-Matos
- **A Human-AI Framework to Design Collaborative Cyber Physical Systems**
Artem A. Nazarenko, Luís M. Camarinha-Matos
- **Analyzing Value-Sharing Methods in Energy Communities with Coalitional Game Theory**
Saeed Akbari, Luís M. Camarinha-Matos, Joao Martins
- **Human-Centric Principles for Computational Systems Supporting Collaborative Creativity**
Zahra Ebadpour, Sanaz Nikghadam-Hojjati, Jose Barata

13:00 – 14:15 Lunch

14:15 – 16:15 Session B

B – Intelligent Computational Systems

- **Transition Invariants in the Analysis of Concurrent Systems Modelled by Petri Nets**
Maxim Maliński, Marcin Wojnakowski, Remigiusz Wiśniewski, Andrzej Obuchowicz
- **Evaluating Postal Systems' Current State, Roadmap to Automation**
Uku Tulev, Eduard Shevtshenko, Ilmar Ermus

- **Modular and Configurable Internet of Things Devices for Value Chain Digitalization**
Miguel Arvana, João Goes, Andre Dionisio Rocha
- **Mapping Forest Height with Multifrequency SAR, InSAR, and Multispectral Datasets**
João E. Pereira-Pires, André Mora, Raffaella Guida, José M. Fonseca, João M. N. Silva, Pedro Barreira

16:15 – 16:30 Coffee break

16:30 – 17:00 Ice Breaking Session 1

17:00 – 18:00 Tutorial

Creativity and Innovation in the Digital Era

Fernando Angelino – IPS, Portugal

17:00 – 18:30 Posters

18:30 – 19:00 Ice Breaking Session 2

19:15 – 20:00 Welcome reception

Day 2 – Thursday 4 Jul 2024

09:00 – 11:00 Session C

C – Human-Robot Collaboration

Special session organizers: Dario Antonelli (Italy), Chrysostomos D. Stylios (Greece)

- **Continual Learning Supporting Human-Robot Collaboration**
Yuchen Fan, Dario Antonelli, Alessandro Simeone
- **Leveraging Information Flow-Based Fuzzy Cognitive Maps for Interpretable Fault Diagnosis in Industrial Robotics**
Marios Tyrovolas, Chrysostomos Stylios, Khurshid Aliev and Dario Antonelli
- **Convolutional Neural Networks for Autonomous UAV Navigation in GPS-denied Environments**
Ricardo Serras Santos, João P. Matos-Carvalho, Slavisa Tomic, Marko Beko, Carlos T. Calafate
- **Multimodal Creativity State detection from Speech and Voice**
Sepideh Kalateh, Luis A. Estrada-Jimenez, Sanaz Nikghadam Hojjati and José Barata

11:00 – 11:30 Coffee break

11:30 – 13:00 Session D

D – Electronic Systems

- **A Physically Unclonable Function for Biomedical Devices Authentication**
João Cabacinho, João Casaleiro, Luís B. Oliveira
- **Determining Thin Film Characteristics by Prism Coupling Technique**
Paulo Lourenço, Yuri Vygranenko, João Costa, Miguel Fernandes, Alessandro Fantoni, Manuela Vieira, G. Lavareda
- **A Novel Analogue Computing System in HiL for Electric Traction**
Bruno Luís, Stanimir Valtchev

13:00 – 14:15 Lunch

14:15 – 15:15 Keynote 2

Cognitive Control in Collaborative Systems

Fabio Fruggiero, Università degli Studi della Basilicata, Italy

15:15 – 16:45 Session E

E – Human-Centric Biomedical Systems

Special session organizers: Luis Oliveira, Bruno Guerreiro, Filipe Silva, Hugo Gamboa (Portugal)

- **synple: A Platform for Privacy Preserving Synthetic Patient Data Generation**
Inês Silveira, Luís Silva, Francisco Veladas, Rodrigo Braga, Hugo Gamboa
- **Patient-Centered Healthcare: A Framework for Analyzing Patient Feedback through Sentiment Analysis and Topic Modeling**
Luis Osório and Nuno Fachada
- **Nonlinear Model Predictive Control for Optimal Dose Administration in Radiotherapy**
João C. G. Araújo, Bruno J. Guerreiro, Luis B. Oliveira, and Filipe Ferreira da Silva

16:45 – 17:00 Coffee break

17:00 – 18:45 Panel session

AI is shaping our lives ...

19:30 – 23:00 Conference Dinner

Day 3 – Friday 5 Jul 2024

09:00 – 11:00 Session F & YEF-ECE 1

F – Cybersecurity and Safety

- **Achieving Adaptive Safety via Trust Building in Autonomous Ecosystems**
David Halasz and Barbora Buhnova
- **Behavioral and Human-Centric Access Control Model in XACML Reference Architecture: Design and Implementation of EHR Case Study**
Nastaran Farhadighalati, Jose Barata, Sanaz Nikghadam-Hojjati, and Eda Marchetti
- **Quantized Digital Amplification Physical Layer Security Schemes**
Pedro Viegas, Paulo Montezuma, Rui Dinis, João Guerreiro and João Oliveira
- **Evolving Cybersecurity Challenges in the Age of AI-Powered Chatbots: A Comprehensive Review**
André F. Costa, Nuno Mateus Coelho

Opening YEF-ECE 2024

Y1 – Digital Systems

Multi Agent Reinforcement Learning System for Vehicular and Pedestrian Traffic Control with Visible Light Communication

Gonçalo Galvão, Manuela Vieira and Manuel Vieira

Implementation of an intelligent virtual assistant based on LLM models for irrigation optimization

Henrique Chia and Ana Inês Oliveira

AI generated route data pre - processing for faster decision making

Rene Maas, Eduard Sevtsenko and Tatjana Karaulova

Specification of Complex Events and Their Integration in the IOPT-Tools Development Environment

Diogo Natario and Luís Gomes

Extending IOPT-Nets with High-Level Features: A Digital Twin of a Power Wheelchair

Carolina Lagartinho Oliveira, Filipe Moutinho and Luis Gomes

11:00 – 11:30 Coffee break

11:30 – 13:00 YEF-ECE 2 & YEF-ECE 3



YEF-ECE 2024

International Young Engineers Forum on Electrical and Computer Engineering
(associated to DoCEIS 2024)

Following the success of the 2017, 2018, 2019, 2020, 2021, 2022 and 2023 editions we are proud to organize the 2024 International Young Engineers Forum on Electrical and Computer Engineering – YEF-ECE 2024.

The International Young Engineers Forum looks for the latest developments and innovative applications in electrical and computer engineering, dealing with systems' design and utilization, looking forward to efficient devices and systems with appropriate control algorithms to meet the needs of business and industry in a global economy. This event will be a unique opportunity for young engineers to connect with each other enabling experience's sharing and to become internationally active.

Y2 – Electronics

Shunt active power filter applied to four-wire electrical network

Darcy Apresentação, Paulo Gambôa and Ricardo Luís

Implementation of NMOS-based LDO Using Recycling Folded-Cascode in 16 nm FinFET

Miguel Máximo, Mauro Santos, João Oliveira, Pedro Toledo, Ricardo Machado and Luis Oliveira

Design of a 300mV-Supply Schmitt-Trigger-Based DIGOTA for GBW and DC Gain Enhancement in 16nm FinFET

Ricardo Machado, Pedro Toledo, Luis Oliveira, Miguel Máximo, Mauro Santos and João Oliveira

An Active Self-Interference Cancellation Front-end for Stepped-Frequency Continuous-Wave Radar

Diogo Monteiro, João Casaleiro, Vítor Costa, Guilherme Marques and Diogo Silva

Imaging with Capacitive Sensors Arrays for Powder Bed Fusion Quality Control

Victor Macedo, André Oliveira, Vasco Luz and Luis Rosado

Y3 – Energy

Impact of Vehicle-to-Grid Technologies on the Electricity System

Marcelo Luís, Gonçalo Glória, Ricardo Pastor and Nuno Amaro

Step-by-Step Design of a LLC Resonant Converter for EV Fast Charging Applications

Joao Rocha, Saghir Amin, Goncalo Rego, Joao Afonso and Vitor Monteiro

Economic Feasibility of Production Units for Self Consumption with Storage Batteries to Charge Electric Vehicles: Case Study in the Residential Portuguese Sector

Rodrigo Pinheiro, Anabela Pronto and João Pina

Development of a Power Electronics Interface between an Energy Storage System and the Power Grid

José A. Faria, Marcos Novo, João Dias, L. A. M. Barros and J. G. Pinto

A methodology for creating power system models from open source data

Riccardo Chianese and Nuno Amaro

13:00 – 14:15 Lunch

14:15 – 15:15 Keynote 3

Key Challenges in Cyber Security and Cyber Resilience

José Alegria, Former Chief Security Officer and CISO at Altice Portugal

15:15 – 16:15 Horizontal Session

What do companies look for in a PhD?

16:15 – 16:30 Coffee break

16:30 – 18:00 Session G & YEF-ECE 4

G – Energy Management and Sustainability

- | |
|--|
| <ul style="list-style-type: none">• Rule-Based Control Algorithm to Explore Energy Flexibility from Residential Pool Filtration Pumps
<i>João Tabanêz Patrício, Rui Amaral Lopes, Nuno Amaro, João Martins</i> |
| <ul style="list-style-type: none">• Three-Level Zero-Voltage Transition Interleaved Buck Converter with DC Transformer-based Isolation for EV Fast Charging Stations
<i>Saghir Amin, Joao Rocha, Vitor Monteiro, Nuno Costa</i> |
| <ul style="list-style-type: none">• Promoting Decarbonization of Islands: A Case Study on the Replacement of Gas Water Heaters in Terceira Island, Azores, Portugal
<i>Rafael Menezes-Barros, Rui Amaral Lopes and João Martins</i> |

Y4 – Image Processing

Data Science for Geographic Information Systems

Afonso Oliveira, Nuno Fachada and João P. Matos-Carvalho

Forest height estimation using Machine Learning Regressors with SAR data

Pedro Barreira, André Mora, João E. Pereira-Pires, José M. Fonseca and Juan Guerra-Hernández

Horses Identification Through Deep Learning Algorithms

Rafael Santos, Filipe Moutinho, José Prazeres, Valderi R. Q. Leithardt and João Pedro Matos-Carvalho

CBP detection using template matching to compute the solar rotation profile

Francisco Figueira and André Mora

Super-Resolution of Multiple Sentinel-2 Images Using Composite

Loss Function

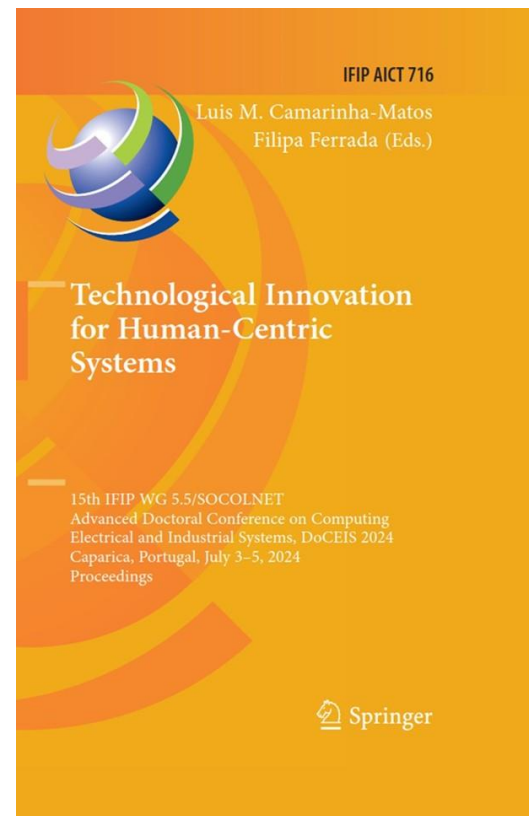
Shuai Liu, José M. Fonseca and André Mora

Adaptive Simulation of Separate Factors in the Alexandridis Wildfire Model

Isabella Papageorgiou, João Pedro Matos-Carvalho, Nuno Fachada and Markos Avlonitis

18:00 – 18:30 Closing Session & Awards

<https://doceis.dee.fct.unl.pt/>



PRO-VE 2024 - 25th IFIP/SOCOLNET Working Conference on Virtual Enterprises



The present course of our 'non-linear world' highlights the profound unpredictability in modern environments, economies, and societies. The intricacies of our economic and industrial dynamics are interwoven with various dimensions, including political, sociological, and ecological crises, resulting in continuous periods of unpredictable fluctuations reflected in the VUCA acronym (volatile, uncertain, complex, and ambiguous). This unpredictability challenges conventional linear models of systems control and management. To tackle these systemic dynamics, the concept of 'navigation' metaphorically represents novel approaches to designing and managing organizations and ecosystems. Successful navigation requires a delicate balance between establishing clear and stable directions for our collective journey and embracing strong adaptability to carve effective paths into the future. www.pro-ve.org

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