

INESC TEC INTERNATIONAL VISITING RESEARCHER PROGRAMME 2026 EDITION

Call Announcement

Deadline: May 15, 2026

<u>Introduction</u>	2
<u>Candidate Profile and Eligibility Requirements</u>	3
<u>How to Apply</u>	3
<u>Financial Assistance and Mobility Contract</u>	5
<u>Work Plans</u>	5
<u>Reporting and Acknowledgments</u>	6
<u>Data Protection</u>	6
<u>Non-Discrimination Policy</u>	7
<u>Additional Information</u>	7
<u>Contacts for Queries</u>	7
<u>Annexe 1 – List of Available Research Topics</u>	8

Introduction

The [Institute for Systems and Computer Engineering, Technology and Science – INESC TEC](#) is pleased to announce the opening of the **INESC TEC International Visiting Researcher Programme (IIVRP) – 2026 Call for Applications**.

INESC TEC is a world-class R&D organisation in the field of ICT and the largest RTO in Portugal, supporting the advanced training of researchers and their active participation in international collaborative networks. The institution is strongly committed to promoting intercultural awareness and understanding in the research arena.

This new Call builds on the success of previous IIVRP editions and aims to complement other mobility funding schemes managed by INESC TEC. The 2026 edition is open to applications from **senior researchers worldwide** who wish to collaborate with an INESC TEC host and their team on world-class, curiosity-driven research across various scientific fields aligned with INESC TEC's global presence. **Bright PhD and Master's students affiliated with foreign organisations** are also welcome to apply, though preference will be given to senior researchers.

For this Call, the topics that candidates may pick to frame their applications are listed in [Appendix I](#) of this announcement.

Supported visits shall encourage **long-lasting international research partnerships, research through co-authored publications** and **collaborative research funding proposals** among other potential collaborative scientific outcomes. It is fundamental that both the hosts and the visitors themselves regard this scheme as a first step towards developing the partnership further beyond the funded visit. The scheme welcomes visitors who are establishing a partnership with INESC TEC hosts for the first time or who already have some collaboration going on but want to deepen their relationship with INESC TEC.

We will be accepting applications until **May 15 (23:59 UTC+1), 2026**. Research visits may begin any time from **October 1, 2026**, and must conclude no later than **July 31, 2027**. Each visit should last between **one and three months**.

Applicants admitted to the scheme will benefit from an immersive experience in INESC TEC's ecosystem to explore and develop collaborations in the institution's fields of knowledge, engage in interdisciplinary and collaborative research with scientific peers and acquire and transfer new knowledge. During their stay, they are also expected to engage in events organised by INESC TEC and prepare internal and/or public-facing activities whereby they can present the research work they are undertaking at INESC TEC.

Candidate Profile and Eligibility Requirements

For this edition, INESC TEC will only accept applications from **individuals affiliated with universities or other research-performing organisations outside of Portugal**, regardless of their nationality. Candidates admitted to this edition are expected to retain their affiliation with the home institution during their intake at INESC TEC.

The program is primarily aimed at senior researchers, but outstanding PhD and Master's students from foreign institutions may also apply.

Applicants must demonstrate a strong command of English, both written and spoken. Proficiency in English is essential to ensure effective integration into the research teams, active participation in meetings and scientific discussions, and the preparation of technical and scientific outputs.

Individuals who have already been visiting researchers in the previous editions of the IIVRP are not excluded from submitting a new application for the current Call. However, they will not be considered first-time applicants, and their applications will lose priority to new candidates.

How to Apply

Applicants meeting, in principle, the eligibility requirements (see "[Candidate Profile](#)") and sought profiles must first identify **one topic from the list of available research topics (see [here](#))** proposed by INESC TEC, and aligning with their interests and those of their home institution.

Each topic has at least a scientific host at INESC TEC, who will act as an **INESC TEC Host**.

When choosing a topic, applicants may interact with INESC TEC's hosts for questions strictly related to the scope of the work underpinning the topic. However, at this stage, applicants are discouraged from sending any documents required by the application process to their potential hosts.

To apply for a research visit at INESC TEC, applicants must fill out and submit [this online application form](#) with the following documents **in English** attached:

- Complete CV - the CV must have a maximum of 2 pages (font-size: 11 points) and include the **Google Scholar URL (this is mandatory)**;
- A one-page motivation letter that should clearly state the proposed research objectives and their potential impact beyond the visiting period; applicants must demonstrate a clear and explicit vision for achieving joint outcomes such as international co-authored publications, policy briefings, or funding applications;

- A letter of support from their supervisor/manager at the home institution on official letterhead, **confirming their agreement to the applicant visiting INESC TEC** under the Programme¹ and **providing sound arguments for their support.**

Evaluation

As applications come in, INESC TEC's International Relations Service will be performing eligibility checks. Applications based on incomplete forms, with missing mandatory documents or that diverge substantially from our specifications (e.g. being written in a language other than English) will be rejected without further review.

After the submission deadline, an evaluation panel appointed by the Board of Directors of INESC TEC will analyse applications moving forward. The host(s) of the topics picked by the applicant will also be required in the first instance to assess if the candidate(s) potentially match the profile sought.

Applications will be reviewed against the following criteria:

- **Applicant's suitability:** Does the candidate's profile make them suitable to carry out the proposed work?
- **Impact:** Is there a strong likelihood of significant outcomes arising from the visit, including international co-authored publications, policy briefings, advancement of the relevant academic field, and/or funding applications?
- **Sustainability and legacy:** Is there convincing evidence of the sustainability and legacy of the collaboration beyond this investment, with potential long-term benefits for INESC TEC and the candidate's home institution?
- **International projection:** Does this collaboration have the potential to improve INESC TEC's international standing in a given research line/area?

During the evaluation period, the panel may wish to interact further with applicants to clarify any information in their applications. Applicants should be available to hold a virtual meeting or respond to questions by e-mail from the panel or a panel member.

All applicants shall be notified of the panel decision and whether they will receive financial support under this Call by e-mail (with a delivery receipt notification), **normally six weeks after the submission period ends. If we receive a high volume of applications, we may need more time to notify candidates.**

¹ Applicants are accountable for informing their home institution about the intention to apply for this research programme and ascertaining whether their full-time participation potentially creates any conflicting issues with their home institution, including regarding IP matters.

Financial Assistance and Mobility Contract

For the period of the visit, INESC TEC will confer upon admitted applicants the status of Visiting Researchers. Admitted applicants must retain their primary affiliation to their home institution throughout the visit, and any changes to this status should be immediately communicated to INESC TEC.

Admitted applicants will sign a mobility contract that specifies not only the rights and duties of admitted applicants but also the components of the financial assistance they are entitled to after being accepted into the Programme:

- Monthly allowance²: net amount of 1600 Euros to cover living expenses for each month of the mobility period.
- One-off travel allowance: €350 euros for travels within Europe and €750 for travels outside of Europe.
- Work accident insurance.³

The contract will be signed before the start of the mobility period, with admitted applicants receiving an up-front instalment corresponding to 50% of the monthly allowance plus travel allowance. The payment plan will be detailed in the contract.

If admitted candidates fail to comply with any requirements established by this Call, the mobility contract, or INESC TEC's policies applicable to external staff visiting the Institute, they may be forced to return all the funding received from INESC TEC under the Programme.

Admitted applicants are responsible for their own housing and accommodation. However, they may contact the IIVRP Team or the Admin Assistant of their host Centre for guidance on these and other matters, such as visas (if applicable). Applicants are welcome to bring their families, but INESC TEC cannot assist with the related formalities.

Visit extensions under the IIVRP will not be allowed.

Work Plans

Work Plans must underpin all visits supported through this Programme and should align with the research topic proposed by INESC TEC while fitting applicants' research needs and goals. They

² The funds granted are chargeable as income by the Portuguese tax system. The monthly allowance mentioned will be the amount transferred by INESC TEC, assuming that the visiting researcher presents a certificate of fiscal residence and fills out the tax form RFI (to be provided by INESC TEC services) to avoid double taxation in Portugal. More information [here](#).

³ Visiting Researchers should check if they need other types of insurance, and if so, arrange it before arriving in Portugal. Examples include health and travel insurance.

should also set the proper context for two-way knowledge transfer between the applicant and INESC TEC and potential collaborations extending beyond the internship.

Before the visit starts, the scientific host at INESC TEC will arrange to meet virtually with the admitted applicant to discuss both parties' expectations regarding the work plan and its outcomes. The scientific host and the admitted applicant will work together to devise a realistic work plan ahead of the visit, with clear goals and outcomes.

Depending on the workplace of the host of the admitted applicant, the work plan can be carried out in one of INESC TEC's poles in Porto, Braga or Vila Real. **This scheme does not fund remote or hybrid visits, i.e., visitors are expected to travel to and stay in Portugal for the duration of their work plan, which must be from one to three consecutive months long.**

The working languages are English or Portuguese. Nevertheless, English proficiency is required for the production of technical and scientific outputs.

Acknowledgements and Reporting

All activities funded through this scheme must be branded and advertised as an INESC TEC International Visiting Researcher Programme Award, and INESC TEC must be and acknowledged on all associated documents and outputs, such as scientific publications or presentations.

Admitted applicants commit to submitting, a few days before the end of their mobility period, a report⁴ detailing their progress against the goals set in the work plan. In writing their reports, admitted applicants should respect any restrictions on confidential information or intellectual property that may have been required by INESC TEC or their home institution. After completing the visiting research period and submitting their report, INESC TEC will issue a certificate of completion.

Since outcomes and impacts take time to be tracked, the IIVRP Team, for up to three years between January and March, will ask both the host and the admitted applicant to complete a short survey to capture how the relationship is progressing and any related outcomes of the visiting period at INESC TEC that were not captured by the post-visit report. Hosts and visitors not complying with this requirement may be deemed ineligible for future editions of the IIVRP.

Data Protection

For further information on how INESC TEC processes your personal data, please click on this [link](#).

⁴ As per a report model to be provided by INESC TEC.

Non-Discrimination Policy

INESC TEC actively promotes a policy of non-discrimination and equal access so that no candidate can be privileged, benefited, harmed or deprived of any right or exempted from any duty based on their country of origin, age, sex, sexual orientation, marital status, economic situation, education, genetic heritage, reduced capacity for work, disability, chronic illness, nationality, ethnic origin or race, language, religion, political or ideological convictions and trade union membership. INESC TEC celebrates diversity and is committed to creating an inclusive environment for all its employees and visitors.

Additional Information

- Financial assistance and cost of living in Portugal

The financial support granted to admitted candidates was estimated to help them cover most of their living expenses during their stay in Portugal and visit to INESC TEC. Nevertheless, we encourage all candidates to consider, while preparing their applications, all potential costs involved in their participation in such a mobility programme to understand if they might need to complement the monthly allowance with other funds (e.g.: personal savings, grants). For more information on the cost of living in Portugal, consult this website.

- Suggested reading on the cost of living in Portugal: [Numbeo Cost of Living in Portugal](#).

Contacts for Queries

International Relations Service (SRI)

internationalrelations@inesctec.pt / + 351 22 209 40 19

The SRI has published a [quick guide for foreign newcomers](#) covering some topics of interest for potential applicants under this Programme.

Annexe 1 – List of Available Research Topics

Pos.	Research Topic	Description of the research topic	Topic Owner and Co-Owner	Topic Owner and Co-Owner Email	Centre
1	XR-Enabled Safe and Efficient Industrial Human–Robot Collaboration	Industrial human–robot collaboration is expanding, but real deployment is still limited by safety assurance, unclear robot intent, and the effort required to configure and adapt systems on the shop floor. This topic investigates how Extended Reality (XR) interfaces and robot digital twins can create a shared understanding between operators and robots, enabling intuitive communication of goals and constraints and improving situation awareness during collaborative tasks. The research combines industrial robotics capabilities (manipulation, motion planning and online replanning) with human–robot interaction methods to design and evaluate interaction techniques that reduce workload and improve usability and trust. Digital twin and perception components support scene understanding and uncertainty-aware decision making. Outcomes include reusable interaction concepts, evaluation protocols, and demonstrators that can transfer across industrial contexts.	Marcelo Petry	marcelo.petry@inesctec.pt	Robotics in Industry and Intelligent Systems
2	LLM Co-Lecturers for Online Higher Education: Orchestration and Situation Awareness	This topic explores the design and implementation of co-lecturers based on local Large Language Model (LLM), integrated into online higher education courses. The research focuses on pedagogical orchestration requirements, situation awareness needs of instructors, and the analytics necessary to support formative feedback and self-regulated learning. The visiting researcher will collaborate in defining decision protocols (automation vs. human intervention), instructor dashboard interfaces, and analytics pipelines. The work combines system prototyping with instructional design research, grounded in immersive learning theory (system, narrative, and agency dimensions). Outputs may include architecture specifications, orchestration design patterns, and an evaluation protocol aligned with self-regulated and formative assessment frameworks.	Leonel Morgado & Maria van Zeller	leonel.morgado@inesctec.pt & maria.v.zeller@inesctec.pt	Human-Centered Computing and Information Science
3	Immersive Instructional Design for AI-Infused Education	This topic advances a principled framework for Immersive Instructional Design (IID) applied to AI-infused education. Building on a sociotechnical perspective, the research examines how immersive environments	Leonel Morgado & Eliane Schlemmer	leonel.morgado@inesctec.pt &	Human-Centered Computing and

		(understood through system, narrative, and agency dimensions) can guide the intentional integration of AI systems such as LLM co-lecturers into higher education. The visiting researcher will collaborate in refining theoretical constructs, mapping them to design patterns, and producing applied case studies grounded in ongoing system development. The work will bridge conceptual modelling, educational design, and professional software practice with AI tools. Expected outputs include co-authored journal papers, framework refinements, and groundwork for future joint grant applications.		eliane.schlemmer@inesctec.pt	Information Science
4	Professional Software Development Practices with AI: Educational and Organisational Implications	This topic investigates how AI-assisted software development practices reshape professional workflows, decision-making, and learning processes. Embedded within the development of an LLM co-lecturer system, the research analyses how AI tools influence architecture design, code production, validation, and collaborative reasoning. The visiting researcher will collaborate in documenting practice transformations, identifying emergent competencies, and translating findings into higher education curricula. The work integrates empirical observation, system prototyping, and reflective methodological analysis. Outputs may include empirical papers on AI-augmented development, competency frameworks, and curricular innovation proposals.	Leonel Morgado & Fernando Cassola Marques	leonel.morgado@inesctec.pt & fernando.c.marques@inesctec.pt	Human-Centered Computing and Information Science
5	Automatic and explainable diagnosis of Obstructive Sleep Apnea and its cardiovascular, hypersomnolence, and cognitive comorbidities from nocturnal pulse oximetry	Polysomnography (PSG) is the gold standard for diagnosing obstructive sleep apnea (OSA), but it is costly, complex, intrusive, and not easily accessible. Pulse oximetry, in combination with artificial intelligence (AI) models, has been widely investigated as an alternative to PSG for the automatic diagnosis of OSA, as it records blood oxygen saturation (SpO2) and pulse rate (PR) signals with a non-invasive fingertip sensor integrated in a portable device. This research aims to develop and validate an automatic, interpretable diagnostic system for OSA and its main comorbidities, including cardiovascular risk, hypersomnolence, and cognitive impairment. By applying explainable AI (XAI) models to a large-scale dataset exceeding 15,000 SpO2 and PR recordings, this research aims to transform pulse oximetry into a scalable tool for accurate OSA detection and comorbidity assessment, supporting longitudinal monitoring and early risk stratification, aligning with INESC TEC's research lines.	Daniela Santos	daniela.santos@inesctec.pt	Telecommunications and Multimedia
6	AI-augmented fault analysis, protection and control in IBR-dominated power	The increasing penetration of inverter-based resources (IBRs) and large electronic loads, such as data centers, is reshaping fault behavior and operational dynamics in modern power systems. Reduced short-circuit levels, fast converter-driven transients, and high uncertainty challenge	Ricardo Jorge Bessa	ricardo.j.bessa@inesctec.pt	Power and Energy Systems

	systems with high electronic load penetration	traditional fault analysis, protection, and control strategies. Therefore, this topic focuses on the development of AI-augmented frameworks for real-time fault analysis, protection, and control intelligence in converter-dominated grids. The research will explore the integration of advanced transient signal analysis (e.g., waveform and traveling-wave features), probabilistic and deep learning models, and human-centered decision-support systems. The work should include: characterization of fault signatures and protection challenges in IBR-rich systems with high electronic load penetration; development of uncertainty-aware AI models combining physics-informed signal processing and data-driven learning for real-time fault diagnosis; investigation of generative AI for rare-event synthesis and stress testing of protection schemes; design of human-AI collaborative decision-support mechanisms for operator-centric protection and control.			
7	Day-Ahead Optimization of Multi-Vector Green Hydrogen Hubs	Develop a reusable day-ahead optimization module to support planning of hydrogen hubs. The researcher will define a simplified but representative model of a hub (electrolyser, H2 storage, renewables, grid import/export and off-taker demand profiles). It will also implement a day-ahead scheduler to minimize cost and/or emissions proxies under operational constraints. Finally, the researcher will validate the tool against a set of scenarios and KPIs (cost, RES share, H2 production, flexibility indicators). Deliverables: technical report suitable as a paper draft.	Filipe Joel Soares	filipe.j.soares@inesctec.pt	Power and Energy Systems
8	Day-Ahead Optimization of Multi-Vector Energy Use in Ceramic Manufacturing	Develop a reusable day-ahead optimization module to support energy planning in a ceramic manufacturing plant. The researcher will define a simplified but representative multi-vector model of the plant energy system (electricity and thermal demand, PV generation, storage options, grid import/export and tariff structure, and key operational constraints linked to production). It will also implement a day-ahead scheduler to minimize energy cost and/or emissions proxies while respecting process constraints and practical operating limits. Finally, the researcher will validate the tool against a set of scenarios and KPIs (cost, RES share, peak reduction, CO2 proxy, self-consumption). Deliverables: technical report suitable as a paper draft.	Filipe Joel Soares	filipe.j.soares@inesctec.pt	Power and Energy Systems
9	Re-architecting Operating Systems for Large-Scale AI Workloads	Artificial Intelligence (AI) workloads, including large language models, machine learning, and deep neural networks, have become the dominant workload in HPC systems and hyperscale data centers. Despite their prevalence, scale, and specialized requirements, operating systems (OSs) and their corresponding software stacks remain largely general-purpose.	Ricardo Gonçalves Macedo	ricardo.g.macedo@inesctec.pt	High-Assurance Software

		Traditional OS designs prioritize fairness, isolation, and broad compatibility across diverse applications and workloads. In contrast, AI workloads exhibit complex execution patterns, extreme I/O and memory bandwidth demands, massive parallelism, and tightly synchronized distributed training. This mismatch results in inefficiencies, resource underutilization, performance variability, and excessive energy consumption. This research topic proposes introducing new abstractions and mechanisms of core OS subsystems, including scheduling, storage, memory, and accelerator orchestration, to better support AI training and inference. By rethinking the OS architecture as an AI-aware infrastructure, the goal is to improve utilization, scalability, performance predictability, and energy efficiency in next-generation AI data centers and HPC systems.			
10	Semantic alignment in Narrative Understanding (NLP and multimodal)	Narrative Extraction and Understanding is a hot research topic that we have followed at INESC TEC. We have developed a semantic annotation framework in collaboration with linguists and produced datasets with detailed and dense semantic annotations including Participants, Events, Temporal Expressions and Relations (Role, Temporal, Objectal, Qualitative Spatial, Causal). On top of that we are developing NLP and AI approaches for automatically obtaining these annotations. These techniques include fine tuning pre-trained models (BERT-like), training QA models and using generative AI approaches (which usually have lower performance than customised small models). We are also exploring narrative information in multimodal settings, namely with medical image, for a stronger representation (embeddings) alignment of parts of texts and images. Challenges: - Apply the narrative framework on other languages - Develop and improve automatic semantic annotation methods - Apply narrative understanding in different scenarios - Align semantics of language with other signals	Alípio Jorge	alipio.jorge@inesctec.pt	Artificial Intelligence and Decision Support
11	Invariant Representation Learning for Gastric Endoscopy Using Domain-Specific Self-Supervised Foundation Model Adaptation	This research topic focuses on adapting foundation models to gastric endoscopy through large-scale domain-specific self-supervised learning. Rather than relying solely on labelled datasets, we will leverage extensive unlabelled multicentre endoscopic video to learn invariant mucosal representations robust to variability in centres, imaging platforms, modalities (e.g., WLE, NBI), and anatomical regions. The work involves designing self-supervised learning strategies tailored to endoscopic data (e.g., temporal consistency learning, masked modelling, contrastive and non-contrastive approaches), studying domain generalisation mechanisms, and formally quantifying invariance under real-world	Miguel Coimbra	miguel.coimbra@inesctec.pt	Biomedical Engineering Research

		distribution shifts. The ultimate goal is to develop robust, transferable representations that serve as the foundation for reliable and interpretable AI systems for structured mucosal state modelling, enabling clinically trustworthy gastric endoscopy AI.			
12	Enhancing Temporal Stability in Multi-Object Tracking for Reliable Video-Based Counting in industrial environments	This research focuses on improving temporal consistency in multi-object tracking systems for reliable event-based counting in video sequences. In moderately sparse scenes, tracking errors such as identity switches and track fragmentation may occur due to detection noise, motion variability, or brief occlusions. These errors directly affect counting accuracy over time. The study proposes a modular pipeline combining object detection with motion-constrained tracking and event-based counting. Different tracking strategies, including motion modeling and track lifecycle management, will be experimentally compared using metrics such as ID switches, MOTA, and counting error. The objective is to evaluate how temporal constraints and motion consistency models improve identity preservation and long-sequence stability in real-time vision systems.	Shazia Tabassum	shazia.tabassum@inesctec.pt	Artificial Intelligence and Decision Support
13	Enhancing Domain-Specific Large Language Models through Hierarchical Deliberation and Improved Chain-of-Thought Fine-Tuning	This research aims to improve domain-specific large language models by advancing current chain-of-thought fine-tuning approaches. While step-by-step reasoning supervision enhances performance, linear reasoning traces often lead to shallow decomposition, limited cross-checking, and error propagation. We propose a hierarchical deliberation framework that extends chain-of-thought into structured multi-level reasoning, integrating iterative self-reflection and optional retrieval grounding. The model will be fine-tuned on domain-specific corpora augmented with structured reasoning annotations and evaluated against standard chain-of-thought baselines. Performance will be assessed across accuracy, reasoning depth, robustness under distribution shift, and calibration. The objective is to develop a principled, generalizable reasoning architecture that improves reliability and analytical consistency in domain-specific AI systems.	Shazia Tabassum	shazia.tabassum@inesctec.pt	Artificial Intelligence and Decision Support
14	Novel Electro-Optical exploration of the BRAIN cortex “in-action” (NEO-BRAIN)	Novel Electro-Optical exploration of the BRAIN cortex “in-action”: Towards an AI-based Advanced Processing Platform for Functional Near-Infrared Spectroscopy Integrated with Video-EEG and other Biosignals.? The Neuroengineering and Advanced Human Sensing Lab (a.k.a. BRAINlab) of the Center for Biomedical Engineering Research (C-BER) has extensive experience in biomedical signal processing, particularly physiological signals from different integrated devices, namely wearable devices. This visiting position aims to integrate the successful applicant into our R&D team and ongoing research and development projects of novel methods for	João Paulo Cunha	joao.p.cunha@inesctec.pt	Biomedical Engineering Research

		processing multimodal physiological signals, with focus in analyzing the optical+electrical biosignals of the human brain cortex using our new Functional Near-Infrared Spectroscopy (fNIRS) that is now coupled to our Video+EEG+ECG+Resp+SpO2 integrated system with 64 channels and to develop machine learning and deep learning methods for exploring new approaches to different stimulation scenarios with potential applications in health and wellness.			
15	Towards Energy Efficient Federated Learning	Federated Learning (FL) enables collaborative model training without centralizing sensitive data, making it a key paradigm for privacy-preserving AI. However, most existing research prioritizes model accuracy, robustness, and privacy while overlooking computational cost and energy consumption. This project aims to systematically analyze the energy footprint and computational bottlenecks of state-of-the-art FL algorithms under realistic deployment scenarios. The work will include profiling training and communication overhead, evaluating trade-offs between convergence speed and resource usage, and identifying inefficiencies across different algorithmic families. Based on this analysis, the project will propose design principles and potentially a novel energy-aware federated learning strategy that reduces computational and communication costs while maintaining performance and privacy guarantees. The ultimate goal is to contribute to the development of sustainable federated AI systems aligned with green computing principles.	Cláudia Vanessa Brito	claudia.v.brito@inesctec.pt	High-Assurance Software
16	Human-Centric Industry 5.0: Implementing Worker Well-being and Trustworthy AI in Smart Manufacturing	This research topic advances knowledge on how manufacturing organisations adopt and manage advanced technologies, particularly AI-enabled systems, within the Industry 5.0 paradigm. Moving beyond the technology-driven focus of Industry 4.0, Industry 5.0 emphasises human centricity, sustainability, and resilience. The topic explores how technology management strategies, organisational capabilities, and adoption dynamics shape the integration of smart technologies while promoting worker well-being and effective human-machine collaboration. Key themes include technology evaluation and readiness, change management, skills development, socio-technical system redesign, and trustworthy and explainable AI governance. Senior researchers are invited to contribute conceptual and empirical work on technology adoption frameworks, dynamic capabilities, and organisational transformation processes that support human-centric and resilient smart manufacturing systems.	Ana Cristina Simões	ana.c.simoese@inesctec.pt	Industrial & Systems Engineering and Management

17	Physical AI in Industrial Robotics - Manipulation of Flexible Objects	This research aims to advance industrial robotics by developing systems integrated with physical AI for the manipulation of flexible objects. It focuses on creating novel robotic solutions, including solutions based on dual-arm robots or humanoids, capable of handling semi-rigid and flexible materials, which present unique challenges due to their variable elasticity, texture, and form. Through AI-driven control systems, robots will be able to perform tasks such as sorting, picking, folding, and more with greater precision and efficiency. This research will also address the definition of adaptive manipulation policies, and multi-modal sensing to enhance robot interaction with flexible materials. The findings could offer valuable contributions to industrial robotics and automation, advancing the field toward smarter, more efficient systems.	Luís Freitas Rocha	luis.f.rocha@inesctec.pt	Robotics in Industry and Intelligent Systems
18	Quantum Generative Learning models with Parameterized Quantum Circuits	Parameterized Quantum Circuits (PQCs) offer promising avenues for generative modeling, allowing complex data distributions to be encoded in quantum states that are out of reach of classical systems. This topic examines whether commuting versus non-commuting PQCs with hidden qubits yield different advantages in terms of learning expressiveness and training stability. We will also explore how these PQC-based generators can be used in kernel methods for discriminative tasks as a means for enhancing classification performance. Building on our previous work (e.g., Quantum Mach. Intell. 5, 18 (2023); Mach. Learn.: Sci. Technol. 5, 035037), we aim to deepen the theoretical foundations and practical implementations of quantum-assisted learning algorithms for generative modeling.	André Manuel Sequeira	andre.m.sequeira@inesctec.pt	High-Assurance Software
19	Quantum Extreme Learning Machines for fast reinforcement learning agents	Quantum Extreme Learning Machines (QELMs) adapt the concept of extreme learning—where most network parameters remain fixed—to quantum parameterized architectures. QELMs can drastically reduce training complexity, accelerating policy convergence for reinforcement learning (RL) agents at the same it proposing solutions outside the classical realm. Through carefully designed feature maps and cost function QELMs may reduce known trainability issues in standard parameterized quantum models. This project will design and test QELM-based RL methods, comparing their performance to classical extreme learning and fully trained quantum networks on standard RL benchmarks. Drawing on our prior investigations in quantum RL (Quantum Mach. Intell. 6, 53 (2024); IEEE TQE, 5, 2024), we aim to demonstrate a practical path toward quantum speedups in real-world decision-making tasks.	André Manuel Sequeira	andre.m.sequeira@inesctec.pt	High-Assurance Software

20	Tensor Networks for the Design and Dequantization of Quantum Learning Agents	Tensor network techniques, such as Matrix Product States or Tree Tensor Networks, can encode large quantum states with reduced complexity. This project explores how these representations can inform the design of quantum agents and also facilitate their partial or complete dequantization. By systematically translating PQC-based policies into classical tensor networks, we aim to pinpoint which quantum features genuinely enhance learning performance, which can be emulated classically, and if these *quantum-inspired* models provide nonetheless better expressivity compared with standard classical models.	André Manuel Sequeira	andre.m.sequeira@inesctec.pt	High-Assurance Software
21	Parameterized Quantum Circuits for Multi-Class Classifiers	Parameterized Quantum Circuits (PQCs) provide a flexible framework for universal and quantum-enhanced classifiers. This topic investigates PQC-based multi-class classifiers with a particular focus on probability aggregation strategies. We will study and compare different aggregation schemes in terms of expressiveness, scalability, and training stability vs classical simulability under realistic quantum noise and hardware constraints. Building on our previous expertise in quantum machine learning, this research aims to establish principled design guidelines for multi-class quantum classifiers and to identify practical architectures that can improve performance on real-world classification tasks.	André Manuel Sequeira	andre.m.sequeira@inesctec.pt	High-Assurance Software
22	Quantum Reinforcement Learning in Continuous Action Spaces	Parameterized Quantum Circuits (PQCs) are increasingly explored in reinforcement learning, yet their use in continuous action spaces remains relatively underdeveloped. This topic investigates PQC-based policy models for continuous control. We will study how PQCs can represent expressive stochastic and deterministic policies, and how tailored cost functions can be designed to balance trainability, optimization stability, while limiting classical simulability. A central question is whether quantum models can provide practical or asymptotic advantages in continuous-control settings, where the ultimate quantum advantage is still an open problem. This research aims to develop principled architectures and training objectives for quantum reinforcement learning that are both theoretically grounded and compatible with near-term hybrid quantum-classical implementations.	André Manuel Sequeira	andre.m.sequeira@inesctec.pt	High-Assurance Software
23	Analysis of Interval and Distributional-valued Data	The large amounts of available raw data often are not the researcher direct concern and only an analysis at a higher aggregated level puts in evidence relevant patterns. This is the case of data from social networks, large surveys, sensors, business, and web-generated data. Data aggregation, however, leads to information loss; therefore variability across records should be kept in the form of complex descriptions, e.g. sets of values,	Paula Brito & Sónia Dias	paula.brito@inesctec.pt & sonia.dias@inesctec.pt	Artificial Intelligence and Decision Support

		intervals, or distributions. Symbolic Data Analysis (SDA) provides a framework for the representation and analysis of such complex data, considering their inherent variability. Methods for the (multivariate) analysis of such symbolic data have been developed, following different approaches and criteria, taking the variability into account. SDA allows aggregating large datasets at a chosen degree of granularity while keeping the information on the intrinsic variability, in the form of intervals or empirical distributions, and then analyse the resulting complex data arrays.			
24	Optimization and Data-Driven Quantification of Operational Flexibility through Hourly Source Composition Analysis	This research proposes a data-driven optimization framework to quantify operational flexibility by analyzing the hourly composition of energy sources supplying the load. The study utilizes historical time series of demand and generation mixes to develop flexibility indicators that correlate physical supply variability with energy market prices. Through Python-based processing, the objective is to model and optimize how the hourly participation of each source influences system ramping requirements and price behavior. Since flexibility is often not an explicitly traded commodity, its technical necessity forces the dispatch of high-cost reserves, creating indirect economic signals. This approach develops performance metrics to optimize the valuation of flexibility in systems with high renewable penetration, offering an analytical framework to identify market inefficiencies. The results provide a strategic decision-support tool for grid management, ensuring that economic signaling and resource allocation are optimized to reflect actual technical effort required to balance intermittent generation and enhance system resilience.	Tiago André Soares	tiago.a.soares@inesctec.pt	Power and Energy Systems
25	Cooperative Row Change Planning for Multi Robot Systems in Vineyard or Orchard Scenarios	This topic aims to design and evaluate a simple cooperative strategy that enables multiple agricultural robots to safely perform row change maneuvers in vineyard or orchard environments. The focus is on lightweight coordination approaches—such as priority rules, minimal communication protocols, or turn-taking mechanisms—that prevent conflicts and deadlocks when robots transition between adjacent crop rows. The student will develop and test these methods primarily in simulation using a representative multi robot environment. When feasible, the project will include real-world validation using robots available at the TRIBE Lab. The expected outcome is a practical, easy to implement coordination strategy suitable for structured agricultural settings.	Luís Carlos Santos	luis.c.santos@inesctec.pt	Robotics in Industry and Intelligent Systems
26	Deep Learning-Based 3D OCT-OCTA Segmentation	Retinal health not only underpins visual function but also serves as an indicator for certain neurological disorders. Optical Coherence Tomography (OCT) enables rapid, non-invasive 3D retinal structural images	Bisheng Wang	bisheng.wang@inesctec.pt	Telecommunications and Multimedia

	for Retinal and Neurological Health	with micrometer-level resolution, emerging as a powerful tool for the diagnosis and monitoring of retinal diseases, while its derivative, OCT Angiography (OCTA), provides 3D visualization of retinal vasculature. With its expanding role in assisting the diagnosis of diabetic retinopathy, age-related macular degeneration, and neurological diseases such as Alzheimer's, OCT(A) has become an important tool in clinical practice. To fully unlock its diagnostic potential, precise segmentation of retinal layers, vasculature (including capillaries, arteries, and veins), and the foveal avascular zone (FAZ) is essential. Therefore, this research aims to leverage state-of-the-art AI techniques to explore accurate segmentation for various anatomical structures in retinal OCT(A) volumes. Furthermore, we aim to investigate the quantitative correlations between retinal structural alterations and disease progression, ultimately advancing AI-assisted diagnosis.			
27	Continuous Learning for Computer Vision Models in Dynamic Environments	Real-world computer vision systems deployed in dynamic operational environments are critically affected by domain shift and distribution drift, phenomena whereby the statistical properties of incoming data diverge progressively from those of the original training distribution. This research proposes an Edge-Cloud Continual Learning architecture designed to enable visual perception systems to adapt autonomously and continuously, without requiring manual retraining cycles or significant human intervention. The proposed framework integrates intelligent data selection mechanisms at the edge layer with automated model update pipelines in the cloud, incorporating principled strategies to prevent catastrophic forgetting and ensure the preservation of previously acquired knowledge. Data efficiency is addressed through active and few-shot learning paradigms, minimizing the volume of labelled data required throughout the adaptation process. Expected contributions encompass an open-source continual learning framework, systematic benchmarking of incremental learning strategies across distinct operational conditions, and empirical validation in at least two representative real-world perception scenarios.	Daniel Queirós Silva & Sandro Augusto Magalhães	daniel.q.silva@inesctec.pt & sandro.a.magalhaes@inesctec.pt	Robotics in Industry and Intelligent Systems
28	Machine Vision for Fruit Counting in Olive Groves/Orchards/vineyards	This project aims to evaluate and adapt existing deep learning models for fruit detection and counting in olive groves, orchards, or vineyards using realistic field imagery. The student will rely on transfer learning and available pre-trained models for object detection and instance segmentation (e.g., YOLOv8, Faster R-CNN, Mask R-CNN, DETR). The work will involve testing these models on representative agricultural	Daniel Queirós Silva & Luís Carlos Santos	daniel.q.silva@inesctec.pt & luis.c.santos@inesctec.pt	Robotics in Industry and Intelligent Systems

		<p>datasets and fine-tuning them when needed. A key objective is to benchmark several approaches for fruit identification, tracking across frames, and counting, taking into account challenges such as occlusions and irregular lighting. The project will be conducted primarily in simulation or offline dataset analysis, with the possibility of validating the models using real images collected by TRIBE Lab robots. Expected outcomes include a benchmarking report, a lightweight fruit counting pipeline, and recommendations for future real-time deployment.</p>			
29	<p>Human–Robot Interaction Safety Assessment for Field Operations</p>	<p>This topic focuses on evaluating practical safety aspects of human–robot interaction during field operations involving agricultural or outdoor mobile robots. Given the short duration of the internship, the goal is not to develop new safety algorithms but to assess, test, and document existing safety mechanisms already implemented in INESC TEC’s robotic platforms. The student will study current obstacle detection, speed limiting, and emergency stop procedures, and perform controlled experiments to evaluate how these systems behave during close range interactions with humans in realistic outdoor conditions. The work may include the analysis of sensor logs, verification of safety distances using perception modules, and testing simple human intent indicators such as presence detection or approach trajectories. Additionally, the student may contribute to improving and documenting existing safety related datasets collected at the TRIBE Lab. Expected outcomes include a structured safety assessment report and practical recommendations for improving field interaction safety.</p>	<p>Luís Carlos Santos & José Maria Sarmento</p>	<p>luis.c.santos@inesctec.pt & jose.m.sarmento@inesctec.pt</p>	<p>Robotics in Industry and Intelligent Systems</p>
30	<p>Artificial Intelligence for CT-based Cardiovascular Risk Stratification</p>	<p>Cardiovascular diseases are the leading cause of death worldwide and a significant source of morbidity, meaning that early detection of disease is of the utmost importance. Medical imaging plays a leading role in the detection, diagnosis, and prognosis of cardiovascular diseases, and several biomarkers are known to be associated with higher cardiovascular risk and cardiovascular diseases. The goal of this project is to develop artificial intelligence tools that can automatically interpret cardiovascular imaging, namely computed tomography images, to extract known (or hitherto unknown) clinical biomarkers for cardiovascular risk prediction and diagnosis. This involves the segmentation/detection of structures, radiomic feature extraction, and/or end-to-end risk prediction. The specific focus of the short stay will be defined depending on and in agreement with the applicants’ interests and competencies.</p>	<p>João Manuel Pedrosa</p>	<p>joao.m.pedrosa@inesctec.pt</p>	<p>Biomedical Engineering Research</p>

31	<p>Artificial Intelligence for CT-based Quantitative Interstitial Lung Disease Progression Evaluation</p>	<p>Interstitial lung diseases (ILDs) are a broad group of respiratory diseases that affect the interstitium and alveoli. Given the nature of ILD and the low life expectancy of these patients (3-5 years), close follow-up and management are crucial. High-resolution computed tomography (HRCT) is frequently used but relies on time-consuming and subjective visual analysis. The quantitative analysis of ILD findings and anatomical structures could thus enable reproducible and objective patient evaluation and, consequently, the development of progression-prediction tools. The goal of this project is to develop artificial intelligence tools that can automatically interpret HRCT imaging, namely the segmentation and/or detection of ILD findings and anatomical structures such as airways and vessels, radiomic feature extraction, and/or progression prediction. The specific focus of the short stay will be defined depending on and in agreement with the applicants' interests and competencies.</p>	<p>João Manuel Pedrosa</p>	<p>joao.m.pedrosa@inesctec.pt</p>	<p>Biomedical Engineering Research</p>
32	<p>Scalable All-Chemical Fabrication and Photopatterning of Gold-Coated Silver Plasmonic Nanometric thin Films on Optical Fiber Platforms</p>	<p>Plasmonic thin films are typically fabricated by physical or chemical vapor deposition, requiring costly infrastructure, being poorly suited for non-planar platforms, such as optical fibers. Alternatively, electroless silver deposition offers a scalable alternative, yet rapid oxidation severely limits its practical use. We propose an all-chemical strategy to fabricate stable plasmonic thin films via conformal gold-coating of silver films, via the Tollens' reaction, with controlled reduction kinetics suppressing galvanic replacement. However, the silver thin films must micropatterned, as to sustain propagating surface plasmons while ensuring conformal gold coating. This method combines the superior optical performance of silver with the chemical stability and biocompatibility of gold. The approach will be demonstrated on side-polished optical fibers, where microstructured plasmonic thin films will be patterned using a maskless photolithography approach. The integration of chemical deposition and rapid microfabrication enables cost-effective, scalable and high-performance optical fiber sensors for chemical and biological detection.</p>	<p>Paulo Soares Santos</p>	<p>paulo.s.santos@inesctec.pt</p>	<p>Applied Photonics</p>
33	<p>Human-Centred Digital Phenotyping for Early Detection and Intervention with Virtual Reality in Depression</p>	<p>This research explores the integration of digital phenotyping, responsible artificial intelligence, and virtual reality (VR) technologies to support early detection and intervention pathways for depression in young adults. The project develops a human-centered architecture that combines multimodal behavioural data (passive sensing, interaction patterns, ecological momentary assessments) with contextual indicators (mobility and environmental data) to generate clinically supervised risk signals. Beyond predictive modelling, the research investigates adaptive</p>	<p>Dennis Lourenço Paulino</p>	<p>dennis.l.paulino@inesctec.pt</p>	<p>Human-Centered Computing and Information Science</p>

		intervention strategies, including immersive VR-based therapeutic environments. A strong emphasis is placed on ethical governance, explainability, privacy preservation, and clinician-in-the-loop validation to ensure responsible deployment in real-world mental health contexts. The overarching objective is to create scalable, evidence-based digital infrastructures that complement—not replace—clinical decision-making.			
34	Multimodal foundation models for opportunistic atrial fibrillation detection and prediction	Cardiovascular diseases remain the leading cause of mortality worldwide, with atrial fibrillation (AFib) representing one of the most prevalent and underdiagnosed cardiac arrhythmias. Early detection of AFib is crucial to prevent severe complications such as stroke and heart failure. In this context, the joint analysis of complementary physiological signals—phonocardiogram (PCG), electrocardiogram (ECG), and photoplethysmogram (PPG)—offers a unique opportunity to capture the electromechanical and hemodynamic mechanisms underlying cardiac dysfunction. The core objective of the stay is to develop and evaluate novel multimodal deep learning approaches for AFib detection and prediction using synchronous PCG, ECG, and PPG signals. The student will explore modern signal foundation models and their multimodal fine-tuning to enable opportunistic AFib detection and short- to mid-term risk prediction. The work will encompass methodological development and experimental validation on curated datasets already available at INESC TEC.	Francesco Renna	francesco.renna@inesctec.pt	Biomedical Engineering Research
35	Next-Generation Adaptive and Interpretable AI Strategies for Ransomware Protection	With the rapid evolution of technology and the exponential growth of digital data and online services, cyberattacks have become more frequent and sophisticated. Among the most disruptive threats, ransomware stands out for its ability to block access to data or services and demand ransom payments for recovery. Despite existing detection and protection mechanisms, it continues to evolve, adopting new evasion strategies to bypass traditional defenses. This research topic aims to design innovative strategies to detect and analyze emerging ransomware variants. It should explore static and dynamic analysis techniques to better understand malicious behavior and leverage Artificial Intelligence (AI) to build adaptive and resilient detection models. It should also emphasize robustness and reliability by integrating explainable AI techniques to interpret model decisions and ensure their correctness. By combining advanced analysis with interpretable machine learning, this work seeks to enable more effective, transparent, and trustworthy ransomware protection systems.	Tânia Esteves & João Tiago Paulo	tania.c.araujo@inesctec.pt & joao.t.paulo@inesctec.pt	High-Assurance Software

36	<p>Advanced Hydrodynamic and Mooring Analysis for Multi-Purpose Floating Offshore Structures</p>	<p>This research focuses on the hydrodynamic behavior and structural integrity of floating offshore platforms, such as floating wind turbines, aquaculture systems, and offshore substations. The primary objective is to contribute for the development of high-fidelity numerical models to simulate complex fluid-structure interactions and the non-linear dynamics of mooring systems under extreme environmental conditions. By analyzing floating structure responses and mooring tension, the research aims to optimize design efficiency, ensure operational safety, and reduce Levelized Cost of Energy (LCOE) for renewable energy applications. Key areas of investigation include wave-induced motion analysis. This work is critical for advancing the reliability of multi-use offshore platforms that provide essential energy and service infrastructure in deep-water environments.</p>	<p>Diogo Neves</p>	<p>diogo.neves@inesctec.pt</p>	<p>Robotics and Autonomous Systems</p>
37	<p>Enhancing Object Recognition and Localization in Retail Environments through Generative AI</p>	<p>In this research topic, we aim to develop an innovative Generative AI pipeline that leverages advanced computer vision techniques to analyze RGB and depth data captured by robots navigating supermarkets in Portugal. The project focuses on recognizing and accurately locating products displayed on shelves, ultimately creating a Digital Twin representation of the retail space. By integrating AI image inference for object recognition, we use Generative AI approaches to differentiate products based on 2D data. Additionally, we employ optical character recognition (OCR) to read product labels and analyze 3D depth data to enhance object localization precision. The use of large language models (LLMs) will facilitate matching object descriptors retrieved from images with a comprehensive object database via Retrieval-augmented generation (RAG) techniques, ensuring an efficient inventory management system that improves customer experience. A key objective is to evaluate how effectively this novel approach compares with established solutions like TensorFlow and AWS Rekognition.</p>	<p>Rafael Lírio Arrais</p>	<p>rafael.l.araais@inesctec.pt</p>	<p>Robotics in Industry and Intelligent Systems</p>
38	<p>Creating a Photogrammetry-Based Representation of Retail Spaces Using Advanced Imaging Techniques</p>	<p>In this research topic, we aim to develop a photogrammetry-based representation of retail environments using RGB and depth images collected by robotic agents navigating supermarkets. Our approach will employ advanced techniques such as Neural Radiance Fields (NeRFs) and Gaussian Splatting to create highly detailed 3D models of the retail space. NeRFs utilize deep learning to synthesize novel views of a scene by modeling volumetric representations, capturing intricate details and realistic lighting conditions. Gaussian Splatting enhances rendering efficiency by representing points in 3D space as Gaussian distributions, allowing for smoother transitions and better handling of occlusions. A key</p>	<p>Rafael Lírio Arrais</p>	<p>rafael.l.araais@inesctec.pt</p>	<p>Robotics in Industry and Intelligent Systems</p>

		innovation of our project is the integration of depth information, already being collected, into this approach to further improve the accuracy and quality of the results. The ultimate goal is to create a web-based viewer that provides retail employees with an accurate and continuously updated depiction of their store as new data collected.			
39	Developing a Generative AI Approach for Error Identification in Robot Operations	In this research topic, we aim to develop a Generative AI approach to identify errors in robot operations by analyzing their logs and performance metrics. The core idea is to supply large language models (LLMs) with operational data, utilizing techniques such as Retrieval-Augmented Generation (RAG) and Model Context Protocol (MCP) to enhance the AI's contextual awareness. By continuously monitoring Robot Operating System (ROS) logs and robot metrics, our goal is to create an AI agent capable of recognizing failure patterns and suggesting strategies to address their root causes. Additionally, we will assess the software source code that may have originated the failure situation, providing insights based on this analysis. Innovative contributions include an explainable diagnostic tool that detects faults and offers actionable insights, creating a proactive maintenance framework. This framework could significantly improve reliability and efficiency in robotic systems across various applications, ultimately enhancing operational performance and reducing downtime.	Rafael Lírio Arrais	rafael.l.araais@inesctec.pt	Robotics in Industry and Intelligent Systems
40	Developing a Lingua Franca for ROS Simulators	In this research topic, we aim to create a lingua franca for ROS-compatible simulators to streamline the adaptation of source code across different simulation environments. As new simulators emerge, the need for a standardized interface becomes critical to reduce the time spent managing various configurations and adapting code. Our innovation is akin to developing a universal adapter, similar to the USB-C standard, allowing developers to seamlessly integrate their ROS applications into any simulation environment without extensive code rewrites. This unified interface will define common protocols, APIs, data formats, and configuration parameters, enabling interoperability among simulators like Gazebo, Webots, Unity, and NVIDIA Isaac Sim. Additionally, we will establish a common structure for assessing simulation compliance with user intentions, facilitating integration into CI/CD pipelines. This project leverages INESC TEC's extensive experience in robotic simulations and CI/CD integration, promising to enhance reproducibility, accelerate research and development, and foster collaboration within the robotics community.	Rafael Lírio Arrais	rafael.l.araais@inesctec.pt	Robotics in Industry and Intelligent Systems

41	<p>Automating Robotic Task Generation through AI-Driven State Machine Synthesis</p>	<p>In this research topic, we aim to develop an innovative approach that utilizes AI to automatically generate state machine representations for robotic tasks by integrating AI-based planning with the structured benefits of task scripting. Traditional task scripting relies on manually defined state machines, which can become a bottleneck in dynamic environments. By employing techniques such as reinforcement learning, we propose to automate the creation of state machines, allowing AI to learn from interactions in simulation and propose new state transitions. This AI-driven state machine synthesis will include learning-based structure generation, where the AI designs entire state machine frameworks, and hybrid representation learning that combines deep learning with symbolic reasoning to ensure safety and compliance. Our goal is to create a system that not only generates effective task scripts but also maintains the transparency and reliability necessary for industrial applications, ultimately enhancing the flexibility and autonomy of robotic systems.</p>	<p>Rafael Lírio Arrais</p>	<p>rafael.l.araais@inesctec.pt</p>	<p>Robotics in Industry and Intelligent Systems</p>
42	<p>Choreographies for Actively-Secure Multiparty Computation</p>	<p>Choreographic programming allows expressing the behavior of a distributed program as a single program. Besides serving as an easier-to-read specification of the distributed behavior, it also offers strong guarantees about the program, in particular that its distributed execution is deadlock-free by design. A very special kind of distributed computation is secure multiparty computation (MPC), in which multiple parties compute joint functions over parts of private data. Writing secure applications using these techniques directly can be challenging, resulting in the development of several programming languages that aim to make secure computation more accessible. This topic seeks to explore the potential of choreographic programming for easing the specification of MPC programs. Despite their versatility, choreographic languages lack mechanisms to handle network faults or program faults, meaning that their guarantees only hold in perfect environments without adversaries, which is insufficient for MPC.</p>	<p>Hugo Pereira Pacheco</p>	<p>hugo.p.pacheco@inesctec.pt</p>	<p>High-Assurance Software</p>
43	<p>From Prediction to Explanation: Causal AI for Brain Science</p>	<p>Causal AI advanced methods in causal inference and causal discovery can be used to model and understand cause-effect relationships in the brain. The objective is to develop models that not only predict neural and cognitive outcomes, but also reason about interventions, treatment effects, and counterfactual scenarios in brain systems. By learning causal representations, the goal is to create more robust, interpretable, and transferable AI models that can support clinical neuroscience, neurology, and psychiatry, informing diagnosis, therapy planning, and</p>	<p>Ana Rita Nogueira & Ricardo Teixeira Sousa</p>	<p>ana.r.nogueira@inesctec.pt & ricardo.t.sousa@inesctec.pt</p>	<p>Artificial Intelligence and Decision Support</p>

		neurorehabilitation strategies. Key challenges include identifying causal neural mechanisms from observational and multimodal data (e.g., neuroimaging, electrophysiology, clinical records), mitigating confounding effects, and ensuring generalisation across heterogeneous populations and brain conditions. Applications range from personalised brain disorder treatment and precision psychiatry to predictive modelling of neurodegenerative disease progression, cognitive decline, and neurological risk stratification.			
44	From Prediction to Causation: AI for Real Estate Systems	This research focuses on the causal analysis of real estate price variations, moving beyond traditional predictive models to identify cause–effect relationships that drive market fluctuations. While most machine learning approaches in real estate rely on correlation-based models (e.g., regression, tree-based models, deep learning), this project applies causal discovery frameworks to: <ul style="list-style-type: none"> • Identify structural drivers of price variation. • Distinguish correlation from causation. • Quantify the impact of specific factors (e.g., interest rates, infrastructure investments, demographic shifts, policy changes). • Support diagnostic and counterfactual analysis (e.g., What would happen to prices if a new transport line is introduced?). The goal is to develop interpretable, robust, and policy-relevant causal models that improve decision-making for urban planning, investment strategy, and housing policy.	Ana Rita Nogueira & Ricardo Teixeira Sousa	ana.r.nogueira@inesctec.pt & ricardo.t.sousa@inesctec.pt	Artificial Intelligence and Decision Support
45	Causal Modelling of Anomalies in Complex Systems	This research focuses on the use of causal AI for anomaly detection in industrial and human-centered systems, moving beyond traditional pattern-based and statistical detection methods to identify the underlying cause–effect mechanisms behind abnormal events. While most anomaly detection approaches rely on correlation, thresholds, or black-box machine learning models, this research direction applies causal inference and causal discovery frameworks to: <ul style="list-style-type: none"> • Identify structural causes of anomalies rather than symptoms. • Distinguish true causal disruptions from spurious correlations. • Quantify the impact of operational, organizational, and environmental factors. • Support diagnostic and counterfactual reasoning (e.g., What caused a production failure? What organizational change would prevent a recurrence?). The goal is to develop interpretable, robust, and decision-relevant causal models that improve fault diagnosis, risk management, workforce analytics, and operational resilience in industrial systems and human resources contexts.	Ana Rita Nogueira & Ricardo Teixeira Sousa	ana.r.nogueira@inesctec.pt & ricardo.t.sousa@inesctec.pt	Artificial Intelligence and Decision Support

46	Network Digital Models and Twins	Investigation of novel ML-based algorithms and models to evolve network simulator 3 (ns-3) – the most used network simulator worldwide for wireless networks – towards a platform for supporting Digital Twins of wireless networks. This is a research topic with a long tradition at INESC TEC and increasing international visibility, namely within the ns-3 community. The visiting researcher will be integrated into the INESC TEC team that has been involved in the topic in the last 10+ years, namely in national and international projects such as DECARBONIZE, FP7 SUNNY and H2020 Fed4FIRE+ (SIMBED, SIMBED+, SMART), HEUR CONVERGE, HEUR OVERWATCH, HEUR SuperIoT, HEUR HURRICANE and HEUR REPLICA 6GS OC2.	Hélder Martins Fontes & Rui Lopes Campos	helder.m.fontes@inesctec.pt & rui.l.campos@inesctec.pt	Telecommunications and Multimedia
47	Underwater Communications	Investigation of novel wireless underwater communications solutions, namely multimodal approaches combining radio, optical, and acoustics. Within this research topic, new ML-based algorithms and new communications paradigms such as semantic communications will be explored. This is a research topic with a long tradition at INESC TEC and increasing international visibility within the underwater communications community. The visiting researcher will be integrated into the INESC TEC team that has been involved in this research topic in the last 10+ years, namely within national and international projects such as FCT GROW, BLUECOM+, ENDURE, Under-Fi, ACOUSTNET and SEAGUARD.	Hélder Martins Fontes & Rui Lopes Campos	helder.m.fontes@inesctec.pt & rui.l.campos@inesctec.pt	Telecommunications and Multimedia
48	Macroeconomic and Trade Impacts of ReFuelEU Aviation: SAF Mandates, Competitiveness and Carbon Leakage	The aviation sector is one of the hardest-to-decarbonize industries and operates within a highly competitive and globally integrated market. Under the ReFuelEU Aviation Regulation, the European Union has introduced progressively increasing mandates for Sustainable Aviation Fuels (SAF), starting at 2% in 2025 and reaching 70% by 2050. While SAF are essential to meet climate neutrality goals, their significantly higher production costs and uneven global supply distribution raise concerns regarding competitiveness, carbon leakage, and hub re-routing outside the EU. This project evaluates the macroeconomic and trade implications of these mandatory SAF shares using a multi-regional computable general equilibrium (CGE) model. Alternative supply structures, domestic production, strategic imports, and hybrid approaches, will be simulated to assess impacts on aviation costs, trade flows, sectoral competitiveness, energy security, and emissions. The project aims to quantify the systemic economic consequences of SAF mandates while identifying cost-effective and resilience-enhancing pathways for European aviation decarbonization.	Flávia Barbosa	flavia.barbosa@inesctec.pt	Industrial & Systems Engineering and Management

49	<p>Bioenergy as a Strategic Resilience Instrument? Energy Security under Geopolitical Shocks in Europe</p>	<p>The Russian invasion of Ukraine exposed the European Union’s structural vulnerability to fossil fuel imports and triggered a profound shift in energy policy under the REPowerEU framework. While accelerated renewable deployment is central to the strategy, the role of bioenergy as a resilience instrument remains insufficiently quantified. This project addresses the question: Can bioenergy act as a structural buffer against fossil fuel supply shocks in the EU, or does it create new economic and trade vulnerabilities? Using a multi-regional computable general equilibrium (CGE) model, the research will simulate supply disruption scenarios in gas, oil, and fertilizer markets. It will evaluate the macroeconomic, trade, agricultural, and emission consequences of scaling domestic bioenergy production versus diversifying sustainable imports. The objective is to quantify systemic trade-offs between security of supply, price stability, competitiveness, and climate targets in a geopolitically unstable context.</p>	<p>Flávia Barbosa</p>	<p>flavia.barbosa@inesctec.pt</p>	<p>Industrial & Systems Engineering and Management</p>
50	<p>Bioinspired Visual Intelligence: Advancing Event-Based Perception, Neuromorphic Robotics and Spiking Neural Networks</p>	<p>This study proposes a bioinspired visual attention system that integrates event-based sensing with neuromorphic computation to enhance real-time perception in autonomous robots. The approach draws on biological visual processing, particularly border ownership and perceptual grouping in the primate brain. A hierarchical neural architecture will implement figure-ground segmentation, enabling the system to isolate behaviorally relevant foreground objects from cluttered scenes with minimal computational cost. A fully spiking convolutional neural network (sCNN) will process event streams and extract salient motion cues. This motion-enhanced saliency triggers active gaze shifts, mimicking fixational and saccadic eye movements, allowing the robot to focus on the most relevant regions of the visual field. By exploiting the sparse, asynchronous output of event-based cameras and deploying computation on neuromorphic hardware, the system aims to deliver low-latency, energy-efficient, and robust visual attention suitable for real-world robotic applications and dynamic, complex environments.</p>	<p>Ana Filipa Sequeira & Jaime Cardoso</p>	<p>ana.f.sequeira@inesctec.pt & jaime.cardoso@inesctec.pt</p>	<p>Telecommunications and Multimedia</p>
51	<p>Emerging Multi-Sector Economic Clusters in Portugal</p>	<p>This research investigates the formation and dynamics of multi-sector economic clusters in Portugal, defined as geographic concentrations of interconnected firms, suppliers, service providers, institutions, and talent from two or more distinct industries that collaborate, share knowledge, and generate competitive advantages. The study leverages diverse datasets, including economic and financial indicators, Geographic Information System (GIS) data, real estate market statistics, automotive market and traffic data, as well as energy consumption and electrical power grid</p>	<p>João Pereira Silva & Gonçalo Duarte Nunes</p>	<p>joao.p.silva@inesctec.pt & goncalo.d.nunes@inesctec.pt</p>	<p>Artificial Intelligence and Decision Support</p>

		information, to identify emerging patterns and relationships across sectors. By integrating quantitative and spatial analyses, the research aims to uncover the structural, economic, and infrastructural factors that drive the development and performance of these multi-sector economic clusters, offering insights for policy makers, investors, and industry stakeholders.			
52	FairFaces: Advancing Generative AI for Fair and Unbiased Face Biometrics	The widespread use of facial biometrics in authentication, surveillance, and identity verification has intensified concerns about bias and fairness across ethnicity, gender, and age groups. This visitor programme examines how Generative AI—particularly generative adversarial networks (GANs) and diffusion models—can be used to develop fairer, more robust facial recognition systems. The core objective is to leverage generative models to create balanced, diverse, and privacy-preserving datasets, simulate underrepresented scenarios, and uncover bias patterns in existing systems. Visitors will collaborate with INESC TEC researchers to improve model interpretability, debias training pipelines, and ensure equitable performance across demographic groups. Work will also address ethical risk assessment, adversarial robustness, and compliance with emerging AI regulatory frameworks, including the EU AI Act. By integrating advances in machine learning, ethics, and human-centered AI, this programme aims to support the development of trustworthy biometric systems that foster inclusivity, accountability, and fairness in high-stakes real-world applications.	Ana Filipa Sequeira	ana.f.sequeira@inesctec.pt	Telecommunications and Multimedia
53	Stable Feature Selection in Non-Linear Models	We will investigate feature selection in non-linear models, prioritizing the stability of feature importance rankings rather than raw importance magnitudes. Traditional methods often rely on absolute scores, overlooking how consistently a feature contributes across data variations or training runs. We propose estimating the distribution of importance ranks for each feature and defining a Feature Stability Score (FSS) to measure rank consistency under varying data samples and model initializations. Features deemed unstable by this criterion will be considered unreliable and iteratively removed. This approach will form the basis of a robust, stability-driven feature selection framework. Additionally, we will explore making the method model-agnostic to ensure broader applicability across learning algorithms. By emphasizing rank stability, the framework will select features that remain relevant despite inherent data variability, improving generalization performance and supporting more reliable, transparent, and trustworthy model interpretation in practical applications.	Ana Filipa Sequeira	ana.f.sequeira@inesctec.pt	Telecommunications and Multimedia

54	Autonomous On-demand Wireless Networks	<p>On-demand wireless networks (OWN) comprise deployable access and backhaul systems for scenarios where fixed infrastructure is unavailable or limited in coverage and capacity. OWN include relocatable networking nodes, disaggregated O-RAN architectures, and edge computing functions hosted on mobile platforms such as drones and other autonomous vehicles. Toward 6G, OWN extend to integrated sensing and communications, AI-native network control, and 3D network architectures, including Non-Terrestrial Networks. We investigate OWN as measurement-driven closed-loop systems that jointly optimize node placement, topology formation, scheduling, and backhaul configuration. Real-time network KPIs, traffic demand, and environmental data are fused to ensure target performance under time-varying conditions, enabling autonomous, self-adaptive deployment across contexts. The visiting researcher will join the INESC TEC team with 10+ years of experience in related R&D projects, including within Horizon Europe (HURRICANE, OVERWATCH, CONVERGE), FCT FALCON and WISE, PRR NEXUS, and H2020 ResponDrone, while validating novel solutions through simulation and controlled field experiments.</p>	André Filipe Coelho & Rui Lopes Campos	<p>andre.f.coelho@inesctec.pt & rui.l.campos@inesctec.pt</p>	Telecommunications and Multimedia
55	Model Checking for Improving Automation of Cryptographic Proofs	<p>Machine-checked cryptographic proofs exist in a tension between high-assurance manual proofs and automated symbolic analysis. Game-based frameworks like EasyCrypt excel at relational proofs but require the developer to manually orchestrate “game-hop” strategies. This becomes increasingly laborious when applied to protocols where the state space explodes due to complex interleavings. Moreover, the “gold standard” for cryptographic proofs is Universal Composability (UC). While UC provides enhanced modularity, its formalization remains excruciatingly manual and particularly requires to explicitly construct a simulator that maps adversarial actions from a real world to an ideal world. This topic proposes integrating model checking to enhance automation. We will consider one or more possible pathways: - Leveraging hyperproperty model checking to automate UC proofs, bypassing simulator construction. - Developing a hybrid proof approach that allows decoupling state-space analysis (to be performed via model checking) from cryptographic reductions. - Directly embedding temporal logic operators into a relational game-based framework.</p>	Hugo Pereira Pacheco & Manuel Barbosa	<p>hugo.p.pacheco@inesctec.pt & manuel.barbosa@inesctec.pt</p>	High-Assurance Software
56	Data analysis of Distributed Acoustic Sensing applied to	<p>This research focuses on the analysis of Distributed Acoustic Sensing (DAS) data collected from optical fibres installed along high-voltage transmission lines operated by REN – Portuguese National Energy</p>	Ricardo Teixeira Sousa &	<p>ricardo.t.sousa@inesctec.pt &</p>	Artificial Intelligence and Decision Support

	high-voltage transmission lines	Networks. DAS technology enables continuous, distributed vibration monitoring over long distances, transforming optical fibres into dense arrays of acoustic sensors. The main objectives of this work are: <ul style="list-style-type: none"> • Study and characterization of DAS signals in high-voltage transmission lines. • Detection of bird collisions with overhead conductors. • Development of a physical or generalized collision model. • Exploration of unsupervised learning approaches for anomaly detection. • Analysis of transient events captured by DAS signals. The project aims to distinguish collision events from other transient phenomena (e.g., wind, mechanical oscillations, environmental noise) and to model their physical signatures. Given the likely scarcity of labelled data, the research emphasizes unsupervised and physics-informed approaches. 	Susana Oliveira Silva	susana.o.silva@inesctec.pt	
57	Data analysis of Distributed Acoustic Sensing applied to submarine cables	This research focuses on the analysis of Distributed Acoustic Sensing (DAS) data acquired from submarine optical fibre cables, using them as large-scale underwater sensing systems. Submarine cables, originally deployed for telecommunications, can be repurposed through DAS technology to capture a wide range of underwater acoustic and vibrational phenomena. The main objectives of this work are: <ul style="list-style-type: none"> • Analysis of seismic wave propagation recorded through submarine DAS. • Detection and characterization of large marine mammals. • Development of physics-based and Machine Learning models to interpret observed signals. The project aims to extract meaningful physical information from DAS signals in underwater environments, distinguishing between seismic events, biological activity, and background ocean noise. This research lies at the intersection of geophysics, marine science, and advanced signal processing, contributing both to Earth observation and marine ecosystem monitoring. 	Ricardo Teixeira Sousa & Susana Oliveira Silva	ricardo.t.sousa@inesctec.pt & susana.o.silva@inesctec.pt	Artificial Intelligence and Decision Support
58	Development of Efficient ML technologies to optimize model memory footprint	This research focuses on Efficient Machine Learning, with a particular emphasis on optimizing the deployment and operation of large-scale models such as Large Language Models (LLMs). In most companies, large models require substantial computational resources, including high disk storage, large memory footprints, and powerful hardware to deliver responses within acceptable latency. These requirements often limit real-world adoption, especially in industrial environments with constrained infrastructure. The goal of this research is to develop functional algorithms and system-level strategies that: <ul style="list-style-type: none"> • Optimize disk space usage (e.g., model compression, pruning, quantization, parameter sharing). • Reduce memory consumption during inference and training. • Ensure useful response times 	Ricardo Teixeira Sousa & José Ferreira Pinto	ricardo.t.sousa@inesctec.pt & jose.f.pinto@inesctec.pt	Artificial Intelligence and Decision Support

		under practical deployment constraints. • Enable scalable and cost-effective deployment in real industrial settings. The focus is not only theoretical efficiency, but also the delivery of robust, deployable solutions for companies, aligned with applied AI and technology transfer objectives.			
59	Development of fine-tuning methods for multimodal small Large Language Models (sLLMs)	This research topic focuses on the development of advanced fine-tuning methods for small multimodal Large Language Models (sLLMs), capable of integrating and processing different types of data, such as text, images, and potentially structured data. The objective is to design computationally and data-efficient strategies that enable the adaptation of pre-trained models to specific domains while maintaining high performance and reducing training costs. The research will explore techniques such as parameter-efficient fine-tuning, aligned multimodal adaptation, model compression, and optimization for resource-constrained environments. It also aims to evaluate robustness, generalization capacity, and practical applicability in industrial and scientific contexts.	Ricardo Teixeira Sousa & José Ferreira Pinto	ricardo.t.sousa@inesctec.pt & jose.f.pinto@inesctec.pt	Artificial Intelligence and Decision Support
60	Socio-technical transformation trajectories for AI integration in organisations	Designing AI-based systems for operations and management in organisations extends far beyond the technical domain. AI technologies are not merely disruptive in the sense of introducing efficiency gains; they are transformative because they alter significantly knowledge flows, skill requirements, and patterns of collaboration between humans and between humans and machines. Consequently, AI implementation requires socio-technical design approaches that jointly consider technical and organisational capabilities, governance mechanisms, and human competencies. Managers and researchers need conceptual and practical tools to anticipate how AI systems reconfigure work practices, redefine responsibilities, and affect individual autonomy and collective performance. This research aims to develop socio-technical transformation trajectories that guide organisations through AI-enabled change. These trajectories are conceptualised within a multidimensional design space defined by human, social, and organisational requirements. By mapping alternative configurations and maturity paths, the research supports responsible, human-centred, and strategically aligned AI-driven organisational transformation.	António Lucas Soares	antonio.l.soares@inesctec.pt	Industrial & Systems Engineering and Management
61	Smart garments, wearables and AI-enhanced multimodal data fusion for pervasive, context-aware predictive health	Current health wearables often lack clinical accuracy or predictive depth, or fail to attain the required user compliance, which are the primary barriers to long-term effective human monitoring. This research focuses on achieving high-fidelity, clinical-grade vital signs and activity tracking during both rest and vigorous intensity exercise for pervasive, context-aware	Miguel Velhote Correia	miguel.velhote.correia@inesctec.pt	Biomedical Engineering Research

		<p>predictive health. By leveraging edge-AI multimodal data fusion, we aim to move beyond passive tracking toward proactive intervention, overcoming degradation in physiological signal capture caused by movement and environment artefacts. We plan to explore interdependencies between physical activity patterns and shifts in vital signs to isolate true physiological distress from exercise-induced strain and predict adverse events, such as hypertensive crises, before symptoms manifest. We will also seek to develop personalised baseline profiles to detect early signs of arrhythmia or overexertion, thereby enhancing the reliability of remote patient monitoring and athletic performance tracking.</p>			
62	<p>Process Mining applied to processes in the financial area and document management</p>	<p>This research topic focuses on applying Process Mining techniques to financial and document-intensive processes to discover, analyse, optimise and continuously monitor operational workflows. Financial institutions and document-driven environments (e.g., credit approval, compliance validation, onboarding, claims management, document lifecycle management) generate large volumes of event data across heterogeneous information systems. By extracting and analysing event logs, Process Mining enables:</p> <ul style="list-style-type: none"> • Discovery of the real process flows. • Identification of bottlenecks and inefficiencies. • Detection of deviations and compliance risks • Performance analysis (lead times, rework, loops, delays) • Data-driven process optimisation <p>The core research objective is to find the optimal process configuration under operational, regulatory and performance constraints, integrating:</p> <ul style="list-style-type: none"> • Performance mining. • AI-driven optimisation strategies. • Integration with document intelligence and automated systems. <p>The expected outcome is a decision-support framework that enhances efficiency, transparency, compliance and resilience in financial and document-heavy operations.</p>	<p>Ricardo Teixeira Sousa & Gonçalo Duarte Nunes</p>	<p>ricardo.t.sousa@inesctec.pt & goncalo.d.nunes@inesctec.pt</p>	<p>Artificial Intelligence and Decision Support</p>
63	<p>Mobility as a Service for efficient, sustainable and socially inclusive urban transport of people and freight</p>	<p>MaaS (Mobility as a Service) may be viewed as a generic framework for the design and management of innovative (more resilient and sustainable) urban mobility services (both for people and logistics). In this context, research is naturally interdisciplinary, based on the co-creation of solutions and on digital platforms, addressing the current e-commerce challenges and environmental concerns, and providing more efficient, shared-connected and low-emission sustainable operations. The key drivers of our research are the current trends on: digitalisation; decarbonisation; social inclusion; citizen participation; the sharing economy; and the “smart city”. This work is also grounded on know-how in decision support systems, simulation, optimisation, machine learning, information and knowledge</p>	<p>Jorge Pinho de Sousa & Marta Campos Ferreira</p>	<p>jorge.p.sousa@inesctec.pt & marta.c.ferreira@inesctec.pt</p>	<p>Industrial & Systems Engineering and Management</p>

		management, urban logistics and mobility, and Intelligent Transportation Systems. Strong links and collaborations with different key actors and stakeholders of these processes do feed our research in the area (mostly around doctoral projects), thus ensuring its practical relevance and impact in society.			
64	Planning sustainable urban mobility systems for functional urban areas.	Planning sustainable urban mobility systems is a challenging process, particularly at the scale of functional urban areas that encompass diverse and heterogeneous municipalities. Planning processes bring to the forefront not only financial constraints, technical capability, and access to reliable information about socio-spatial dynamics, but also power dynamics that significantly affect decision-making. In the context of the normative drive to decarbonise transport, while ensuring higher service levels and enhanced quality of life, social equality, and economic competitiveness of territories, there is a clear need of frameworks and tools to support structured and collaborative processes in designing innovative mobility services. This research aims to address this challenge by promoting an interdisciplinary approach, the main goal is to produce actionable knowledge to support effective and participatory planning processes. This is particularly relevant when considering the recent inclusion of metropolitan areas as urban nodes of the TEN-T network, underscoring the need for multi-level integration.	Jorge Pinho de Sousa	jorge.p.sousa@inesctec.pt	Industrial & Systems Engineering and Management
65	Resilient and sustainable inter-modal logistics and global transportation networks	Inter-modal logistics and transportation systems play an important economic role, with significant positive impacts, but with many negative externalities. Moreover, the resiliency of the associated networks is critical, with high levels of uncertainty and disruptions. This research supports the design of more resilient and sustainable solutions for freight transportation and logistics and is structured around: seaports and other inter-modal hubs; synchro-modality in transportation networks; and global supply-chains. Decision Support Systems will be developed grounded on optimization and simulation models, AI agents, and data-driven approaches, exploring different techniques and their hybridization potential. This work is mainly related to the operations of ports and their connections with the hinterland, being strongly connected to the MAGPIE European project and to NEXUS, a large-scale innovation agenda for the port, multimodal transport sector in Portugal. This environment guarantees the involvement of key actors and stakeholders in the business, ensuring the research practical relevance and impact.	Jorge Pinho de Sousa & Catarina Moreira Marques	jorge.p.sousa@inesctec.pt & catarina.m.marques@inesctec.pt	Industrial & Systems Engineering and Management

66	<p>Advanced Nanotechnology Platforms for High-Performance Optical Monitoring and Sensing Systems</p>	<p>Our research focuses on the development of advanced optical technologies for chemical and biological sensing, based on nanotechnology-enabled platforms. The work explores the design and implementation of sensing systems that integrate functional nanoparticles with plasmonic thin films in multiple configurations to detect specific analytes with high sensitivity and selectivity. We investigate the optical interaction between nanostructured materials and light, optimizing signal enhancement mechanisms such as localized surface plasmon resonance. The research includes nanoparticle synthesis and functionalization, thin-film deposition, nanofabrication, and device integration. Additionally, we develop and optimize fabrication protocols to improve reproducibility, scalability, and long-term stability. The ultimate goal is to create robust, high-performance sensing platforms suitable for environmental, biomedical, and industrial monitoring applications.</p>	<p>Luís Carlos Coelho</p>	<p>luis.c.coelho@inesctec.pt</p>	<p>Applied Photonics</p>
67	<p>Sustainable Cities Transitions</p>	<p>Rooted in the broader sustainability movement that gained prominence in the late 20th century, sustainable cities aim to balance growth with environmental stewardship, social equity, and economic viability. The focus on sustainability and resilience ensures that cities can adapt to and mitigate the impacts of climate change, promoting a healthier environment for residents. INESC TEC’s research agenda includes the convergence of the smart city and sustainable city paradigms (Almeida et al, 2024). Since systematic literature reviews (SLR) about Sustainable cities are scarcer the project to be developed will build on SLRs and a forthcoming thematic analysis of the definitions, dimensions, and trajectories of both paradigms. The objective is to contribute to the conceptual consolidation of the “smart sustainable city” and to develop a joint framework that allows prototyping to integrate technological innovation with sustainability-oriented urban governance.</p>	<p>Cristina Machado Guimarães</p>	<p>cristina.m.guimaraes@inesctec.pt</p>	<p>Innovation, Technology and Entrepreneurship</p>
68	<p>Cross-Domain Music Information Retrieval: Deep Learning Adaptation Strategies for Low-Resource Musical Traditions</p>	<p>Deep learning has become the dominant paradigm in Music Information Retrieval (MIR), yet state-of-the-art models remain trained almost exclusively on Western mainstream repertoires, producing systematic domain mismatch when applied to underrepresented traditions. This research addresses that gap by investigating domain adaptation strategies for task-specific MIR models covering tasks such as beat tracking, pitch estimation, chord recognition, and structural segmentation, with foundation models operating as upstream feature providers. Underrepresented musical traditions, mostly absent from publicly available MIR training datasets, constitute the target domain, with</p>	<p>António Sá Pinto & Gilberto Bernardes de Almeida</p>	<p>antonio.s.pinto@inesctec.pt & gilberto.b.almeida@inesctec.pt</p>	<p>Telecommunications and Multimedia</p>

		<p>Portuguese heritage music serving as a primary case study. Depending on the research focus established collaboratively, adaptation approaches may include self-supervised pre-training, data augmentation, semi-supervised learning, or the use of large language models as semantic proxies for musical understanding, all under low-resource constraints. A key objective is to produce shared, reproducible model checkpoints and fine-tuning pipelines compatible with established open-science frameworks, contributing to culturally inclusive MIR tooling.</p>			
--	--	--	--	--	--