2026 Summer Research Internships

This year, INESC TEC is offering **80 internship topics**! The topics are organized into the following scientific domains:

AI – Artificial Intelligence
BIO – Bioengineering
COM – Communications
CSE – Computer Science and Engineering
PES – Power and Energy Systems
PHO – Photonics
ROB – Robotics
SEM – Systems Engineering and Management

Apply in just three steps:

1. **Browse** the list of internship topics below.
2. **Select up to 3 topics** that best match your interests**.**
3. **Submit your application** via the online form [here], indicating your order of preference.

Each topic is identified by a reference (e.g., S26-AI01). Please use these references when completing the application form, indicating in order of preference the topics you identify with the most. Your preferences will always be considered in the final selection. To maximize your options, the form will ask you to indicate the keywords that best characterize your research preferences. This allows us to ensure a better match to your profile. When appropriate, we may propose another topic within the same scientific area and in line with your research preferences.

If none of the proposed topics fully match your interests, you may use the **motivation letter** in the application form to describe the research areas you would like to explore. It is important to indicate which scientific domain your preferences belong to.

For each internship topic in the section below, you will find:

- The title of the topic and a **brief description** of the research challenge
- The **research centre** where you will be working
- The **location** and **duration** of the internship
- The internship format (**hybrid, in-person** or **remote** w/ minimum attendance**)**.

For more details about the programme refer to the Call [here].

Artificial Intelligence

S26-AI01 AI for Retinal Health: Deep Learning-Based 3D OCTA Segmentation

S26-AI02 AI-Powered Micro-Vision: Engineering the Future of Medical Diagnostics

S26-AI03 From Clinical PDF Reports to Analysis-Ready Data: Robust Extraction Validation and Product Design Improvements

S26-AI04 Meta-Learning for Adaptive Reaction Selection in Evolutionary Molecular Optimization

S26-AI05 Reinforcement Learning for Adaptive Reaction Selection in Evolutionary Molecular Optimization

S26-AI06 Improving Knowledge-Augmented Biomedical Lay Summarization: Component Validation, Classifier Enhancement, and Cross-Domain Evaluation

S26-AI07 AI-Driven Multi-Agent Stock Recommendation System Based on Financial News

S26-AI08 Understanding the Impact of Adversarial Perturbations on Deepfake Images

S26-AI09 Controlling Facial Attributes in Diffusion-Based Face Generation

S26-AI10 AI-Based Computer Vision System for Corrosion Detection in Offshore Structures

S26-AI11 Enhancing Journalistic Profile Generation using Generative Language Models

S26-AI12 Comparative Analysis of Political and Media Narratives on TikTok in Portugal

S26-AI13 Building and Evaluating Agentic AI Pipelines for Analytical Decision Support

S26-AI14 AI-based Visual Stimuli Generation for Cognitive Training (CognitiveTrainingToolkit)

S26-AI15 Building AI Models for Depression Screening from Interaction Data

S26-AI16 Professor Piano: AI-Driven Cognitive Personalization for an Educational Game

S26-AI17 Validation of LLM-based Chatbot Messages for Cognitive Training (CognitiveTrainingToolkit)

S26-AI18 Anomaly Detection in Industrial Processes

S26-AI19 Reference-Based Evaluation of Video Summarisation Pipelines

S26-AI20 Language-Queryable 3D Reconstruction of Industrial Machinery

S26-AI21 Nous: Architectural Models for Human-Centred AI in a Data-Agile Economy

S26-AI22 Generalist Deep Learning Model for Agricultural Robotics Perception

S26-AI23 Usability Evaluation of an Interactive Platform for Breast Cancer Survival Analysis

Bioengineering

S26-BIO 01 Towards a National Sleep Data Repository: Design and Feasibility of a Standardised Registry Using REDCap

Communications

S26-COM01 Development of a Multimodal Streaming Framework for Context-Aware Autonomous Networks

S26-COM02 Design and Characterization of Lenses for Near-Field Beam Shaping

S26-COM03 Design and Simulate Via-Less Single-Layer Reconfigurable Intelligent Surface Unit Cell Based on Glass for Memristors Integration.

Computer Science and Engineering

S26-CSE01 Mobile Digital Phenotyping Through a Clicker Game: Continuous Capture of Behavioural Signals in Everyday Contexts

S26-CSE02 “Playing Your Way to Fitness”: A Competitive–Cooperative Virtual Reality Game Designed to Motivate Cardio Exercise

S26-CSE03 Dynamic Player Profiling and Adaptive Game Elements in JellyFishGO

S26-CSE04 Event-Driven Device-to-Edge Transmission for Resource-Constrained AI Sensing

S26-CSE05 Analysis of the impact of video genres in user viewing behaviour

S26-CSE06 Web-based visualizer for ONNX-Flow

S26-CSE07 Robotair - Summer Internship in On-premises Infrastructure for Robotics

S26-CSE08 Robotair - Summer Internship in Frontend Development

S26-CSE09 Robotair - Summer Internship in MCP Server Development for LLM Integration

S26-CSE10 Robotair - Summer Internship in Chaos Engineering for Robotics

S26-CSE11 The AI Scout: Speculative Design of a Human-AI Interface for Collaborative Football Scouting

S26-CSE12 Development of Web-Based Cognitive Training Mini-Games (CognitiveTrainingToolkit)

S26-CSE13 A Java Interpreter for a Low-level IR for Object-Oriented Programming

S26-CSE14 A Semantic Analysis Compiler Pass for a Low-level IR for Object-Oriented Programming

S26-CSE15 A VSCode plugin for Alloy

S26-CSE16 ARNavAI 2.0: Indoor Navigation in AR with Multimodal Smart Guide

S26-CSE17 Froddo: Decision Support Systems and Layered Dashboards for Transport Management

S26-CSE18 Custom RISC++ Instructions for Nonlinear AI Operators

S26-CSE19 Lightweight Streaming Support for RISC++

S26-CSE20 Real-Time Localization Integration with Digital Twins

S26-CSE21 Immersive Digital Twin of the Ocean for Oil Spill Response (NVIDIA Omniverse)

S26-CSE22 Immersive Digital Twin of the Ocean for Oil Spill Response (Vibe Coding)

S26-CSE23 Refinery in 360°: From GALP's "Digital Archive" to Immersive Experiences

S26-CSE24 ProjectPilot: Your Local Co-Pilot for European Projects

S26-CSE25 Development of the INESC TEC BLUE-X European project website to showcase scientific and technological results

S26-CSE26 DashGEN: Integrated web platform for the online deployment of a dynamic dashboard generation system

S26-CSE27 Extension for Data Streaming Support in IDSA Connectors

S26-CSE28 Interactive UI for Application Packages

S26-CSE29 The Cheater's Shadow: Persistent Underrating in Competitive Rating Systems

S26-CSE30 UI for Data Access Policy Definition in Data Spaces

S26-CSE31 Modernization of Kadabra, a Source-to-Source tool for Java

S26-CSE32 Experiments on Java Bytecode Manipulation

S26-CSE33 UX Evaluation of the Apploy Web Platform

S26-CSE34 Design and Implementation of Frontend and Backend Testing Strategies

S26-CSE35 Towards European Data Sovereignty: A State-of-the-Art Analysis of the Gaia-X Initiative

S26-CSE36 Caching System for Optimizing External Services Communication

S26-CSE37 SIMPL in the European Context: A State-of-the-Art Review of Open Middleware for Data Spaces

S26-CSE38 Analysis of the IDS Ecosystem in Data Spaces: From Reference Architecture to Practical Implementation

S26-CSE39 Exploration of Memristor-Based Digital Computing Architectures

S26-CSE40 Evaluating and Improving Attention Atlas: A Usability Study of an Interactive Tool for AI Model Exploration

Power and Energy Systems

S26-PES01 Simulation-Driven Energy System Sizing for Self-Sufficient vElectrified Container Terminals

S26-PES02 Power Flow and Contingency Analysis for Hosting Capacity Assessment in Transmission Networks

Photonics

S26-PHO01 Theoretical Modelling of Nanoparticle-Induced Plasmon Resonances

Robotics

S26-ROB01 Floating systems behaviour and Mooring analysis

S26-ROB02 Unmanned Aerial Heavy-Lift Operations in Maritime Environments: Design, Prototyping and Integrated Flight Control

S26-ROB03 Robotair - Summer Internship in Robotics and DevOps

S26-ROB04 Robotair - Summer Internship in Robotics and Communications

Systems Engineering and Management

S26-SEM01 Operational and Strategic Optimisation of Technology Transfer Office Activities

S26-SEM02 A Data-Driven Approach to Identifying Spatial Determinants for Last-Mile Parcel Locker Planning

S26-SEM03 Mapping Sustainability and Impact Measurement Frameworks: A Market and Ecosystem Intelligence Analysis for Companies and Social Economy Organizations

S26-SEM04 Interpretation of Responsible Innovation Self-Assessment Results Using Large Language Models

S26-SEM05 manuFORESTS Framework - Modelling and simulating carbon negative value-chain - examples

S26-SEM06 Optimising Technology Information Extraction in the TTO with AI and Automation

Artificial Intelligence

MORE INFORMATION

S26-AI01 AI for Retinal Health: Deep Learning-Based 3D OCTA Segmentation

OCTA is a breakthrough in retinal imaging, providing high-resolution, dye-free 3D visualization of blood vessels crucial for detecting diseases like diabetic retinopathy and Alzheimer's. This project invites students to explore the cutting edge of medical AI by refining deep learning models (e.g., advanced U-Net) to segment intricate structures like Arteries and veins.

Using real-world 3D clinical data, students will gain hands-on experience in generating objective metrics for physicians. This one-month program covers the essential research workflow: from domain-specific programming to algorithm design and validation. It offers a focused opportunity to experience high-impact AI research and contribute to the future of assisted diagnosis.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Bisheng Wang

S26-AI02 AI-Powered Micro-Vision: Engineering the Future of Medical Diagnostics

Cell segmentation is a fundamental step in biological image analysis. In this project, we will explore how to leverage cutting-edge AI models to accurately segment and differentiate specific cells of interest within biomedical images. Students will engage with state-of-the-art techniques for cell segmentation and tracking using large-scale datasets and video sequences. This one-month immersion covers the essential research workflow—from mastering domain-specific programming and background knowledge to implementing diverse AI models. Participants will have the unique opportunity to create powerful tools to detect and track cells, contributing to the development of objective metrics for modern biological discovery.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Bisheng Wang

S26-AI03 From Clinical PDF Reports to Analysis-Ready Data: Robust Extraction Validation and Product Design Improvements

Clinical sleep studies rely on polysomnography (PSG), a complex diagnostic test that produces detailed reports containing key physiological metrics such as the Apnoea–Hypopnoea Index (AHI), oxygen saturation, and sleep-stage distribution. Despite their clinical importance, these reports are typically delivered as heterogeneous PDF documents that vary widely across manufacturers and centres. As a

result, extracting structured data for research or clinical audit remains a manual, time-consuming, and error-prone task.

This project addresses a central challenge in applied data science and natural language processing: reliably extracting structured clinical information from heterogeneous, real-world documents. Building on an existing prototype, the student will investigate how well automated extraction methods generalise to previously unseen report formats, identify the main sources of extraction error, and explore improvements using a combination of rule-based and NLP techniques.

In parallel, the project will examine how interface design can support human validation and trust in automated outputs, framing the system as a human-in-the-loop information extraction tool. The student will redesign key interface components to improve transparency, usability, and workflow efficiency.

This is a hands-on project at the intersection of data science, NLP, and healthcare, offering experience with noisy real-world data, model evaluation, and system design. The outcome will be a validated and improved extraction pipeline, accompanied by a structured analysis of its performance and limitations, which will contribute to ongoing research in clinical information extraction and digital health.

Research Centre: CTM
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Daniela Ferreira-Santos, Nuno Guimarães

S26-AI04 Meta-Learning for Adaptive Reaction Selection in Evolutionary Molecular Optimization

Designing novel molecules with desired properties is a core challenge in drug discovery and materials science. Traditional methods are computationally intensive and lack adaptability, while de novo design often leads to molecules that are synthetically infeasible or biologically irrelevant. Evolutionary approaches guided by reaction templates offer a promising alternative by mimicking real biochemical reactions. However, reaction selection is often random, limiting efficiency. This internship will explore meta-learning to prioritize reaction rules based on past performance across optimization tasks. The student will develop models to guide rule selection within an evolutionary pipeline, reducing computational cost and improving candidate quality.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: João Filipe Silva Correia

S26-AI05 Reinforcement Learning for Adaptive Reaction Selection in Evolutionary Molecular Optimization

A core challenge in molecular design, particularly for drug discovery and materials science, is efficiently navigating vast chemical spaces to identify molecules with desired properties. Traditional methods are computationally intensive and lack adaptability, while de novo design often leads to molecules that are synthetically infeasible or biologically irrelevant. Evolutionary approaches guided

by reaction templates offer a promising alternative by mimicking real reactions, but selecting transformations efficiently remains difficult due to the combinatorial explosion of possibilities. This internship explores reinforcement learning to learn policies for reaction selection, guiding an evolutionary pipeline toward high-quality candidates while reducing computational cost.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: João Filipe Silva Correia

S26-AI06 Improving Knowledge-Augmented Biomedical Lay Summarization: Component Validation, Classifier Enhancement, and Cross-Domain Evaluation

Biomedical lay summarization aims to automatically generate accessible versions of scientific literature for non-expert audiences, a task with growing relevance for public health communication and patient empowerment. This internship proposes to extend an existing knowledge-augmented summarization framework — developed at INESC TEC and presented at the CL4Health 2026 workshop — through a set of targeted experiments designed to strengthen its empirical grounding and broaden its applicability. The work encompasses five interconnected tasks: (1) refining the comparison between keyword-based and concept-level knowledge representations from UMLS and DBpedia; (2) conducting a systematic coverage analysis comparing QuickUMLS and MetaMap as entity linking tools on the target dataset, addressing an open question raised during peer review; (3) exploring improved text classification strategies, including prompt engineering and fine-tuning of PubMedBERT, for more accurate concept filtering; (4) performing ablation studies to isolate the contribution of each pipeline component to overall summarization quality; and (5) evaluating the generalizability of the approach on an additional biomedical lay summarization benchmark. The internship will be conducted over four weeks using the Deucalion HPC cluster at MACC/FCCN, leveraging an already stabilized training environment. Expected outcomes include a comprehensive experimental report, improved model configurations, and results that lay the groundwork for a journal extension of the workshop paper.

Research Centre: LIAAD
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Evelin Amorim

S26-AI07 AI-Driven Multi-Agent Stock Recommendation System Based on Financial News

The increasing availability of unstructured data, such as financial news, creates new opportunities for the development of decision-support systems in finance. In particular, the use of Natural Language Processing (NLP) and Artificial Intelligence (AI) techniques enables the extraction of relevant signals from textual data, contributing to the prediction of financial asset behaviour.
This internship proposes the development of an experimental stock recommendation system based on financial news in Portuguese, exploring both predictive modelling approaches and Multi-Agent System (MAS) architectures. The internship will be carried out by two students with complementary roles:

Student 1 will focus on the development of AI models (NLP and forecasting). The expected outputs include a benchmark of models and a comparative report. Responsibilities include:
- Exploring and preparing the financial news dataset
- Developing NLP models, such as sentiment classification and text embeddings
- Implementing supervised models (e.g., regression, decision trees, transformers)
- Creating predictive signals (features) from news data
- Evaluating model performance

Student 2 will develop a Multi-Agent System (MAS) with the goal of creating a functional prototype capable of generating (near) real-time recommendations. Responsibilities include:
- Designing a multi-agent system where agents represent assets or strategies
- Feeding agents with financial news via RSS streams
- Integrating models developed by Student 1
- Creating specialized agents (e.g., sentiment agent, risk agent, recommendation agent)
- Defining interaction rules between agents

Research Centre: LIAAD
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Evelin Freire Amorim, Pedro Campos

S26-AI08 Understanding the Impact of Adversarial Perturbations on Deepfake Images

Deepfake detection systems remain vulnerable to adversarial perturbations — small, carefully designed modifications that are often imperceptible to humans but can cause machine learning models to fail. This internship will analyse how adversarial perturbations change the visual and statistical properties of deepfake images using a dataset of paired clean and adversarial examples. The student will compare images in pixel and frequency domains, compute perturbation statistics, and create visualizations such as heatmaps and spectrum comparisons. The goal is to identify common patterns that explain why adversarial examples are effective, contributing to a better understanding of robustness challenges in deepfake detection systems.

Research Centre: CTM
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Ana Filipa Sequeira, Rafael Mamede

S26-AI09 Controlling Facial Attributes in Diffusion-Based Face Generation

Diffusion models enable highly realistic image generation from text prompts, but controlling specific facial attributes remains challenging. This internship explores how effectively characteristics such as age, expression, hairstyle, or accessories can be guided through prompt design. Using a pre-trained diffusion model, the student will generate face images from structured prompts and analyse how consistently desired attributes appear. The project will examine prompt sensitivity, interactions between attributes, and the balance between control and diversity. Results will include visual

comparisons and simple statistics, providing insight into the capabilities and limitations of modern generative AI systems.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Ana Filipa Sequeira, Maria Salvador, Rafael Mamede

S26-AI10 AI-Based Computer Vision System for Corrosion Detection in Offshore Structures

This internship proposal is designed for students with an interest in artificial intelligence and computer vision applied to real-world industrial challenges. The project focuses on the development of an AI-driven system for the detection and assessment of corrosion in offshore structures, such as platforms, wind turbine foundations and maritime infrastructure. A key component of this internship is the active involvement of students in field campaigns, where they will participate in the acquisition of visual data using drones, handheld imaging systems and other sensing technologies. These campaigns will provide hands-on experience in real operational environments, exposing students to the practical challenges of offshore inspection, including lighting variability, environmental conditions, and access constraints. Following data acquisition, students will engage in data curation processes, including annotation, labelling, quality control and dataset organization. Emphasis will be placed on building high-quality datasets suitable for training robust machine learning models. The core technical work will focus on the development and implementation of computer vision algorithms for corrosion detection, leveraging state-of-the-art techniques in deep learning, such as convolutional neural networks (CNNs) and vision transformers. Students will explore tasks such as image classification, object detection, and semantic segmentation to identify and quantify corrosion patterns.
The project will also include model validation, performance evaluation and deployment considerations, aiming to create a reliable tool for supporting inspection and maintenance operations in offshore environments. The internship will culminate in a prototype system capable of processing real-world data and assisting in corrosion assessment. This opportunity provides interdisciplinary experience combining fieldwork, data engineering, and advanced AI techniques, preparing students for careers in intelligent inspection systems, digital twins and autonomous monitoring solutions in the maritime and energy sectors.

Research Centre: CRAS
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Andry Maykol Pinto, Pedro Leite, Celso Pereira

S26-AI11 Enhancing Journalistic Profile Generation using Generative Language Models

Perfil Público is a platform that automatically generates journalist profiles from news articles using Data Mining techniques applied to Arquivo.pt data. This internship investigates whether recent generative AI models, such as Gemini and ChatGPT, can improve the quality and richness of these profiles. The work will focus on expanding data extraction to multiple Portuguese news sources,

evaluating models for generating short journalist biographies, and assessing their performance in tasks like keyword extraction, readability estimation, and entity identification. Additionally, the platform will be enhanced to integrate and visualize these new AI-driven features. https://aclanthology.org/2024.propor-2.27.pdf.

Research Centre: LIAAD
Internship Location: INESC TEC FCUP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 4 weeks
Supervisors: Nuno Guimaraes

S26-AI12 Comparative Analysis of Political and Media Narratives on TikTok in Portugal

This internship investigates how narratives produced by major political parties differ from those disseminated by traditional news media on TikTok. The project focuses on comparing these narratives to understand how political discourse on TikTok challenges or diverges from established journalistic framing.
Methodologically, it applies Natural Language Processing (NLP) techniques, with a particular emphasis on the Text2Story package, to extract structured narrative elements from the text. Complementary techniques, including topic modelling, Named Entity Recognition (NER), and sentiment analysis, will be used to systematically analyse and contrast discourse across political actors and news media.

Research Centre: LIAAD
Internship Location: INESC TEC FCUP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 4 weeks
Supervisors: Nuno Guimaraes

S26-AI13 Building and Evaluating Agentic AI Pipelines for Analytical Decision Support

This internship explores how lightweight agentic AI pipelines can improve evidence-grounded analytical decision support. The student will implement and compare a strong retrieval-based assistant and a structured planner-verifier pipeline on a small benchmark of document-based analytical tasks. The work combines prototyping and evaluation, focusing on output quality, evidence grounding, interpretability, and practical trade-offs such as latency and complexity. Expected outcomes include reusable code, annotated test cases, comparative results, and recommendations for future human-centred AI research.

Research Centre: CRACS
Internship Location: INESC TEC FCUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Álvaro Figueira, Alexandre Godinho

S26-AI14 AI-based Visual Stimuli Generation for Cognitive Training (CognitiveTrainingToolkit)

This project proposes the development of an AI-based module for automatic generation of visual stimuli for cognitive training. The system will create images aligned with psychologist-defined categories and difficulty levels. A human validation mechanism will allow approval, rejection, or regeneration before use. The module will be integrated into the platform, ensuring structured management and reuse of stimuli, contributing to richer and more adaptive training experiences.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Dennis Lourenço Paulino, André Thiago Netto, Hugo Paredes

S26-AI15 Building AI Models for Depression Screening from Interaction Data

This project focuses on the practical development of machine learning models for inferring depression severity from digital interaction data. Students will work with existing datasets collected from user interactions, complemented by synthetic data to support experimentation under limited-data conditions. The goal is not only to test and compare different ML approaches, but also to adapt and refine them in order to obtain a model that best fits the structured JSON-based interaction data available in the project.

The internship is hands-on and data-driven, involving data preparation, feature extraction, model training, adaptation, and performance evaluation. Particular attention will be given to how behavioural signals captured during user interaction can be associated with different levels of depression severity. The project is especially suited for students interested in Artificial Intelligence, Machine Learning, and Data Science, and motivated to apply computational methods to real-world mental health research.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: André Thiago Netto, Dennis Paulino, Hugo Paredes

S26-AI16 Professor Piano: AI-Driven Cognitive Personalization for an Educational Game

“Professor Piano v.2” (https://doi.org/10.1145/3696593.3696650) is a game designed to enable neurodivergent individuals to explore and learn how to play music (specifically the piano) in a playful, simple, and intuitive way. This project aims to extend the system by developing AI-driven cognitive personalization mechanisms. A model will be created to adapt interface and content to user characteristics, particularly individuals with autism, promoting a more inclusive, effective, and user-centred learning experience.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid

Internship Duration: 5 weeks
Supervisors: Dennis Lourenço Paulino, Andre Thiago Netto, Hugo Paredes

S26-AI17 Validation of LLM-based Chatbot Messages for Cognitive Training (CognitiveTrainingToolkit)

This project proposes the development of a validation module for messages generated by an LLM-based chatbot in the context of cognitive training. The system will support the generation of conversational interactions tailored to different tasks and difficulty levels defined by psychologists. It includes a human validation mechanism, allowing professionals to review, approve, reject, or request reformulation before deployment. The module will be integrated into the platform, ensuring coherence, safety, and clinical adequacy of interactions, contributing to more reliable and user-centred conversational experiences.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Dennis Lourenço Paulino, Rafael Ris-Ala, Hugo Paredes

S26-AI18 Anomaly Detection in Industrial Processes

We want to explore methodologies to use deep generative models for anomaly detection in industrial process data. The goal is to encode process parameters into 2D image representations that a convolutional model can learn from, enabling the detection of process faults without labelled anomaly data. The project will also explore explainability techniques to help operators understand which process variables drove each anomaly flag.
Objectives: We would like to explore a multivariate industrial process dataset and investigate strategies for encoding process parameters into 2D image representations; Design, implement, and evaluate a deep generative model that learns normal process behaviour and flags deviations, paired with explainability methods that highlight the variables responsible for each detected anomaly.
Workplan: Explore the dataset, review literature, and survey encoding strategies for multivariate time series; Analyse requirements, design the encoding pipeline, model architecture, and explainability approach; Implement the data pipeline, train the model, evaluate detection performance across fault types, and generate explanations for flagged anomalies;
Write a report in the format of a two-column paper and a final presentation.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Nuno Pereira, Paula Viana

S26-AI19 Reference-Based Evaluation of Video Summarisation Pipelines

In this project, we aim to build an evaluation framework for LLM-based video summarisation pipelines applied to industrial monitoring. Measuring whether the extracted sequence matches what actually happens in the video requires a structured reference and a comparison methodology that goes

beyond free-text similarity. The project aims to define a reference format for sequences of actions, build a test suite of annotated videos, and evaluate a summarisation pipeline using automated matching and model-as-a-judge scoring.

Objectives: Explore video summarisation pipelines based on multimodal LLMs, and related work on LLM evaluation; Define a reference format for sequences of actions in industrial videos, covering action labels, timing, and ordering; Build a test suite that combines annotated real footage with short synthetic clips to target specific evaluation criteria; Design and apply a comparison methodology that measures action coverage, ordering, timing, and hallucination, combining automated matching with model-as-a-judge scoring.

Workplan: Explore related work on video summarisation, LLM evaluation, and model-as-a-judge methodologies; Define the reference format and document the scoring procedures. Build the test suite: annotate a small set of real videos with action sequences and prepare synthetic clips targeting specific criteria; Experiment with existing video summarisation pipelines; Implement the evaluation scripts (automated matching plus model-as-a-judge) and run the full evaluation ; Analyse results and iterate on the reference format and scoring procedures; Write a report in the format of a two-column paper and a final presentation.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Nuno Pereira, Paula Viana

S26-AI20 Language-Queryable 3D Reconstruction of Industrial Machinery

In this project, we aim to build a language-queryable 3D representation of an industrial setting. Gaussian Splatting produces photorealistic, real-time-renderable 3D reconstructions from photos, and these can be combined with language-aligned features (such as those from CLIP or similar models), allowing each region of the scene to be associated with textual descriptions. This combination lets users ask questions like "where is the emergency stop button?" or "highlight the coolant nozzle?" and have the corresponding region highlighted in the 3D view.

Objectives: Explore 3D Gaussian Splatting, language-aligned feature embeddings (such as CLIP and LangSplat), and related work on queryable 3D scenes; Capture video of a real machine and produce a 3D Gaussian Splatting reconstruction using an existing toolchain (such as Nerfstudio); Extend the reconstruction with language-aligned features, associating textual embeddings with regions of the 3D scene; Implement a query interface that accepts natural-language questions and highlights the matching region in the 3D view; Evaluate the system on a small set of test queries covering machine parts, safety elements, and operational regions.

Workplan: Explore 3D Gaussian Splatting, language-aligned embedding methods, and existing toolchains; Capture photos and/or video of the scene and prepare the dataset (camera poses, frame selection). Alternatively, select from available models; Train a baseline Gaussian Splatting reconstruction and inspect quality; Integrate language-aligned features into the reconstruction, following an existing method; Implement the query interface: text input, embedding lookup, and 3D highlight rendering; Build a test set of queries with expected regions, run the evaluation, and iterate; Write a report in the format of a two-column paper and a final presentation.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)

Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Nuno Pereira, Paula Viana

S26-AI21 Nous: Architectural Models for Human-Centred AI in a Data-Agile Economy

This project investigates and develops architectural models for human-centred AI practices in a data-driven economy. It proposes a shared, interoperable XAI schema, enabling explanations and human corrections to flow across services. It also includes a dynamic decision control mechanism that adapts system autonomy based on risk, uncertainty, and operator workload. Additionally, label aggregation pipelines using weighted reputations will be developed to ensure quality in continuous learning. The goal is to foster more transparent, trustworthy systems with effective human oversight.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Dennis Lourenço Paulino, Andre Thiago Netto, Hugo Paredes

S26-AI22 Generalist Deep Learning Model for Agricultural Robotics Perception

This project focuses on building robust AI perception for agricultural robotics. The student will consolidate and harmonize multiple existing lab datasets into a single unified dataset, including annotations for fruits, branches, trunks, and other vegetation structures. The work involves defining a common label taxonomy, improving annotation consistency, and training/evaluating deep neural networks to produce a generalized model that performs reliably across different crops, scenes, and field conditions.

Research Centre: CRIIS
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: José Maria Sarmento, Luís Santos, Francisco Oliveira

S26-AI23 Usability Evaluation of an Interactive Platform for Breast Cancer Survival Analysis

This project focuses on evaluating the usability of an interactive platform for breast cancer data exploration, survival analysis, and prognostic prediction.
In the first stage, the intern will explore the platform, understand its modules, and identify typical user workflows.
In the second stage, they will help design realistic test tasks, prepare questionnaires, and support a small usability study.
In the final stage, they will analyse quantitative and qualitative feedback, identify usability issues, and propose concrete interface improvements.
The internship is suitable for students interested in AI, data visualization, UX, and digital health.

Research Centre: CRACS
Internship Location: INESC TEC FCUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Álvaro Figueira

Bioengineering

MORE INFORMATION

S26-BIO 01 Towards a National Sleep Data Repository: Design and Feasibility of a Standardised Registry Using REDCap

Sleep disorders such as obstructive sleep apnoea (OSA) represent a significant and underdiagnosed public health burden, yet clinical data related to sleep studies remain fragmented across centres, systems, and formats. In Portugal, sleep laboratories and clinical services generate valuable data through polysomnography and related exams, but the lack of a standardised structure limits large-scale analysis, multicentre collaboration, and the development of national registries.
This project addresses a key question in digital health and clinical data science: how can heterogeneous sleep-related data be standardised and integrated into a scalable national registry? Rather than building a full repository, the project focuses on a feasibility study, aiming to define a core clinical dataset, understand variability across centres, and design a prototype registry using REDCap.
The student will (i) characterise the landscape of sleep diagnostics in Portugal at a high level, (ii) define a harmonised data model covering essential clinical, demographic, and exam-related variables, and (iii) implement and test this model within REDCap as a prototype registry. The project will also evaluate the suitability of REDCap for this purpose, identifying strengths, limitations, and barriers to national-scale adoption.
This work sits at the intersection of data science, clinical informatics, and digital health, providing hands-on experience in real-world data modelling and system design. The outcome will be a validated blueprint for a national sleep data repository that supports future research, clinical audit, and health system planning.

Research Centre: CTM
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Daniela Ferreira-Santos

Communications

MORE INFORMATION

S26-COM01 Development of a Multimodal Streaming Framework for Context-Aware Autonomous Networks

Multimodal data enables enhanced perception and monitoring in wireless environments by fusing heterogeneous sources such as UAV/UGV sensing, network telemetry, and operational events, allowing a context-rich spatio-temporal representation.
This internship focuses on prototyping a multimodal data ingestion and synchronization pipeline with streaming strategies, build a visualization layer for real-time monitoring and exploratory analysis, and prepare the data interfaces needed to integrate AI reasoning-based agents for context-aware decision support. The resulting architecture lays the groundwork for network and environment state representation and perception-augmented reasoning control loops for proactive network optimization.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Marco Oliveira, André Filipe Coelho

S26-COM02 Design and Characterization of Lenses for Near-Field Beam Shaping

Near-field antenna systems have many different applications, ranging from antenna measurements to communications, biomedical devices, and wireless power transfer. In this internship, the objective is to design and characterize lenses for a near-field antenna system, in a 5G FR2 band, to generate planar, Gaussian beam, and Bessel beam wavefronts. It includes a study/review of fundamental concepts in antennas and lenses as well as the design, fabrication and experimental characterization of the lenses, and possibly simulation, if time allows. Thus, it is an excellent opportunity to learn more about near-field antenna systems, both in theory and in practice.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: José Pedro Luís, Luís Pessoa

S26-COM03 Design and Simulate Via-Less Single-Layer Reconfigurable Intelligent Surface Unit Cell Based on Glass for Memristors Integration.

This project explores the design and simulation of a novel unit cell for a Reconfigurable Intelligent Surface (RIS) technology. The novel RIS-UC structure will take into consideration the fabrication requirements of memristors as reconfigurable techniques. For instance, the use of a substrate with a low roughness surface, such as glass, is to be considered. Furthermore, the project will focus on single-

layer via-less RIS unit cells with a view to reducing the integration complexity with memristors. Such challenges become more critical in large-scale RIS implementations, where hundreds or thousands of unit cells are required. The project is designed to instruct students in the fundamentals of RIS technology, with the subsequent application of this knowledge being conducted through a simulation study of novel unit cells. The work includes modelling and simulation of the RIS-UC performance utilizing 3D Electromagnetic Simulators, such as CST and HFSS. The aim is to achieve a balance between structural simplicity and effective electromagnetic performance, making it a practical candidate for scalable and cost-efficient future wireless communication systems.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Luís Pessoa, Mohamed Ghatas

Computer Science and Engineering

MORE INFORMATION

S26-CSE01 Mobile Digital Phenotyping Through a Clicker Game: Continuous Capture of Behavioural Signals in Everyday Contexts

Mobile digital phenotyping aims to capture valid behavioural signals in everyday contexts, yet it faces persistent challenges related to low user adherence, irregular interaction patterns, and the difficulty of collecting high resolution data without increasing cognitive load. This proposal introduces the implementation of a mobile clicker style game designed for continuous digital phenotyping. The game integrates simple, repeated tapping interactions within an incremental reward loop, enabling the collection of high granularity temporal data such as click frequency, inter click intervals, hesitation patterns, motor variability, and performance changes associated with fatigue.

Research Centre: HumanISE
Internship Location: INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Hugo Paredes, Diogo Guimarães

S26-CSE02 “Playing Your Way to Fitness”: A Competitive–Cooperative Virtual Reality Game Designed to Motivate Cardio Exercise

Sedentary behaviour and low adherence to cardio exercise (such as rowing or stationary cycling) represent a significant challenge for global cardiovascular health, despite the well-established benefits of regular physical activity. Maintaining long-term engagement in exercise is particularly difficult, highlighting the need for interventions that promote sustained participation. In response to this challenge, our project proposes the development of a virtual reality exergame prototype designed to increase enjoyment, intrinsic motivation, and, consequently, adherence to cardio exercise. Drawing on principles of gamification and VR, the system aims to map real rowing input directly into a virtual

running environment. The design focuses on integrating competitive and cooperative mechanics, along with social features and narrative progression, which are commonly employed in existing exergames.

Research Centre: HumanISE
Internship Location: INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Hugo Paredes, Diogo Guimarães

S26-CSE03 Dynamic Player Profiling and Adaptive Game Elements in JellyFishGO

The citizen science project "JellyFishGO" is an adaptation of the famous game "Pokémon GO", focused on the capture of gelatinous marine organisms. The purpose of this project is, through gamification, to educate players and encourage them to contribute to the scientific community, helping to understand and prevent the issue of jellyfish bloom outbreaks. In this serious game, we aim to combine competitive and cooperative elements (such as leaderboards, point systems, teams, badges, and ranks) with two goals: to study player motivation according to Bartle's Taxonomy and to evaluate the impact of these elements on player retention and on their contributions to the scientific community. The JellyFishGO game already has a functional version, including an initial player classification system based on a questionnaire administered at first login. This questionnaire identifies the user's profile according to Bartle's taxonomy, as well as their competitive or cooperative orientation. However, this static method does not reflect the natural evolution of the player over time, nor does it adequately capture their real behaviours during interaction with the game. The goal of this project is to develop a dynamic player classification system capable of continuously updating the user's profile based on their observed in-game behaviours. This system should identify, in real time, tendencies associated with Bartle's player types (Achiever, Explorer, Socializer, Killer) and with their competitive/cooperative positioning.

Research Centre: HumanISE
Internship Location: INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Hugo Paredes, Diogo Guimarães

S26-CSE04 Event-Driven Device-to-Edge Transmission for Resource-Constrained AI Sensing

This internship will develop a small experimental benchmark for split sensing at the device-edge interface. The student will compare periodic data transmission with event-driven, neuromorphic-inspired transmission, using a lightweight on-device encoder and an edge-side classifier. The goal is to measure how much communication can be reduced while preserving useful task performance. Expected outputs are a runnable prototype, baseline comparisons, and plots showing accuracy-communication trade-offs for resource-constrained edge AI systems.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)

Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Francisco Manuel Ribeiro

S26-CSE05 Analysis of the impact of video genres in user viewing behaviour

Immersive multi-view streaming enables users to explore interactive 360-degree environments, offering highly engaging and personalized experiences. A significant technical challenge lies in selecting the most relevant viewports in real time, which is essential for minimizing latency and maximizing Quality-of-Experience (QoE). Video content genre strongly influences user viewing behaviour, as different genres elicit distinct attention patterns and focal points. Integrating genre-specific insights into predictive models can improve viewport selection accuracy, allowing streaming systems to prefetch the most relevant content efficiently and adapt dynamically to user interests. This project aims to develop a bespoke genre-based dataset capturing user viewing patterns across different content types, providing a foundation for both model training and future research. This approach enables more accurate and efficient viewport prediction, paving the way for optimized, genre-aware immersive streaming solutions.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: In-person
Internship Duration: 5 weeks
Supervisors: Tiago Soares da Costa

S26-CSE06 Web-based visualizer for ONNX-Flow

ONNX-Flow is a compiler framework written in TypeScript for analysing and manipulating ONNX graphs. ONNX is an open format for representing machine learning models. Internally, ONNX-Flow uses Cytoscape, a JavaScript library for representing graphs.
There are already ONNX visualizers, such as Netron.app, however they only support the standard ONNX format. In this internship we would like to develop a graph visualizer (and possibly editor) that supports ONNX-Flow internal format, based on Cytoscape. Since ONNX-Flow is currently being used to optimize graphs and apply complex transformations, it would be beneficial to have a visualizer that could seamlessly integrate with the current framework. You will develop ONNX-Flow Explorer, an interactive dashboard that lets researchers see exactly how an AI model transforms step-by-step. You will build a UI that integrates seamlessly with our compiler, allowing users to inspect nodes and track transformation history. Join our lab to build the ONNX-Flow Explorer and gain hands-on experience with modern frontend tech and graph visualization!

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: João Bispo, José Ferreira

S26-CSE07 Robotair - Summer Internship in On-premises Infrastructure for Robotics

Join the Robotair (robotair.io) project at INESC TEC as an On-premises Infrastructure intern and help us improve the Robotair infrastructure to safely serve robotic software at scale to robotic fleets! You will develop and integrate new components into the Robotair platform, implementing a robust air-gapped methodology for serving containerized applications and configuration artifacts. You will work with cutting-edge technologies — Linux, Docker — in an innovative architecture ensuring maximum security and data control.

Ideal for BSc or MSc students passionate about infrastructure, Linux, and Docker. We are looking for someone with a genuine desire to learn and contribute to innovation. Gain valuable practical experience while working in a dynamic team.

Research Centre: CRIIS
Internship Location: INESC TEC FEUP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 5 weeks
Supervisors: Rafael Arrais, Pedro Melo

S26-CSE08 Robotair - Summer Internship in Frontend Development

Join the Robotair (robotair.io) project at INESC TEC as a Frontend Development intern and dive into cutting-edge web technologies!

You will work with our React-based frontend application, gaining practical experience in developing new components and collaborating with an experienced team to identify and fix bugs. This internship offers a unique opportunity to enhance CSS skills and explore UI/UX design principles. Ideal for BSc or MSc students curious about frontend development. This role will allow you to contribute to an innovative platform that revolutionizes the implementation of robotic software. Apply now to start your career in technology!

Research Centre: CRIIS
Internship Location: INESC TEC FEUP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 5 weeks
Supervisors: Rafael Arrais, Pedro Melo

S26-CSE09 Robotair - Summer Internship in MCP Server Development for LLM Integration

Join the Robotair (robotair.io) project at INESC TEC and be part of developing the core of our secure API communication! As an MCP Server Development intern, you will build a server that securely connects to Robotair's API endpoints on behalf of users, ensuring fine-grained access control. You will design how AI agents request access, displaying exactly which resources will be available upon user consent, and manage secure API interactions. This is perfect for BSc or MSc students passionate about backend development, AI, and cloud to gain hands-on experience in authentication workflows, scalable service design, and LLMs.

Research Centre: CRIIS
Internship Location: INESC TEC FEUP

Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 5 weeks
Supervisors: Rafael Arrais, Pedro Melo

S26-CSE10 Robotair - Summer Internship in Chaos Engineering for Robotics

Join the Robotair (robotair.io) project at INESC TEC and help us build resilience into our robotic platform! As a Chaos Engineering intern, you will develop automated failure injection tools to test Robotair's ability to withstand real-world failures.
You will build a CLI tool to simulate network partitions, agent crashes, and API timeouts. You will integrate chaos testing into our CI/CD pipeline, creating automated resilience tests that run on every deployment. This work will identify hidden dependencies before they impact production fleets. Ideal for BSc or MSc students passionate about distributed systems and reliability engineering. We are looking for someone with strong programming skills and a desire to build robust systems.

Research Centre: CRIIS
Internship Location: INESC TEC FEUP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 5 weeks
Supervisors: Rafael Arrais, Pedro Melo

S26-CSE11 The AI Scout: Speculative Design of a Human-AI Interface for Collaborative Football Scouting

Stepping into football scouting can be particularly challenging since it requires analytical sensibility, continuously updated context descriptions, and understanding of player attributes and actions. Most current technological solutions do not support artificial intelligence (AI)-mediated collaboration in an effective way.
This internship invites a student to explore how AI can support collaborative scouting practices. The student will engage with emerging concepts in human-AI interaction, experiment with low-fidelity prototypes, and help envision tools that enhance analysis and improve decision-making. The project emphasizes transparency, explainability, and real-world applicability, providing hands-on experience at the intersection of sports analytics and AI-driven system design.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Dennis Lourenço Paulino, António Correia, Hugo Paredes

S26-CSE12 Development of Web-Based Cognitive Training Mini-Games (CognitiveTrainingToolkit)

This project focuses on developing three web-based mini-games for cognitive training within a shared platform. The games will be designed according to clinical principles and tailored for older adults, ensuring simple interaction and progressive difficulty levels. Performance metrics will be collected and integrated into the platform’s modular architecture. The goal is to provide reusable components supporting multiple cognitive domains.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Dennis Lourenço Paulino, Andre Thiago Netto, Hugo Paredes

S26-CSE13 A Java Interpreter for a Low-level IR for Object-Oriented Programming

This internship proposes developing a Java-based interpreter for OLLIR (Object-Oriented Low-Level Intermediate Representation). OLLIR is a three-address code-based IR supporting OOP features, currently used in the Compilers curricular unit. In its current status, students must wait until the final stages of the semester—when they generate Java bytecodes—to verify if their generated OLLIR code executes correctly. This delay hinders rapid feedback and iterative learning. The core objective of this project is to design and implement a standalone interpreter capable of directly executing OLLIR code. This will empower OLLIR users to immediately test and debug their intermediate representations, significantly improving the pedagogical experience and workflow.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Tiago Carvalho, João Bispo

S26-CSE14 A Semantic Analysis Compiler Pass for a Low-level IR for Object-Oriented Programming

This project focuses on building a robust semantic analyser for OLLIR (Object-Oriented Low-Level Intermediate Representation). As a three-address code IR supporting OOP languages like Java, OLLIR is a fundamental component of the Compilers curricular unit. At its present state, semantic validation within the OLLIR ecosystem is highly limited, operating under the fragile assumption that the input code is already semantically correct. This internship aims to bridge this gap by designing a comprehensive semantic analysis process. The student will implement mechanisms to validate types, variable scopes, and structural constraints, thereby guaranteeing the correctness of the IR. This process will prevent downstream errors during optimization and the final code generation phase.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Tiago Carvalho, João Bispo

S26-CSE15 A VSCode plugin for Alloy

This internship focuses on modernizing the development experience for Alloy, a prominent language and tool used by researchers for modelling and validating software designs. Currently, programming in Alloy relies heavily on a standalone JAR file with a highly limited built-in IDE. This project aims to

study and implement the integration of Alloy into Visual Studio Code. The work can be modularized to encompass three key areas: developing robust syntax highlighting, enabling direct execution of Alloy models within the VSCode environment, and integrating its graphical visualization GUI. This modernization will greatly enhance developer productivity and accessibility for the widespread community of software engineers using Alloy.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Tiago Carvalho, Nuno Macedo

S26-CSE16 ARNavAI 2.0: Indoor Navigation in AR with Multimodal Smart Guide

"Complex buildings (hospitals, universities, museums, cultural centres) remain difficult to navigate, especially for occasional visitors and users with accessibility needs. Traditional signage is static, often ambiguous, and does not adapt to the user's profile or context (e.g. urgency, available time, reduced mobility).
ARNavAI proposes an indoor navigation solution based on Augmented Reality (AR), combining visual guides (overlapping arrows/tracks), personalized AI-supported auditory instructions and, optionally, a virtual avatar/guide with adaptive behaviours. The platform also aims to be configurable for any building, through a simple mapping process (plans, POIs and routes), and collect usage data (anonymized) to identify navigation patterns and needs for improvement of signalling/flows. This project continues an existing initial version, evolving it into a more robust, demonstrable prototype ready to be applied in a real case."

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Fernando Cassola

S26-CSE17 Froddo: Decision Support Systems and Layered Dashboards for Transport Management

This project aims to develop a layered dashboard system for decision support in transport management. The solution will integrate multiple data sources, combining real-time information with predictive models based on machine learning to analyse traffic flow, congestion, and demand. Tailored interfaces will be designed for managers and authorities, enabling monitoring, analysis, and scenario simulation. The work includes architectural design, data integration, and development of interactive visualizations. The goal is to support informed decision-making, improve operational efficiency, and contribute to smarter mobility systems.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP or INESC TEC UTAD
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Dennis Lourenço Paulino, Andre Thiago Netto, Hugo Paredes

S26-CSE18 Custom RISC++ Instructions for Nonlinear AI Operators

Many AI workloads are not only dominated by matrix operations, but also by simple nonlinear functions (e.g., exp, activation functions) that are slow to execute in software. RISC-V allows adding custom instructions, and in this project we use RISC++, an in-house RISC-V core written in C/C++ and synthesized to hardware, which makes such extensions easier to prototype. This internship focuses on adding one or two simple custom instructions for nonlinear operations (e.g., exp approximation or part of GELU), and evaluating their benefit compared to standard software implementations. The objective is to demonstrate more efficient execution of operations which are common in AI models.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Nuno Paulino, Guilherme Oliveira

S26-CSE19 Lightweight Streaming Support for RISC++

Many programs spend a lot of time moving data between memory and the processor instead of doing useful computation. While RISC-V is flexible, it does not include simple mechanisms to efficiently support this kind of data streaming. In this project, we use RISC++, an in-house RISC-V core written in C/C++ and synthesized with HLS, which allows quick hardware modifications. This internship builds on an existing basic streaming mechanism and extends it with improvements, such as support for multiple streams, configurable strides, or simple loop integration. The goal is to evaluate how these additions improve performance on small loop-based kernels.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Nuno Paulino, Guilherme Oliveira

S26-CSE20 Real-Time Localization Integration with Digital Twins

Real-Time Location Systems (RTLS) are increasingly used to track assets and processes in smart environments. In this internship, students will develop a simple pipeline that connects an RTLS system to a virtual machine (VM), which processes and forwards location data to a digital twin platform. The goal is to demonstrate a minimal but functional integration between physical tracking systems and digital representations, working towards industrial RTLS + digital twin solutions.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Nuno Paulino, Francisco Vilarinho

S26-CSE21 Immersive Digital Twin of the Ocean for Oil Spill Response (NVIDIA Omniverse)

"Oil spills at sea are events of high environmental and economic significance, requiring a rapid response, coordination among agencies, and the ability to anticipate the spatial and temporal evolution of the oil slick. Relevant information (observations, forecasts, reports, maps) is often scattered and presented in a non-intuitive manner, hindering situational awareness and communication among teams. A prototype of a digital twin of the ocean with immersive (3D) visualization can make this entire process clearer, facilitating the analysis and exploration of "what if…?" scenarios and supporting training and operational briefings.

This project aims to explore the potential of the NVIDIA Omniverse platform, which allows for the creation of interactive 3D environments that can be integrated with data sources and simulation, providing a suitable technological context for experimenting with real-time visualization, integration, and interaction.

Stakeholders: maritime/environmental authorities, civil protection, port operators, emergency response teams, researchers, and students.

This project builds upon an existing initial version, evolving it into a more robust, demonstrable prototype ready for application in a real-world scenario."

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Fernando Cassola

S26-CSE22 Immersive Digital Twin of the Ocean for Oil Spill Response (Vibe Coding)

"Oil spills at sea are events of high environmental and economic criticality, requiring a rapid response, coordination among agencies, and the ability to anticipate the spatial and temporal evolution of the oil slick. Relevant information (observations, forecasts, reports, maps) is often scattered and presented in a non-intuitive manner, hindering situational awareness and communication among teams. A prototype of a digital twin of the ocean with immersive (3D) visualization can make this entire process clearer, facilitating the analysis and exploration of "what if…?" scenarios and supporting training and operational briefings.

This project aims to explore the potential of "vibe coding": rapid, iterative development supported by an agent-first IDE—Google Antigravity—where agents can plan, implement, and validate features by interacting with an editor, terminal, and browser, while keeping the user in control through review and approval.

The project also explores best practices for security and trust when using agents with access to commands and the file system, a relevant topic given the semi-autonomous nature of these tools.

Stakeholders: maritime/environmental authorities, civil protection, port operators, emergency response teams, researchers, and students."

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks

Supervisors: Fernando Cassola, Vitor Cavaleiro

S26-CSE23 Refinery in 360°: From GALP's "Digital Archive" to Immersive Experiences

"GALP digitized its former Matosinhos Refinery (Leça) prior to its dismantling, creating a rare record of high historical and technical value: (i) a set of 3D survey materials using laser and aerial scanning technologies (both mobile and stationary modes) and (ii) 360° video recordings at ground level, pre-processed and converted to MP4.

This type of content can support relevant practical applications: industrial training and safety, team onboarding, heritage preservation, remote inspection, intervention planning, storytelling/museology, and immersive experiences for internal/external communication. However, to derive real value, it is necessary to (1) understand the structure and quality of the files, (2) assess what is technically feasible with different approaches (web, VR/AR, 3D reconstruction), and (3) propose a set of use cases with cost-benefit analysis and a roadmap.

There is an INESC TEC–GALP agreement to analyse a sample of these materials, produce a report on possibilities, and, if possible, develop demonstrators/pilots in a small portion of the area (exploration period).

This project transforms this real-world challenge into a student project, focusing on engineering (pipeline, visualization, UX, validation) and communication of results"

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Fernando Cassola

S26-CSE24 ProjectPilot: Your Local Co-Pilot for European Projects

"European projects (e.g., Horizon Europe/EDF) require ongoing management of large volumes of information: proposals, DoA/GA, deliverables, meeting minutes and notes, emails, work plans, risks, evidence, and periodic reports. This information is scattered across various platforms (Drive/SharePoint, email, Teams/Zoom, personal notes), making it time-consuming to search for, track, and draft deliverables that are coherent and aligned with what was agreed upon.
At the same time, much of this content is sensitive (internal data, partners, budget, decisions), which makes it difficult to use "cloud" assistants due to confidentiality and compliance issues (e.g., GDPR and institutional policies).

The project proposes creating a local, private, project-specific LLM that functions as a "technical assistant" and "co-author" for the project manager: it responds based on project documents, helps draft reports/deliverables, and organizes follow-ups and actions, while maintaining control and audit trails over the sources used.

This project builds upon an existing initial version, evolving it into a more robust, demonstrable prototype ready for application in a real-world scenario."

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks

Supervisors: Fernando Cassola, Carlos Duarte

S26-CSE25 Development of the INESC TEC BLUE-X European project website to showcase scientific and technological results

The BLUE-X European project has been producing a significant set of scientific, technological, and demonstrator-oriented results within the research activities carried out by INESC TEC. This internship proposal aims to engage a student in the development of the project's official website, creating a modern, well-structured, and visually appealing digital platform capable of clearly communicating the project's impact and key outcomes.

Throughout the internship, the student will contribute to defining the website structure, organizing and curating content, and implementing web components to showcase scientific publications, posters, presentations, software, prototypes, and demonstrators developed within the project. The work may also include designing the user experience, integrating content repositories, and applying good practices in usability, accessibility, and scientific communication.

More than simply building a website, the intern will have the opportunity to help shape the digital identity of a European research project, transforming technical and scientific results into accessible, engaging, and relevant content for different audiences, including partners, researchers, stakeholders, and society at large.

This internship offers a highly valuable hands-on experience at the intersection of web technologies, scientific dissemination, and digital innovation, allowing the student to work in a real-world setting with INESC TEC researchers and contribute to a strategic asset for the visibility and impact of the BLUE-X project.

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Fernando Cassola, Marco Oliveira

S26-CSE26 DashGEN: Integrated web platform for the online deployment of a dynamic dashboard generation system

This internship proposal aims to turn an existing technological project developed by student teams into an online, usable platform by consolidating the frontend and backend modules created in previous initiatives into a single integrated solution. The existing system was designed to enable non-technical users to create dynamic, configurable dashboards adaptable to different types of data and application contexts, leveraging intuitive interfaces, integration with multiple data sources, and flexible configuration mechanisms.

The main challenge of the internship will be to build upon this promising foundation and bring it to a new level of maturity, integration, and visibility. The student will analyse the existing components, strengthen the connection between frontend and backend, adapt functionalities, structure the solution for online deployment, and prepare a cohesive and demonstrable version of the platform. The work may also include improvements in user experience, information organization, technical documentation, and the preparation of demonstration scenarios that highlight the platform's value.

This is a particularly attractive opportunity for students interested in full-stack web development, data visualization, systems integration, and the creation of digital products with real-world impact. Rather than developing an isolated prototype, the student will have the opportunity to work on concrete

outputs already produced, contributing to their evolution, operationalization, and valorisation as a technological asset. The expected outcome is a functional online platform that demonstrates the potential of a flexible approach to dashboard creation and that can serve as a basis for future extensions, demonstrations, and research and innovation initiatives.

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Fernando Cassola, Marco Oliveira

S26-CSE27 Extension for Data Streaming Support in IDSA Connectors

This summer internship aims to develop a prototype extension for a connector compliant with the International Data Spaces Association (IDSA), focusing on enabling data streaming between two connectors within a dataspace environment.
The work will be carried out in Java and will focus on implementing a simplified data streaming mechanism, exploring alternatives to the currently supported traditional data transfer models.
The internship will be centred on the development of a proof of concept (PoC), including the design, implementation, and validation of a functional solution in a controlled environment.
Main Objectives:
- Analyse the baseline architecture of an existing IDSA connector
- Identify extension points to support data streaming
- Implement a simple streaming mechanism
- Develop a functional prototype for communication between two connectors
- Validate the solution through a demonstrator use case

Candidate Profile:
- Bachelor's or Master's student in Computer Engineering or a related field
- Knowledge of Java programming
- Interest in distributed systems and system integration

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Marco Amaro Oliveira, Carlos Eduardo Duarte

S26-CSE28 Interactive UI for Application Packages

This internship proposes the development of a web interface for the visualization and interaction with Application Packages based on the Common Workflow Language (CWL), integrated into an existing catalog. The main objective is to design a User Interface (UI) capable of interpreting and representing, in a structured and interactive way, tools and workflows described in CWL.

The solution involves implementing a parsing mechanism for Application Packages, enabling the extraction of metadata and dependencies between components, and their representation through a graph editor/viewer. This approach will allow users to understand workflow topology, explore relationships between steps, and potentially edit or compose new Application Packages.

The frontend component will be developed using TypeScript/JavaScript and the React library, following a modular and extensible architecture. Graph visualization libraries will be evaluated and integrated to support functionalities such as navigation, editing, and structural validation of workflows.

This work will contribute to improving the usability and accessibility of the Application Packages catalog, promoting a more intuitive interaction with complex pipelines and facilitating their reuse in scientific and computational contexts.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Miguel Correia, Marco Oliveira, João Campos

S26-CSE29 The Cheater's Shadow: Persistent Underrating in Competitive Rating Systems

Rating systems such as Elo or TrueSkill are used to balance competitive interactions between users according to their skill level. A reliable system should converge quickly to each player's true skill value. However, cheating can distort these systems in ways that persist even after cheaters are detected and removed — causing the system to converge to a distribution different from the real one. The underrating effect caused by cheaters may propagate through the player network, but it is unclear whether it depends on the proportion of cheaters, the population size, or the architecture of the system itself. This internship investigates these questions through computational simulation.

Research Centre: LIAAD
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Renato Soeiro

S26-CSE30 UI for Data Access Policy Definition in Data Spaces

This summer internship aims to study and develop a prototype user interface (UI) for defining data access policies in the context of data spaces, with a focus on improving their readability and usability for human users.
The work will focus on the design and implementation of an interface that enables intuitive policy definition, abstracting the complexity of the underlying policy languages and models typically used in this domain.
The internship will be centred on the development of a proof of concept (PoC), including requirements analysis, interface design, implementation of core features, and validation using example policies.
Main Objectives:
- Analyse existing policy models and languages (e.g., in the context of data spaces)
- Identify usability and readability challenges in policy definition
- Design a user interface for intuitive policy creation
- Implement a functional UI prototype

- Validate the approach using example policies and usage scenarios

Candidate Profile:

- Bachelor's or Master's student in Computer Engineering or a related field
- Knowledge of web interface development (e.g., HTML, CSS, JavaScript)
- Interest in usability, human-computer interaction, and/or distributed systems

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Marco Amaro Oliveira, Carlos Duarte

S26-CSE31 Modernization of Kadabra, a Source-to-Source tool for Java

This internship involves the reconstruction of Kadabra, a Java-to-Java compilation tool dedicated to code instrumentation and transformation, controlled by the LARA framework. Over time, Kadabra's development has stalled, leaving it outdated compared to modern LARA tools like Clava. It currently suffers from limited operability, inconsistent naming conventions, and a severe lack of documentation. With a recent resurgence of interest in Java code transformation, it is imperative to revitalize this tool. The intern will refactor Kadabra to meet current architectural standards, align it with the broader LARA ecosystem, and introduce advanced features that expand its capacity for sophisticated, automated transformations over Java codebases.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Tiago Carvalho, Luís Sousa

S26-CSE32 Experiments on Java Bytecode Manipulation

This internship proposes an exploratory project focused on runtime Java bytecode manipulation. The primary objective is to enable the dynamic adaptation of Java applications without requiring traditional source-code recompilation or application restarts. The intern will conduct hands-on experiments to investigate the potential of this technique, specifically exploring advanced methods such as direct constant pool manipulation and on-the-fly structural bytecode changes. By the end of the internship, the student should deliver a prototype that demonstrates these capabilities. Furthermore, the project includes developing concrete examples showcasing how runtime manipulation can be leveraged for system optimization.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Tiago Carvalho, João Cardoso

S26-CSE33 UX Evaluation of the Apploy Web Platform

Apploy is a web application focused on the discovery, deployment, and execution of Application Packages based on the Common Workflow Language (CWL), enabling the seamless integration of multiple catalogs and execution infrastructures. The platform abstracts the complexity associated with workflow orchestration, promoting interoperability across different computational pipelines. Despite its functional robustness and architectural flexibility, user experience (UX) plays a critical role in the platform's adoption and efficiency, particularly in scientific and technical contexts.
This proposal aims to conduct a systematic evaluation of Apploy's UX, using both quantitative and qualitative methodologies. The goal is to identify friction points in interaction flows, usability issues, and cognitive barriers associated with workflow navigation, configuration, and execution. Techniques such as heuristic evaluation, usability testing with representative users, and interaction metrics collection will be applied.
Expected outcomes include the identification of critical issues in the user experience and the formulation of evidence-based recommendations to improve the interface and interaction flows. This work will contribute to enhancing the efficiency, accessibility, and adoption of Apploy, aligning its technical complexity with user-centred design principles.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Miguel Correia, Marco Oliveira, João Campos

S26-CSE34 Design and Implementation of Frontend and Backend Testing Strategies

There is a web-based system focused on the discovery, deployment, and execution of Application Packages based on the Common Workflow Language (CWL), enabling the seamless integration of multiple catalogs and execution infrastructures. The platform abstracts the complexity associated with workflow orchestration, promoting interoperability across different computational pipelines.
Within the context of this internship proposal, the main objective is the design and implementation of a comprehensive testing strategy for both the frontend (FE) and backend (BE) layers of the application. At the backend level, emphasis will be placed on the creation of unit and integration tests to validate the correct handling of Application Packages, authentication mechanisms, as well as communication with external services. At the frontend level, the focus will be on implementing automated tests to ensure the robustness of the user interface, including component testing, interaction flows, and application state validation.
Additionally, the goal is to define continuous integration (CI) pipelines that ensure the systematic execution of tests, contributing to improved software quality, early detection of regressions, and increased overall reliability of the platform.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Miguel Correia, Marco Oliveira, João Campos

S26-CSE35 Towards European Data Sovereignty: A State-of-the-Art Analysis of the Gaia-X Initiative

Data sovereignty and federated cloud infrastructure have become critical concerns for European organisations, yet the fragmented landscape of proprietary cloud ecosystems makes interoperability and trust difficult to achieve at scale. Existing solutions are often vendor-locked, lack transparent governance structures, and fall short of the regulatory and sovereignty requirements increasingly demanded across both public and private sectors. This internship project proposes a comprehensive state of the art report on the Gaia-X initiative, examining how its technical standards and architecture have evolved since its launch, how organisations across academia and industry are adopting and implementing its frameworks in practice, and how its governance model has responded to political, institutional and market pressures over time. The report will further contextualise Gaia-X within the broader competitive landscape, benchmarking it against alternative data space and cloud federation initiatives. The outcome will be a structured, evidence-based reference document supporting ongoing research and applied projects at the intersection of digital sovereignty, cloud interoperability, and European data policy.

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Carlos Duarte, Marco Amaro Oliveira

S26-CSE36 Caching System for Optimizing External Services Communication

There is a web-based system focused on the discovery, deployment, and execution of Application Packages based on the Common Workflow Language (CWL), enabling the seamless integration of multiple catalogs and execution infrastructures. The platform abstracts the complexity associated with workflow orchestration, promoting interoperability across different computational pipelines.

This proposal aims to develop an intermediate caching mechanism between the platform and external services, with the goal of optimizing performance and reducing the load on remote APIs. The system to be developed should support caching strategies tailored to different types of data (e.g., static metadata vs. dynamic results), including cache invalidation policies, consistency control, and time-to-live (TTL) management. Additionally, the solution should ensure transparent integration with the existing architecture, minimizing changes to the platform's execution flow.

The work will include the analysis of current access patterns, the design of a caching architecture, and the implementation of a scalable and configurable solution. This approach is expected to improve the platform's overall performance, as well as enhance robustness in its interaction with external services.

Research Centre: HumanISE
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Miguel Correia, Marco Oliveira, João Campos

S26-CSE37 SIMPL in the European Context: A State-of-the-Art Review of Open Middleware for Data Spaces

Secure and sovereign data sharing across European digital ecosystems remains a significant challenge, as organisations struggle with fragmented infrastructure, limited interoperability, and the complexity of aligning with evolving EU data regulations. Existing middleware solutions are often proprietary, difficult to integrate, or insufficiently aligned with the technical and governance standards emerging from European data space initiatives. This internship project proposes a state-of-the-art report on SIMPL, the open-source middleware developed under the European Commission to facilitate interoperable data sharing across EU data spaces and initiatives. The report will analyse how SIMPL's three core components (Simpl-Open, Simpl-Labs and Simpl-Live) have evolved in terms of architecture and technical standards, how organisations from both public and private sectors are adopting and deploying the platform in practice, and how the programme positions itself within the broader Gaia-X and European data strategy landscape. The outcome will be a structured reference document supporting research and applied work at the intersection of data sovereignty, middleware interoperability, and European digital infrastructure.

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Marco Amaro Oliveira, Carlos Duarte

S26-CSE38 Analysis of the IDS Ecosystem in Data Spaces: From Reference Architecture to Practical Implementation

Trusted and sovereign data sharing across organisational and national boundaries has become a cornerstone of Europe's digital economy ambitions, yet the lack of globally recognised standards continues to hinder interoperability and cross-sector collaboration. Proprietary data exchange solutions offer insufficient guarantees of data sovereignty and fail to provide the legal, technical and governance consistency that organisations require to participate confidently in data-driven ecosystems. This internship project proposes a state of the art report on the International Data Spaces Association (IDSA) and its evolving standards framework, examining how key artefacts such as the IDS Reference Architecture Model, the IDSA Rulebook and the Dataspace Protocol have developed since the initiative's inception, how organisations across industries and research institutions are adopting and implementing these standards in practice, and how the governance model has responded to the growing demands of EU data regulation and international standardisation bodies. The report will further contextualise IDSA within the broader data space landscape, including its relationship with complementary initiatives such as Gaia-X and SIMPL. The outcome will be a structured reference document supporting research and applied projects at the intersection of data sovereignty, interoperability standards, and the European data economy.

Research Centre: HumanISE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Marco Amaro Oliveira, Carlos Duarte

S26-CSE39 Exploration of Memristor-Based Digital Computing Architectures

Introduction: Memristors are two-terminal devices that exhibit a programmable resistance value depending on the applied voltage or current. These devices can be used as computational elements, memory elements, or both simultaneously. Currently, the semiconductor industry faces physical limits that hinder the fabrication of smaller and more efficient transistors.
Memristor-based architectures emerge as a promising alternative for non-volatile and reconfigurable digital logic. This internship proposes the investigation of memristor-based logic architectures (IMPLY, MAGIC, and their variants).

General Objective: To develop and compare digital computing architectures based on memristors, with emphasis on the implementation of logic gates.
Specific Objectives: To conduct a systematic literature review and perform simulations of memristor-based logic architectures: IMPLY (Material Implication), MAGIC (Memristor-Aided Logic), and their variants.
Tools: SPICE simulator (LTspice or others), Python, and open-source memristor and transistor models.
Expected Results:
- A technical report including schematics, simulation results, and comparative tables.
- Demonstration of the feasibility of memristor-based digital logic.
- This internship will allow the candidate to acquire skills in electronics and reconfigurable hardware.

Research Centre: CTM
Internship Location: INESC TEC Headquarters (Porto) or INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Luís Outeiro

S26-CSE40 Evaluating and Improving Attention Atlas: A Usability Study of an Interactive Tool for AI Model Exploration

Attention Atlas is an interactive visual analytics tool for exploring attention patterns in transformer models and supporting the analysis of model behaviour, bias and interpretability.
This internship will focus on evaluating and improving the platform's usability. The student will help define representative tasks, prepare and run a small-scale usability study with target users, analyse observations, questionnaires and/or interviews, and synthesise actionable recommendations for the interface and visualisations.
Expected outputs include an evaluation protocol, a usability report, and a prioritized list of improvements.

Research Centre: CRACS
Internship Location: INESC TEC FCUP
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Álvaro Figueira, Ana Pinto

Power and Energy Systems

MORE INFORMATION

S26-PES01 Simulation-Driven Energy System Sizing for Self-Sufficient vElectrified Container Terminals

During this internship, the electrification of container terminals will be investigated as a pathway to reduce emissions and improve operational efficiency, addressing the limitations of conventional planning approaches in capturing operational complexity and variability. A discrete event simulation (DES)-based framework integrated with simulation-based optimization will be developed to design hybrid renewable energy systems (HRES) combining photovoltaic (PV), wind power, and battery energy storage (BESS). By evaluating multiple demand scenarios, the work will identify cost-effective solutions and analyse trade-offs between system cost, performance, and self-sufficiency, providing insights for robust terminal electrification strategies.

Research Centre: CPES
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Adrian Galvez, João Almeida

S26-PES02 Power Flow and Contingency Analysis for Hosting Capacity Assessment in Transmission Networks

This internship focuses on power flow and contingency analysis in transmission networks to assess hosting capacity for large electricity consumers. The student will develop skills in modelling aggregated loads, running steady-state simulations, and performing N-1 contingency studies using industry tools such as PSS®E or DIgSILENT PowerFactory. The work includes identifying network constraints, analysing voltage and thermal limits, and estimating available capacity for new connections. When relevant, results will be compared with data-driven or AI-assisted approaches under development at INESC TEC, providing insight into their advantages and limitations.

Research Centre: CPES
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Ignacio Hernando Gil, Mikka Kisuule

Photonics

MORE INFORMATION

S26-PHO01 Theoretical Modelling of Nanoparticle-Induced Plasmon Resonances

- Develop and expand the theoretical framework of nanoparticle-induced surface plasmon resonances (NPI-SPR).
- Analyse the influence of nanoparticle–film geometry, orientation, and separation distance on plasmonic hybridization phenomena.
- Relate near-field distributions to far-field emission patterns.
- Study Green's tensor–based methods and their application in nano-optics.
- Derive simplified models for plasmonic coupling in nanoparticle–film configurations.
- Support the validation of theoretical predictions with experimental results.

Research Centre: CAP
Internship Location: INESC TEC FCUP
Type of Internship: In-person
Internship Duration: 4 weeks
Supervisors: Paulo Sérgio Soares dos Santos, Luis Coelho, João Pedro Mendes

Robotics

MORE INFORMATION

S26-ROB01 Floating systems behaviour and Mooring analysis

This internship proposal focuses on the hydrodynamic behaviour of floating systems and the structural integrity of mooring configurations over a five-week period. Utilizing the DNV Sesam software suite, the intern will perform comprehensive time-domain analyses to evaluate platform offsets, tether tensions, and environmental response under various sea states. The scope includes establishing numerical models in GeniE and HydroD, followed by coupled motion-mooring simulations in DeepC or SIMA to capture non-linear effects and transient loads. By comparing different mooring arrangements, the program aims to optimize system stability and safety. This intensive training will bridge theoretical naval architecture with offshore engineering industry standards.

Research Centre: INESCTEC.OCEAN
Internship Location: INESC TEC ISEP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 5 weeks
Supervisors: Diogo Rúben Castelo Branco das Neves, Dallán Friel

S26-ROB02 Unmanned Aerial Heavy-Lift Operations in Maritime Environments: Design, Prototyping and Integrated Flight Control

This internship proposal is aimed at students interested in unmanned aerial systems (UAS) and their application in demanding maritime environments. The project focuses on the development of a thruster-based navigation and stabilization system for unmanned aerial platforms designed to transport heavy cargo loads exceeding 100 kg in offshore and coastal operations. Maritime logistics present unique challenges, including strong and unpredictable winds, saltwater corrosion, limited landing infrastructure, and moving platforms such as ships or offshore installations. To address these constraints, the internship will explore propulsion-assisted navigation strategies that enhance stability, manoeuvrability and precision during take-off, flight and landing phases.

Students will be involved in the conceptual design, modelling and prototyping of a system that integrates distributed thrusters for active stabilization and control. A key component of the project is the development of an advanced flight control architecture, incorporating real-time telemetry, sensor fusion (e.g., IMU, GPS, and environmental sensors) and adaptive control algorithms tailored to maritime conditions.

The internship will culminate in the development and testing of a functional prototype, validated through experimental trials that simulate realistic maritime operating conditions. This project provides hands-on experience in multidisciplinary aerospace engineering fields, including propulsion systems, control engineering, embedded systems and experimental validation, while addressing real-world challenges in offshore logistics, search and rescue support, and maritime cargo transport.

Research Centre: CRAS
Internship Location: INESC TEC FEUP
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Andry Maykol Pinto, Daniel Campos, Rafael Claro

S26-ROB03 Robotair - Summer Internship in Robotics and DevOps

Join the Robotair (robotair.io) project at INESC TEC as a Robotics and DevOps intern and help us improve the Robotair solution by enabling automatic containerization of robotic software and its delivery at scale to robotic fleets!

You will integrate newly-developed components and expand existing functionalities of the Robotair platform, enabling users to intuitively customize the solution according to their robotic applications' needs. You will work with cutting-edge technologies on an innovative project with real impact. Ideal for BSc or MSc students passionate about robotics (ROS), Linux, and DevOps. We are looking for someone with a genuine desire to learn, contribute to innovation, and make a difference. Gain valuable practical experience while working in a dynamic team.

Research Centre: CRIIS
Internship Location: INESC TEC FEUP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 5 weeks
Supervisors: Rafael Arrais, Pedro Melo

S26-ROB04 Robotair - Summer Internship in Robotics and Communications

Join the Robotair (robotair.io) project at INESC TEC as a Robotics and Communications intern and help us build a communication layer for the Robotair solution to enable asynchronous communications and remote access to robotic fleets.

You will develop a robust asynchronous communication layer, enabling agents in a fleet to communicate independently with the Robotair platform. Additionally, you will implement secure remote access capabilities, enabling execution of terminal commands and diagnostics — critical features for efficient operations.

Ideal for BSc or MSc students passionate about Linux, systems architecture, and back-end technologies. We are looking for someone with a genuine desire to learn and make a difference. Gain valuable experience in a dynamic team.

Research Centre: CRIIS
Internship Location: INESC TEC FEUP
Type of Internship: Remote (w/ minimum attendance)
Internship Duration: 5 weeks
Supervisors: Rafael Arrais, Pedro Melo

Systems Engineering and Management

MORE INFORMATION

S26-SEM01 Operational and Strategic Optimisation of Technology Transfer Office Activities

This project aims to analyse and optimise the organisational and operational model of a Technology Transfer Office (TTO), focusing on workload management, task prioritisation and value creation across the technology lifecycle. The student will apply management frameworks such as process mapping, portfolio management and performance metrics (KPIs, OKRs), to assess current practices and propose improvements at both team and individual levels. The outcome will be a structured proposal to enhance efficiency, strategic alignment and technology valorisation impact.

Research Centre: TTO
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: João Miguel Ferreira da Rocha, Ana Rita Rego Lopes

S26-SEM02 A Data-Driven Approach to Identifying Spatial Determinants for Last-Mile Parcel Locker Planning

This project aims to optimise parcel locker location planning to support efficient and sustainable e-commerce delivery operations. To this end, the urban environment surrounding these parcel lockers will be spatially characterised, and then the key determinants of demand variability will be identified. Multiple open data sources, such as OpenStreetMap, will be integrated into a Geographic Information System (GIS) framework to extract and quantify a set of variables, such as land use, population density, points-of-interest, and mobility patterns. The lockers will be evaluated for multiple accessibility zones (e.g. using the 15-minute city concept), and statistical analysis will be conducted to identify the most significant predictors of demand for each parcel locker. The Porto Metropolitan Area will serve as the case study.

Research Centre: SYSTEM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Tânia Fontes, Vasco Silva

S26-SEM03 Mapping Sustainability and Impact Measurement Frameworks: A Market and Ecosystem Intelligence Analysis for Companies and Social Economy Organizations

This internship project, developed in collaboration with the Enterprise Europe Network (EEN) Local Point at INESC TEC, focuses on the mapping and systematic review of sustainability and impact measurement frameworks applicable to companies and social economy organizations. Through a market and ecosystem intelligence analysis, the research will identify tools, methodologies, standards, initiatives, and indicators used to assess environmental, social, and economic impact across Portugal, the European Union, and globally. The project will also include stakeholders and initiative mapping, highlighting key actors and events that promote sustainable innovation and impact measurement.

Research Centre: CITE
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Cristina Barbosa, Cristina Machado Guimarães

S26-SEM04 Interpretation of Responsible Innovation Self-Assessment Results Using Large Language Models

Responsible Innovation should extend beyond conceptual awareness and be effectively integrated into the daily practices of researchers and innovation project managers. Innovation processes are expected to be assessed against multiple dimensions, such as ethics, societal impact, inclusion, and sustainability.

Starting from a dataset generated by an online Responsible Innovation self-assessment tool, this internship project aims to explore artificial intelligence approaches, particularly Large Language Models (LLMs), to support the interpretation of qualitative data. The work will focus on extracting insights, identifying patterns, and synthesising key findings from the data, contributing to a more meaningful understanding and communication of Responsible Innovation practices.

Research Centre: CITE

Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 4 weeks
Supervisors: Cristina Machado Guimarães, Cristina Barbosa

S26-SEM05 manuFORESTS Framework - Modelling and simulating carbon negative value-chain - examples

The planet is currently facing a decisive moment regarding the ability to take clear actions capable of mitigating the effects of climate change and its harmful effects on the health and lives of millions of inhabitants. The massive volume of greenhouse gas emissions into the atmosphere has caused an imbalance in the macro-equilibrium of the planet's surface temperature, which is trending upwards and leads to climate changes that pose a high risk to human health and well-being. It is therefore imperative to decarbonize the economy, mitigating greenhouse gas emissions on the one hand, but also developing disruptive and innovative ways to make processes and products carbon-negative, that is, to develop value chains capable of sequestering atmospheric CO2 (or CO2 from emitting sources), acting towards regenerative production.

This short-term stage aims to test the newly developed manuFORESTS© Framework by INESCTEC/FEUP, which is based on a carbon-negative value chain simulation model. The "Forest-Factory" concept was developed within the emerging paradigm of Regenerative Manufacturing, which aims to generate positive impacts on the life cycle of the manufactured product (namely carbon sequestration). In the forest area, which is intended to consist of selected permanent species capable of long-term carbon sequestration, approaches and best practices for factory management and operations are considered, as well as the applicability of advanced and low-carbon technologies. In the factory area, for product manufacturing, processes are modelled and simulated in order to reduce resource consumption and CO2 and pollutant emissions
.
The focus of the internship is to collect information and data from the literature in order to model and simulate, using the manuFORESTS Framework, other forest or agroforestry species, in order to obtain raw material (carbon negative) conducive to the design and manufacture of carbon negative or neutral products. The simulation models integrate Systems Dynamics (long series) and Discrete Event Simulation (process modelling) models. Two examples under consideration for the studies are: pine resin and Japanese cedar wood.

The internship thus comprises an enrichment of the student's knowledge with contact with research in the emerging paradigm of Regenerative Manufacturing and original innovative solutions from INESC TEC /FEUP in this area. In addition, you will have practical training in advanced simulation tools (Systems Dynamics and Discrete Event Simulation) and will contribute to new cutting-edge results in the state of the art of this scientific area.

Research Centre: SYSTEM
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: Hybrid
Internship Duration: 5 weeks
Supervisors: Antonio Baptista, Romão Santos, António Torres Marques

S26-SEM06 Optimising Technology Information Extraction in the TTO with AI and Automation

This internship focuses on improving how the TTO retrieves and uses critical technology-related information stored in a single Excel file with a large volume of data. The student will gather requirements with the team, map key use cases, and develop a solution to support tasks such as retrieving key dates for active patent families, annual cost estimates, and technology data for communication, valorisation, and exploitation activities. An LLM-based approach may be explored, or alternatively an advanced Excel optimisation solution.

Research Centre: TTO
Internship Location: INESC TEC Headquarters (Porto)
Type of Internship: In-person
Internship Duration: 4 weeks
Supervisors: Ana Rita Rego Lopes, João Miguel Ferreira Rocha