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PESSOA

Harnessing AI at Universidade Fernando Pessoa: Driving Innovation Across Diverse Domains

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EU4EU Staff Mobility
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Overview of AI Research at UFP (since 2022)

PROJECTS

2 ongoing

2 completed

4 recent applications

Portugal:

- Associação do Instituto Superior Técnico para a Investigação e o Desenvolvimento
- Autoridade Nacional de Emergência e Proteção Civil
- EGITRON
- Instituto Português do Mar e da Atmosfera
- LNEC - Laboratório Nacional de Engenharia Civil
- PIEP - Pólo de Inovação em Engenharia de Polímeros
- RISE - Rede de Investigação em Saúde
- Sirplaste - Sociedade Industrial de Recuperados de Plásticos
- Universidade de Aveiro
- Universidade do Porto (Faculdade de Engenharia, Faculdade de Letras, Laboratório de Inteligência Artificial e Ciência de Computadores)

Brazil:

- Universidade Estadual de Campinas (Instituto de Filosofia e Ciências Humanas)
- Universidade Estadual de Goiás

Italy:

- Global Earthquake Model Foundation

Mozambique:

- Universidade Eduardo Mondlane (Escola de Comunicação e Artes)

USA:

- California SimCenter AI group
- Humanitarian OpenStreetMap Team
- SafeHub

SAFENET - Seismic Risk Assessment for Transportation Networks

- **Duration:** 01 January 2023 – 30 June 2024
- **Proponent institution:** Universidade do Porto (Faculdade de Engenharia)
- **Participant institutions:** Fundação Ensino e Cultura Fernando Pessoa, Associação do Instituto Superior Técnico para a Investigação e o Desenvolvimento
- **Stakeholders:** Relevant national stakeholders, Humanitarian OpenStreetMap Team + California SimCenter AI group (Berkeley and Stanford University) (ensure the scientific quality and credibility of the outcomes)
- **Funding entity:** Fundação para a Ciência e a Tecnologia

- **Description:** This project intends to establish a unique framework using machine learning techniques and big data to address the issues in seismic risk assessment for transportation networks, using a dynamic open-source platform that will integrate seismic risk analysis tools, traffic simulation, population dynamics in the Lisbon district and the southern area of Portugal (case studies).
- **Key findings and contributions to the field:** By integrating machine learning techniques and big data, the project will provide more accurate risk assessments for transportation networks, informing decision-making and disaster risk reduction measures.
- **Impact of the project:** It will support decision-makers in developing and implementing strategies to mitigate the impact of earthquakes on transportation infrastructure, ultimately fostering sustainable development and economic resilience.

ACAMAI – Automating City Accessibility Mapping using AI

- **Duration:** 01 March 2023 – 30 September 2024
- **Proponent institution:** Fundação Ensino e Cultura Fernando Pessoa
- **Participant institutions:** Universidade do Porto (Laboratório de Inteligência Artificial e Ciência de Computadores)
- **Funding entity:** Fundação para a Ciência e a Tecnologia

- **Description:** It proposes to automate the classification of sidewalk accessibility, using street view panoramas, and deep learning techniques, leveraging labeled datasets and transfer learning; provide planners, decision-makers, and city workers with up-to-date and reliable accessibility information to improve the quality of life and cost-effective planning of intervention works in urban areas.
- **Key findings and contributions to the field:** By providing open labeled datasets and a platform for analyzing accessibility information, the project seeks to improve the accessibility of urban environments and enhance the efficiency of planning and decision-making processes.
- **Impact of the project:** Improve the quality of life for individuals with disabilities and the elderly, while facilitating more cost-effective planning and intervention works in urban areas. The project has the potential to serve as a model for other cities and contribute to the development of open standards for labeling accessibility in urban environments.

Recent Application

Precision Plastics

- **Duration:** preview 36 months
- **Proponent institution:** EGITRON
- **Participant institutions:** PIEP, Sirplaste, Fundação Ensino e Cultura Fernando Pessoa
- **Funding entity:** applied to Foundation for Science and Technology

- **Description:** It aims to create a low-density plastic detection system by combining a number of technologies, including hyperspectral spectroscopy, FTIR (Fourier-Transform Infrared Spectroscopy) and NIR (Near-Infrared Spectroscopy).
- **Key findings and contributions to the field:** Seeks to advance the field of plastic recycling by developing a robust low-density plastic detection system and a disruptive solution for online process control in recycled plastic production.
- **Impact of the project:** It aims to contribute to the transparency and efficiency of the supply chain, while ensuring product quality and resource management through innovative features and methodologies.

Recent Application

The Gender Landscape(s): Intersections of AI and Gender Dynamics in Advertising and Communication

- **Duration:** preview 18 months
- **Proponent institution:** Fundação Ensino e Cultura Fernando Pessoa
- **Participant institutions:** Instituto Politécnico de Viana do Castelo, Instituto Politécnico do Porto (Instituto Superior de Contabilidade e Administração do Porto), LabCom - Comunicação e Artes, Universidade do Minho (Centro de Estudos Humanísticos), Universidade do Porto (Faculdade de Letras)
- **Stakeholders:** Advertising agencies.
- **Funding entity:** applied to Fundação para a Ciência e a Tecnologia

- **Description:** This project explores the intersections between AI, advertising, and gender and the interdisciplinary team aims to fill gaps in the analysis of gender in AI-generated advertisements.
- **Key findings and contributions to the field:** Detecting discursive and visual bias and understanding the ethical and social implications in advertising.
- **Impact of the project:** Provide meaningful perspectives to inform future developments, with results including innovative analyses and robust ethical guidelines.

Recent Application

CULTCOOP - Culture of cooperation and cooperation through culture: complementary archives and intersecting sources. Long-term cultural and socioeconomic processes generated by openness to the world-system: slavery and the triangular trade between the 16th and 19th centuries

- **Duration:** preview 19 months
- **Proponent institution:** Fundação Ensino e Cultura Fernando Pessoa
- **Participant institutions:** Universidade Estadual de Campinas (Instituto de Filosofia e Ciências Humanas), Universidade Estadual de Goiás (Brazil), Universidade Eduardo Mondlane (Escola de Comunicação e Artes) (Mozambique)
- **Stakeholders:** Researchers, professors, and professionals in the fields of History, Archival Science, Political Science...
- **Funding entity:** applied to Instituto Camões (call “Triangular Cooperation”)

- **Description:** Create conditions for the use of resources and construction of knowledge focused on the preservation of collective memory and the creation of conditions for the development of collaborative research. It will develop a system for recording archival information based on ontologies and artificial intelligence representation techniques.
- **Key findings and contributions to the field:** Comprehensive sourcing of historical data on slavery and the triangular trade, innovative methodological approaches to data organization and preservation, and the establishment of a digital repository for research and educational purposes.
- **Impact of the project:** Facilitating triangular cooperation among Brazil, Mozambique, and Portugal, enhancing cultural understanding and knowledge exchange within the Community of Portuguese Language Countries (CPLP), and promoting research, education, and cultural development.

Recent Application

Mob4AirMon - Mobile sensing to assess personal exposure and indoor air quality

- **Duration:** preview 18 months
- **Proponent institution:** Fundação Ensino e Cultura Fernando Pessoa
- **Participant institutions:** RISE - Rede de Investigação em Saúde: do Laboratório à Saúde Comunitária, Universidade do Porto (Laboratório de Inteligência Artificial e Ciência de Computadores)
- **Stakeholders:** hospitals
- **Funding entity:** applied to Fundação para a Ciência e a Tecnologia

- **Description:** Aims to monitor indoor air quality using mobile sensors, focusing on hospitals. It seeks to develop a predictive model for air quality by collecting real-time data from wearable devices and integrating it with other factors. Also aims to compute an Air Quality Index and forecast its changes, using statistical methods like ARIMA and exploring machine learning models for improved accuracy, especially for extreme values.
- **Key findings and contributions to the field:** Utilizing mobile sensing and machine learning to enhance indoor air quality monitoring, aiming to improve health outcomes in healthcare environments and beyond.
- **Impact of the project:** The project aims to significantly impact indoor air quality monitoring in healthcare, potentially benefiting professionals, patients, and visitors by providing accurate information to support decision-making and management strategies for mitigating air pollution's adverse effects on health.

Completed Projects

AI4DRR- Artificial Intelligence for Disaster Risk Reduction

- **Duration:** 01 January 2022 – 17 November 2023
- **Proponent institution:** Fundação Ensino e Cultura Fernando Pessoa
- **Participant institutions:** Humanitarian OpenStreetMap Team, California SimCenter AI group (support)
- **Funding entity:** Fundação para a Ciência e a Tecnologia

- **Description:** It's goal was to create a prototype platform that automates the construction of exposure models for risk assessment by utilizing AI. It made use of Deep Learning techniques to estimate structural features, Google Street View API to gather photos, and OpenStreetMap to identify assets. Digital asset representations were produced by combining data with an artificial neural network.
- **Key findings and contributions to the field:** Improve the efficiency and accuracy of risk assessment studies, particularly in urban areas.
- **Impact of the project:** Enables faster and more accurate creation of exposure models for various hazards. Enhances the scalability and reliability of risk assessment studies, ultimately contributing to more effective disaster preparedness and response efforts.

Completed Projects

ASSIMILATE – Assessment of Seismic Safety Integrated with Machine Learning and Tremors

- **Duration:** 1 March 2021 – 30 March 2023
- **Proponent institution:** Universidade de Aveiro
- **Participant institutions:** Fundação Ensino e Cultura Fernando Pessoa, Universidade do Porto (Faculdade de Engenharia)
- **Stakeholders:** Autoridade Nacional de Emergência e Proteção Civil, Instituto Português do Mar e da Atmosfera (monitors seismic activity), Laboratório Nacional de Engenharia Civil, Global Earthquake Model Foundation, SafeHub
- **Funding entity:** Fundação para a Ciência e a Tecnologia

- **Description:** Combination of low-cost devices with machine learning technology to develop a platform for vulnerability and damage assessment.
- **Key findings and contributions to the field:** It contributes to the goals of the international agendas of the Sendai Framework and the United Nations 17 Sustainable Development Goals, which ask specifically to better understand risk and reduce the impact of natural hazards.
- **Impact of the project:** a large number of buildings will be monitored, and the recorded data will be used to develop a framework to calibrate numerical models relying on machine learning technology. Moreover, data recorded from past events will be explored to expand the framework to the estimation of damage and losses using monitoring data captured in near-real time.

Questions?



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