Artificial Intelligence and humans collaborate to increase safety of critical infrastructures

The European project AI4REALNET will support electricity, rail, and air traffic system operators to implement human-intelligence interactions and increase safety and efficiency in decision-making, considering the challenges of energy transition and digitalisation.

What if Artificial Intelligence (AI) were to be used to support decision-making, and increase efficiency and safety in the operation of critical infrastructures (typically run by humans) in the energy (power grid) and transport (railway and air traffic management) sectors? This is the goal of the Horizon Europe European project AI4REALNET – AI for REAL-World network operation.

It presents itself as a challenging and ambitious project that relies on a collaboration between humans and AI to support decisions made by human operators, creating conditions for the decarbonisation of these sectors, improving the quality of service and efficiency, while solving potential congestion issues in these infrastructures and contributing to increase the efficiency of investments in sectors critical to society.

The goal is not to replace humans by AI, but to ensure that AI emerges as a way to support faster decision-making, and even operationalising specific tasks autonomously. In sectors where human intervention is still predominant, the integration of new AI-centric technologies is an opportunity to reduce the workload of operators, addressing the challenges and needs of the sectors and designing solutions with adequate responses, in order to support people and societal challenges like resilience of critical infrastructures.

To apply and demonstrate AI-based decision systems in industry use cases, revealing tangible additional value, AI4REALNET developments will be validated in six use cases led by industry partners from the three domains.

The project aims at improving the safety and resilience of critical infrastructures, which are becoming more challenging, not only due to the increase in the volume of information, but also due to the changes imposed by decarbonisation. The AI4REALNET consortium hopes that AI can increase the capacity to operate more effectively and with less margin of error.

With the involvement of industry, the project will promote awareness of the benefits of reinforcement learning and explainable machine learning.

The project will also resort to current open-source AI-friendly digital environments, e.g., Grid2Op, Flatland, and BlueSky to foster and advance a global AI community.

The project is led by INESC TEC – a Portuguese research institute dedicated to scientific research and technological developments - and, in addition to Portugal, it brings together organisations

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from France, Germany, Italy, the Netherlands, Switzerland, Sweden and Austria. The consortium is composed of 17 partners.

The project received close to €4M from the European Union, through the Horizon Europe programme, and €2M from the State Secretariat for Education, Research and Innovation (SERI) of Switzerland.

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About INESC TEC

INESC TEC is a private non-profit research association, with Public Interest status, dedicated to scientific research and technological development, technology transfer, advanced consulting and training, and pre-incubation of new technology-based companies.

Present in six sites in the cities of Porto (headquarters), Braga and Vila Real, and with more than 800 researchers, INESC TEC acts from knowledge generation to science-based innovation, and performs collaboratively in search for a more sustainable, responsible, and improved world.

The primary goal of INESC TEC is to exceed performance in research, while considering its social, environmental, and economic impact, with a commitment to the scientific and technological contribution to foster pervasive intelligence. As so, INESC TEC endeavours to be a relevant international player in Science and Technology in eight scientific domains, Artificial Intelligence, Bioengineering, Communications, Computer Science and Engineering, Photonics, Power and Energy Systems, Robotics and Systems Engineering and Management. Being an institution that operates at the interface between the academic and business worlds, bringing academia, companies, public administration, and society closer together, INESC TEC generates new knowledge as part of its research, and leverages that knowledge in technology transfer projects, seeking impact through both value creation and social relevance.

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