AI-powered grid assistant developed by European institutions goes open source

After the integration into an ecosystem that promotes open development and collaborative innovation, the solution developed by European institutions is now available to organisations worldwide. It's expected to facilitate industry adoption while contributing to the development of transparent and scalable AI technologies for critical infrastructures.

A consortium of European institutions from eight different countries has been outlining a new paradigm for AI-assisted operation of safety-critical infrastructures. It has reached an important milestone by successfully integrating a grid operation assistant within the Linux Foundation (LF) Energy ecosystem. The solution, called AINETUS, provides AI components designed to augment operator decision-making in power grid operations through intuitive interfaces and visualisations that allow operators to assess system conditions and AI recommendations immediately.

In line with the goal of strengthening collaboration with the open-source community for energy systems and critical infrastructures, this strategic cooperation aims to promote the long-term sustainability, openness, and industry relevance of AI-based decision-support tools for human operators in power grid control rooms, extending their impact beyond the official conclusion of the AI4REALNET project in March 2027.

“This cooperation represents an important step in advancing AI-based assistants for power system operation, facilitating wider industry adoption while contributing to the development of open, transparent, and scalable AI technologies for critical infrastructures. It also reinforces the project's commitment to open science and open innovation, ensuring that key software assets remain accessible, actively maintained, and capable of generating long-term impact beyond the duration of EU-funded research projects”, explained Ricardo Bessa, a researcher at Portugal's largest Research and Technology Organisation (RTO), INESC TEC, and head of the Power & Energy Systems domain.

By hosting this advanced AI technology for operational planning, improving situational awareness, anticipating system risks, and delivering explainable, actionable recommendations to control room staff within LF Energy, the platform is decoupled from single-organisation ownership and embedded within a trusted, community-driven ecosystem that supports open development, collaborative innovation, and technology transfer across academia, industry, and infrastructure operators.

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Within this collaboration, it'll be possible to integrate selected project outcomes into established open-source ecosystems, governed under the LF Energy framework, ensuring transparent development, community governance, and long-term maintenance.

The open-source initiative will integrate key technological building blocks developed within AI4REALNET, including reinforcement-learning-based agents for operational decision support, high-performance power-flow solvers for real-time analysis, uncertainty-quantification modules for risk-aware operation, and human-AI interaction capabilities based on the hypervision concept. These components follow the architectural and methodological framework described in a recently published iScience paper.

AI4REALNET is led by INESC TEC and, in addition to Portugal, it brings together organisations from France, Germany, Italy, the Netherlands, Switzerland, Sweden and Austria; the consortium welcomes 17 partners.

The project received close to €4M by the European Union, through the Horizon Europe programme, and €2M by the government of Switzerland.

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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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