



Industrial AI Research Centre: Engineering Intelligence for Real-World Systems

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Building the Future of Digital Engineering

The Industrial AI Research Centre (IAI) develops and tests intelligent, connected, and adaptable systems designed to evolve in response to industry needs and sustain critical advantage. The Centre is helping to define what digital engineering can achieve when grounded in real-world complexity and guided by practical outcomes.

The IAI Centre combines expertise in artificial intelligence, machine learning, software engineering, mathematics, and systems engineering, and applies these collective skills to address real-world challenges in defence, healthcare, manufacturing, agriculture, and beyond. It creates new theoretical models and translates them into practical tools and systems to manage the complexities of industrial environments.

Digital Twins for Smarter Decisions

The Centre's research on digital twins emphasises data fusion and data-driven decision-making to tackle challenges in cyberspace and defence, healthcare, space operations, and environmental monitoring. IAI projects have developed virtual models of systems that assist organisations in enhancing operations across various sectors, including healthcare, manufacturing, resource industries, transport, space, and agriculture.

Interoperability for Asset-Intensive Industries

The Centre houses the Australian Open Industrial Interoperability Ecosystem (OIIE) Laboratory, which addresses the growing need for interconnected digital systems in industries such as Energy, Oil & Gas, and public infrastructure. The OIIE Lab's mission is to replace fragmented, customised IT and operational technology systems by a standards-based approach, guided by ISO 18101 and industrial modelling methods such as UML and SysML. The Centre's expertise in interoperability engineering is recognised worldwide for shaping the next generation of interoperability solutions through its strong involvement in international standards organisations.

Adaptive Systems for Earth and Space

The Centre's reach extends from Earth to space, where it leads research in remote intelligent sensing, with applications in space missions, energy grids, transport networks, and Defence. Advanced machine learning, multi-modal data fusion, and uncertainty quantification technologies are employed to develop systems that are intelligent, resilient, and trustworthy. The Centre developed advanced optimisation methods that have resulted in significant fuel savings in train operations and are shaping the future of smart homes and the national energy grid. Utilising the latest technologies in Unmanned Aerial Vehicles, Satellite Technology, and distributed sensor networks, our researchers are building systems that monitor the environment for potentially dangerous substances, detect objects or events of interest from remote sensor networks, and can self-adapt their operations to changing conditions.

AI for Smarter Healthcare

Beyond industrial applications, the Centre has been developing technologies that enhance healthcare outcomes and are scalable across the entire healthcare system. Through partnerships with the Rosemary Bryant AO Research Centre and wider healthcare networks in South Australia, it integrates clinical practice with AI and data science to develop AI-powered tools for risk management and decision support. These tools help forecast adverse events in clinical environments, assist medical professionals in analysing medical images, and provide innovative applications that help patients manage complex healthcare journeys.

Contact

Whether you are exploring new applications of AI, seeking collaboration on complex engineering challenges, or looking to shape the standards that will guide future digital ecosystems, there is space here for meaningful partnership. We invite you to reach out, start a conversation, and help our partners and us build the next chapter of digital engineering in Australia and beyond.

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