UTS UNIVERSITY OF TECHNOLOGY SYDNEY

Artificial Intelligence

WORKING WITH DEFENCE

About UTS

The University of Technology Sydney (UTS) is one of Australia's leading universities, delivering research solutions and new technologies to the Defence and Aerospace industries. Our researchers work closely with Australia's Defence Science and Technology Group (DSTG), Australian Defence Force, Office of National Intelligence, U.S. Department of Defense, international Primes and local small-to-medium enterprises. We're proud to host the NSW Defence Innovation Network and co-host the NSW Space Research Network.

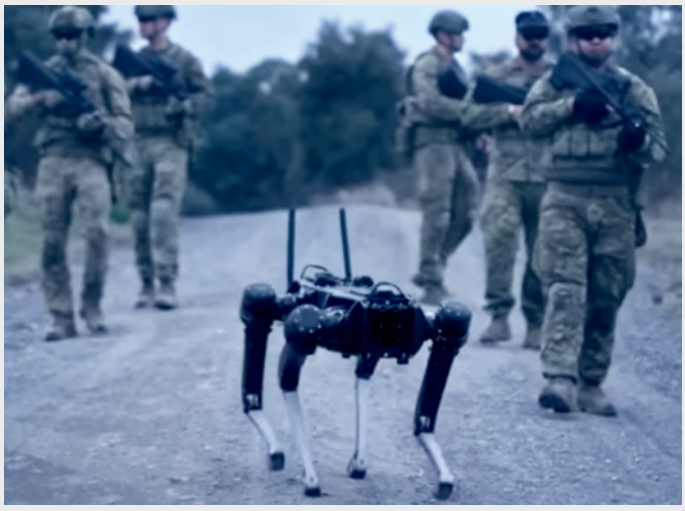
Some of our Defence AI research

Brain-Computer Interface for Robotics and Drones

The Australian Army's Robotic and Autonomous Systems Implementation and Coordination Office (RICO) explores, coordinates and develops disruptive technology that equips the Australian Army to be future ready. UTS received funding from the Australian Defence Innovation Hub (DIH), now the Advanced Strategic Capabilities Accelerator (ASCA), to develop a brain-computer interface system that allows for hands-free control of robots entirely by thought through a seamless interface for interacting with machine systems using brainwaves. See a demonstration video, of the first phase of this collaboration, operating a land drone at **www.youtube.com/watch?v=8lz_i18n9P0**

Australian Artificial Intelligence Institute (AAII)

The AAII at UTS is the largest artificial intelligence research hub in Australia. In 2022, we were **ranked 3rd out of 142 universities world-wide** in the U.S. News Best Global Universities Subject Rankings. In 2021, we were **ranked 10th in the world and 1st in Australia** for artificial intelligence research in the AI Research Index.



Field test of soldiers testing our brain-computer interface to control a land drone.

Drone Detection using Deep Learning and Convolutional Neural Network (CNN)

DroneShield offers versatile solutions for counter unmanned aerial systems providing mission essential capabilities with artificial intelligence-based sensor fusion and signal processing. UTS partnered with DroneShield to produce a computer vision-based drone detection system using Deep Learning to identify threats from unmanned aerial systems. This research project has won in two categories at the AIIA NSW iAwards in 2021 as well as the NSW Defence Innovation Network 'Commercialisation Champion' Impact Award 2022. The collaboration has been funded by the NSW Defence Innovation Network and Innovation Connections.

Navy Operations Head-Up Interface

We have worked with the Royal Australian Navy to develop a head-up interface to support Navy personnel, specifically navigation officers and officers on watch, by presenting critical information in a clear and accessible format. This project was funded by NSW Defence Innovation Network.

Predicting the Effectiveness of State-sponsored Influence Operations

This project is focused on national security and the safety of online information and opinions. We are creating tools to detect harmful online content and implementing proactive mitigation strategies. This work is funded by grants from the Department of Home Affairs, DSTG and NSW Defence Innovation Network. Our team is designing methods and tools for monitoring social and traditional media to detect mis- and disinformation, foreign interference and state backed propaganda using the reaction of social systems as early warning systems. Our models can forecast such harmful content's likely impact and adoption. The next phase is mitigation: proactively via pre-bunking; or reactively via personalised messaging.

AI capabilities and facilities at UTS

The AAII has three distinguished professors, two IEEE Fellows, three ARC Future Fellows /QEII Fellow, seven DECRAs, over 35 core academic staff, 10 postdocs, and 200 PhD students.

The AAII has led 34 ARC projects and been awarded over 60 industry projects with a total research income of over $34 million. Our core expertise includes: machine learning, behaviour analytics, predictive analytics, data visualisation, natural language processing, and human-centred ethical artificial intelligence. In addition to AAII, the Data Science Institute (DSI) at UTS also conducts a range of data and AI research on resources and infrastructure management, transport network management, AI on education, and ethnical AI platforms.

UTS has seven specialty AI research labs corresponding to its research strengths:

- **Data Sciences and Knowledge Discovery (DSKD Lab)**
  Focuses on data science and knowledge discovery, machine learning, and big data analytics.
- **Decision Systems and E-Service Intelligence (DeSI Lab)**
  Applies AI in complex situations and effectively supports data-driven prediction and decision making in real-world systems.
- **Computational Intelligence and Brain-Computer Interface Lab (CIBCI Lab)**
  Develops computational intelligence for decision making in biomedical and clinical domains.
- **Large-Scale Network Analytics Lab (LSN Lab)**
  Focuses on the processing and analysis of large-scale networks.
- **Recognition, Learning and Reasoning Lab (ReLER Lab)**
  Enables machines to accurately recognise their environment, adaptively understand human interactions and analyse behaviour through reasoning.
- **Intelligent Drone Lab (iDL)**
  Facilitates R&D in AI-powered drone autonomy using computer vision, machine learning techniques, and a range of sensor inputs.
- **Intelligent Computing and Systems Lab (Ics Lab)**
  Drives innovation in circuit design, dynamic analysis, and applications of memristor-based neural networks, neuromorphic computing, and brain-inspired computing.

Contact us

For more information on our Defence and Space capabilities visit: **uts.edu.au/defence-space**

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