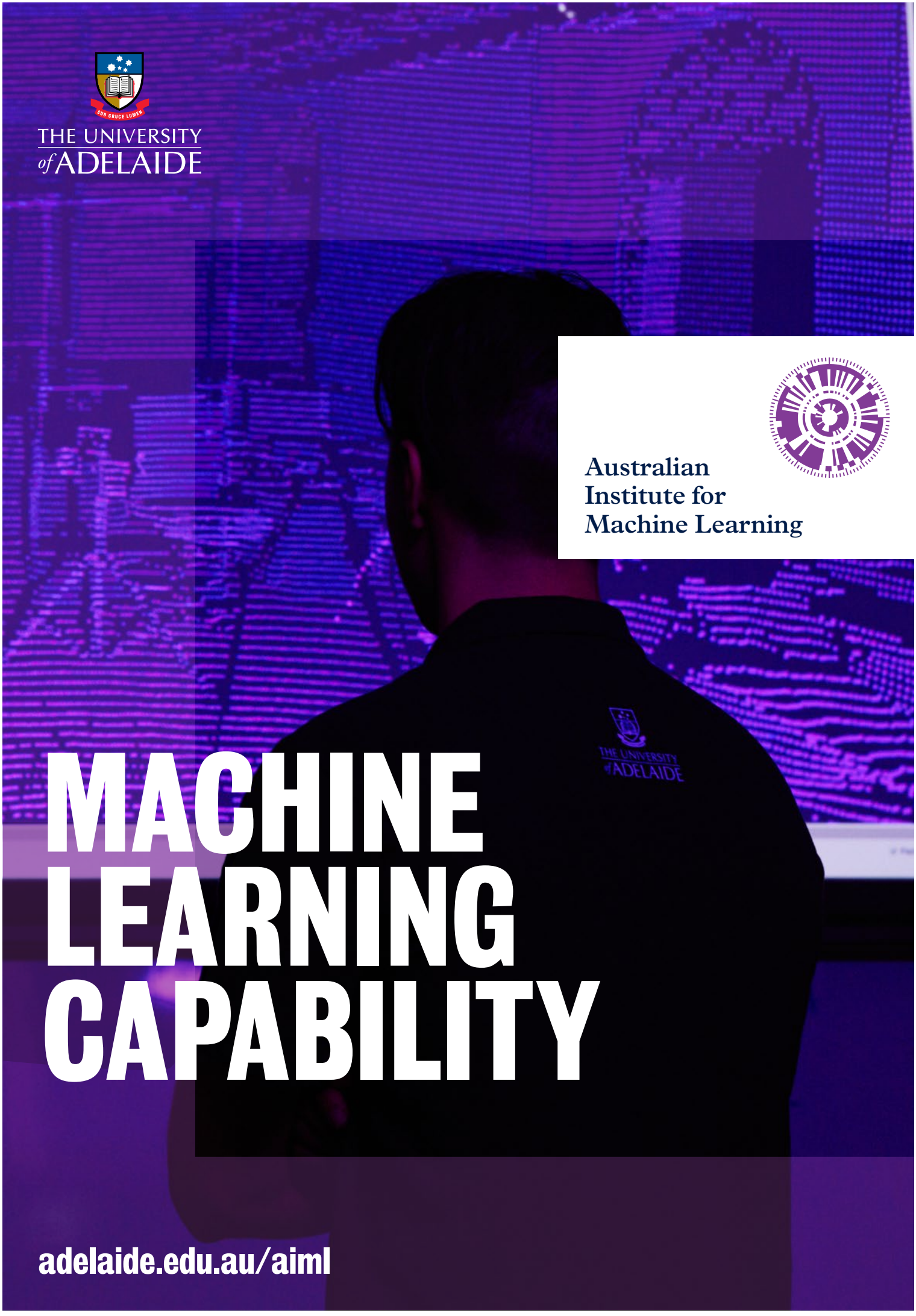
THE UNIVERSITY
of ADELAIDE
Australian
Institute for
Machine Learning
MACHINE
LEARNING
CAPABILITY
adelaide.edu.au/aiml

OUR VISION

TO BE GLOBAL LEADERS IN MACHINE LEARNING RESEARCH, AND HIGH-IMPACT RESEARCH TRANSLATION.

OUR MISSION

RESEARCH EXCELLENCE IN MACHINE LEARNING, ARTIFICIAL INTELLIGENCE AND COMPUTER VISION.

WELCOME

When considering the technological forces shaping our future, few disciplines come more rapidly to mind than artificial intelligence (AI) and its major subset, machine learning. Already playing key roles throughout the global economy, their importance is growing exponentially.

Here at the University of Adelaide, our Australian Institute for Machine Learning (AIML) is on a similar trajectory; established just a few years ago in 2018, it ranks today as one of the top three bodies in the world for computer vision research, and number one in Australasia*.

AIML is a founding member of South Australia's renowned innovation precinct, Lot Fourteen, where it collaborates with neighbours the calibre of Amazon, Microsoft and the Australian Space Agency. Its work—frequently performed in partnership with the private sector and government—is transforming performance capabilities in a vast range of industries: from defence, space and health, to agriculture, energy and resources, and business.

AIML's expertise also complements and magnifies that found in every other discipline within our University. It remains an integral part of our School of Computer Science, itself now ranked inside the world's top 50 university schools and faculties for computer science and engineering^.

As this document proves, you will not find a more capable AI and machine learning partner.

Regards,

Professor Peter Høj AC
Vice-Chancellor and President
The University of Adelaide

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**By volume of papers published in top-tier computer vision conferences and journals.*
^ARWU, 2021.

FROM OUR DIRECTOR

Artificial intelligence and machine learning are transforming Australia and the world.

The Australian Institute for Machine Learning (AIML) combines academic excellence with real-world practicality to create innovation and drive high impact change in this exciting revolution.

AIML's world ranking research excellence, combined with the innovation ecosystem created by the University of Adelaide and our neighbours at Lot Fourteen inspires me.

Success stories to date are diverse; we've created technology tools and capabilities for SMEs and start-ups in sectors including space, communications and visual technologies, banking, agriculture and viniculture, sports, the environment and health.

Our institute is uniquely positioned to work with business. AIML's world-class researchers are aligned with a talented engineering team – this means we can incorporate the very latest technological developments into industrial software to meet the needs of our clients and partners.

We pride ourselves on demonstrating technology feasibility plus facilitating new connections and relationships to deliver desired outcomes. Our professional connections in this state, across Australia and the world over translate into momentum, action and partnerships to maximise commercial opportunities.

At AIML, our door is open. Come and talk with us to see how artificial intelligence and machine learning could transform your business.

Professor Simon Lucey
Director
Australian Institute for Machine Learning

Professor Simon Lucey (Ph.D.) is a professor in the School of Computer Science at the University of Adelaide, and the Director of the Australian Institute for Machine Learning.

Prior to this Professor Lucey was an associate research professor at Carnegie Mellon University's Robotics Institute (RI) in Pittsburgh USA. From 2017-2020, he was a principal scientist at the autonomous vehicle company Argo AI and spent time at the CSIRO (2009-2014).

Professor Lucey has received various career awards including an ARC Future Fellowship (2009-2013). His research interests span computer vision, machine learning, and robotics and he enjoys drawing inspiration from AI researchers of the past to attempt to unlock computational and mathematic models that underlie the processes of visual perception.

ABOUT THE INSTITUTE

The Australian Institute for Machine Learning (AIML) is a global leader in fundamental and applied research, and Australia's first university-based research body dedicated to machine learning.

A joint initiative of the South Australian Government and the University of Adelaide, AIML was launched early in 2018.

With more than 140 researchers, AIML is the largest university-based research group in machine learning in Australia and one of the best in the world.

AIML's high impact applied research is founded in fostering world-class academic capability and achievement. Over the last decade, the institute has consistently ranked third in the world for publications in the top computer vision sites globally.

AIML makes an important national and international contribution to pushing the boundaries of what machine learning can do, and how that can be applied to almost every aspect of our lives.

Machine learning underpins the business models of the largest corporations and has the potential to deliver great social, economic and environmental benefits.

At AIML we collaborate with world-leading companies to develop high-tech products and solutions to everyday problems. Our impact partners include experts in many fields including agriculture, space, medicine, transport, defence, cybersecurity and advanced manufacturing.

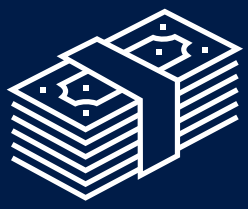
AIML AT A GLANCE

Ranked in the top 3 global research organisations for computer vision

Creating AI solutions for Australian businesses

The largest university machine learning group in the country

140+ people and growing



$39M+ external funding to date (2018–2021)

70 research students in 2021

One of 6 Research Institutes at the University of Adelaide

1st in visual question answering challenge 2.0

"AbCdE"

2nd in CATEX captioning challenge

2nd in Oz Minerals explorer challenge

1st in European Space Agency POSE estimation challenge

AIML CAPABILITIES

Artificial intelligence (AI) is changing every aspect of our lives. The core capability of AI is to learn the patterns that exist in large datasets – hence the term machine learning. AI has been used to create computers that can see, and those that understand human language.

AI can create, mimic, detect fraud, target advertising to the right audience, and more. Those jurisdictions that have their own capabilities will be most able to harness the best from this powerful technology.

AIML consistently wins international competitions for excellence in tailoring AI to address specific tasks, often in completely new areas of application and with short lead times for team building and technology development.

AIML expertise lies across many areas of applied AI, including:

- **Computer Vision** for object counting; extracting information from images and videos, tracking and detecting anomalies; or identifying objects.
- **Robotic Vision** has a focus on the camera as a sensor for a robot, so is usually interested in real-time, creating "situation awareness" so that robot can suitably respond. We have particular capability in visual SLAM, visual geometry and real-time semantic scene understanding.
- **Natural Language Processing / Understanding Language** to extract useful information from documents and datasets, to sort, order and analyse information for patterns, or for chat bots.
- **Visual Question Answering**, where computers are queried with open-ended questions about images. These questions require an understanding of vision, language and common-sense knowledge to answer.
- **Advanced Learning and Reasoning** to extract meaningful insights from big data, to make AI systems explainable and to push machine learning beyond today's capabilities.
- **Signal Processing** to interpret complex signals such as audio and radar, and to review medical images and more.
- **Reinforcement Learning**, where a machine learning model is trained to make a sequence of decisions. The AI faces a game-like situation and learns through trial and error to find a solution to the problem. This is the type of software that was applied for a computer to beat a human at games such as checkers, Go and more recently Fortnite.
- **Deep Learning** imitates the working of the human brain in processing data and creating patterns for use in decision making. It is applied in virtual assistants, vision for driverless cars and in face recognition.
- **Generative Adversarial Networks** involve using machine learning to create a new instance of a particular input (e.g. image, audio, video). For example, based on a series of text the machine will generate an image or a piece of art.
- **Causation and Probabilistic Graphical Models** is a rich framework for learning the relationships in a system or ask causal and interventional questions. For instance, we can ask what are the best times of the year for irrigation or intervening with fertilisers to maximise yield on a farm.

TECHNOLOGY SO GOOD IT CAN PREDICT SHADOWS: AIML'S DEEP LEARNING ENHANCES 3D MAPS OFFERED BY SA COMPANY AEROMETREX

As part of the South Australian government's 2019 program of investment in SMEs, AIML worked with geospatial tech company Aerometrex to create enhanced 3D data products for clients in city planning, development, urban design and regional councils.

Adelaide-based Aerometrex's high-resolution 3D models are ideal for developing new artificial intelligence and machine learning products.

AIML worked with Aerometrex to boost mapping products with deep learning capability. The new technology is so detailed it reveals shadows cast by buildings at different times of the day, and the heights of individual structures.

"Aerometrex remains at the cutting edge of global 3D modelling, and through this project we are taking our solutions to the next level," says Fabrice Marre, Aerometrex's Geospatial Innovation Manager. "AIML are helping us solve real-world problems."

Enhanced 3D maps are expected to become the standard tool for developers and planners around the country who are making decisions around what developments should go ahead, or what designs need to be modified.

"Shading caused by a building is one of the big factors councils consider when approving new buildings," says Marre. "With our maps, city planners are able to see with much more detail exactly how the surrounding areas are going to be impacted."

Other industries stand to benefit too. Solar installers will be able to assess more accurately the optimal layout for solar panels on a roof, landscapers will be able to see where and how shade from large trees will fall at different times of year, and property developers will be able to better plan their projects to maximise the use of space.

Deep learning for better maps

While Aerometrex had developed capabilities for labelling items in 3D maps, their initial approach was restricted by the amount of data that could be labelled, and relatively weak software capability.

"We wanted to create maps with infinitely more detail, and to provide our customers with maps that enabled them to search for very specific information," says Marre.

Aerometrex pulled in AIML's expertise to apply deep learning to create a solution. Machine Learning Engineer Sam Hodge was the AIML lead on the project.

"Because Aerometrex already had so much information, 'teaching' the algorithm was relatively straightforward," says Hodge. "We were able to take all the information they already had, break it down into as much detail as possible then build a model that matched it all together."

The beauty of the approach lies not just in the amount of detail captured, but in the scalability.

"Once we have 'taught' the algorithm enough, we no longer need to label every object," explains Hodge. "The algorithm will keep learning for itself, drawing context and information not only from individual pixels but those surrounding it, and the tens of thousands of other pictures it has examined."

The end result is a 3D map that contains an incredible amount of derived information. Users are able to search areas for specific detail – from single blocks to entire suburbs or cities – that can help them make better decisions whether it's related to planning, developing, building or marketing.

AIML is continuing to work with Aerometrex in 2021.

Established in Australia in 1980, Aerometrex has a strong national and international reputation as a leading practitioner of aerial imaging, photogrammetry, 3D modelling and LiDAR surveys. The company provides professional, accurate digital image mapping and geospatial engineering solutions for clients in government and the private sector. In 2020 Aerometrex had its strongest financial year to date, launched Aerometrex USA and grew its workforce by 33 to reach a total of 116 employees.

Photo by rawkkim on Unsplash

HOW MACHINE LEARNING EXPERTISE HELPS SMALL BANKS KEEP CUSTOMERS SAFE

As part of the South Australian government's 2019 program of investment in SMEs, AIML worked with Lot Fourteen-based business automation company Neo-Analytics to create smarter software for regulatory compliance monitoring in banks and financial institutions.

Adherence to strict regulations and standards is vital for banks to keep financial risks low and ensure safety of clients' money. However small financial institutions with few staff and limited technical capability can feel overwhelmed by this burden of compliance.

Machine learning offers a solution.

"One of the requirements of operating a financial services institution is to follow local and national government laws and regulations – this is called regulatory compliance," said Rick Rofe, founder at Neo-Analytics.

"This is a huge job involving lots of data, and so we worked with AIML to develop automated processing capability for regulatory compliance."

Neo-Analytics now applies algorithms that deliver reliable and accurate results, providing smarter more intelligent software for their client base.

"We are now working with three banks, one of which has our products in production," Rofe said.

"We hope these improvements will soon allow us to employ our contractors permanently as adoption of our machine learning products increases."

Photo by Finn on Unsplash

High burden for small institutions

Financial services institutions include banks, building societies and credit unions – these are regulated entities that can carry on banking business, including taking deposits from customers.

Such institutions are compelled by law to have robust and accurate measures in place regarding risk, including detection, measurement, reporting and management. The implied dollar amount for regulatory compliance totalled A$5.4 billion in 2016, representing 24% of community bank net income.

Data management tools like Excel don't cut it for financial management anymore – institutions need new approaches that offer analytic flexibility, scale and automation. For smaller institutions, cost-effectiveness is also vital.

AIML applied machine learning models to improve Neo-Analytics's regulatory compliance monitoring.

"AIML was instrumental in modelling our compliance needs, and they assisted our developers to implement machine learning algorithms from scratch," said Rofe.

"AIML used the data we made available to them, and built a predictive model for regulatory compliance that proved to be accurate and met our requirements."

Neo-Analytics is a finance RegTech innovator focussed on artificial intelligence and machine learning, credit monitoring and data management. Based at Adelaide's Lot Fourteen innovation precinct, Neo-Analytics helps financial institutions survive and thrive in a market of accelerating and complex change – a market that has become exponentially more challenging due to recent global crises. Their primary focus is around AI-driven features that solve real problems for customers and creating better outcomes.

YES, I'LL ENDORSE THAT: HOW AI HELPS ADELAIDE START-UP PICKSTAR MATCH CELEBRITIES WITH PROMOTIONAL OPPORTUNITIES

As part of the South Australian government's 2019 program of investment in SMEs, AIML worked with start-up Pickstar to apply machine learning and data analytics in a technology platform that matches customers with celebrities for promotional opportunities.

Pickstar is an SA business that allows customers to use an online form to pick from a range of celebrities to be guest speakers and brand ambassadors.

CEO and founder of Pickstar James Begley said AIML has been helpful in providing a service that will be able to effectively pair up customers with the right stars within the client's budget.

"The question that we answer as a business is, who can I get for my budget?" Begley said.

"The work that the AIML does allows us as a Pickstar platform to serve up and recommend the best available talent for someone's brief and budget and that can only happen with heavy investment into machine learning and data analytics to underpin the recommendation engine."

Begley said machine learning will help Pickstar to achieve faster and better results for their customers.

"AIML have provided us a road map but also a prototype, an actual tangible early-stage product that we are going to use and commercialize – this is taking university smarts and bringing it into the real world for commercial application," he said.

"For us the investment into machine learning and data analytics is only going to increase, so if we can maintain that relationship with the institute we will be very pleased to follow on."

Data is king

Dr Grant Osborne, the Lead Machine Learning Engineer at AIML, said Pickstar could see how important data is and how it can be applied to improve the experience for everyone involved.

"The guys at Pickstar are really on it when it comes to seeing that data is important, and knowing if we have this kind of opportunity available for a talent these are the most appropriate jobs," Osborne explained.

Osborne said they try to make the process simple and understandable for companies like Pickstar.

"We build demonstrators that we can put straight in front of the clients, they've got a demo app where they can see all the data and see what the predictions and recommendations type engines will be able to do for them," Osborne said.

"We've been working with Pickstar to essentially help them build a more data-driven business. We've been looking at data sets, helping to identify the most important element of the data, building dashboards as well as doing machine learning around prediction and the kinds of talent they will be recommending for certain jobs. Data is king."

Based in South Australia, Pickstar was started in 2013 by former AFL players James Begley and Matthew Pavlich. The platform hosts a database of sports players and celebrities that is searchable by potential customers seeking to book a star to speak at an event or endorse a product or brand. Pickstar recently opened offices in the USA and the UK to capitalise on new global opportunities with major sporting institutions.

CASE STUDIES

PRESTIGIOUS GOOGLE FELLOWSHIP

PhD candidate Yifan Liu

AIML PhD student Yifan Liu was awarded a prestigious 2020 Google Fellowship in recognition of her exceptional research in computer vision. The scholarship provides Liu AU$15,000 as well as access to a research mentor at Google.

Across all 2020 Google Fellowships, Liu is one of only six recipients in Australia, with an additional 47 students from top academic institutions winning the awards globally.

“Recipients of the Google PhD Fellowships represent the best young researchers in their fields across the world,” said Professor Chunhua Shen, Yifan’s PhD supervisor and head of AIML’s Machine Learning Theory research theme.

“Liu is full of passion for her work and has a strong capacity to conduct independent research.”

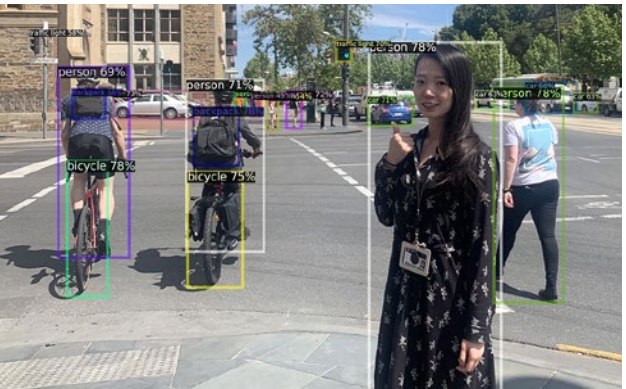
Liu’s research addresses machine learning for understanding images and video in mobile devices. It’s the sort of technology that would be useful for many applications such as smart robotic vacuums and AI driven smartphone photography.

“I am particularly interested in a process called semantic segmentation, which involves creating very fine-grained labelling of all the items a camera has in its field of vision – what a camera can ‘see’”, says Liu.

Semantic segmentation is much more challenging than classifying a photo into a simple ‘cat’ versus ‘dog’, for example. It involves labelling every single pixel in an image into a category.

“Making the task even more difficult, I want to develop such software to run on mobile devices like phones, which need the software to be extremely light and fast,” says Liu.

“To be usable in the real world, for example in smart phones, the system must be very accurate as well as very fast. That’s what I’m focusing on, bringing together different aspects of the technology to make that happen.”



A FRESH TAKE ON ROBOTIC VISION

PhD candidate Huangying Zhan with Professor Ian Reid

Human vision allows us to move through the world and gather constant feedback about our location. For example, we watch the trees whizz by as we leave home and cycle down the street, and experience our workplace grow larger and larger as we approach it.

New AIML research published in 2020 is helping robots take one step closer to having similar capacity. The paper focuses in particular on a capability know as visual odometry, which uses images captured by a robot to determine where in an environment that robot is located.

“Vastly improving existing approaches, AIML PhD student Huangying Zhan produced state-of-the-art visual odometry using just one camera,” says Professor Ian Reid.

“He achieved this by taking a fresh look at visual odometry, and pulling in deep learning and engineering to work alongside the geometric algorithms that had typically been used for basic capability.”

“There are also elements of self-supervision and self-improvement in the new approach, where imagery is fed back into system so that it gets better over time,” Reid explains.

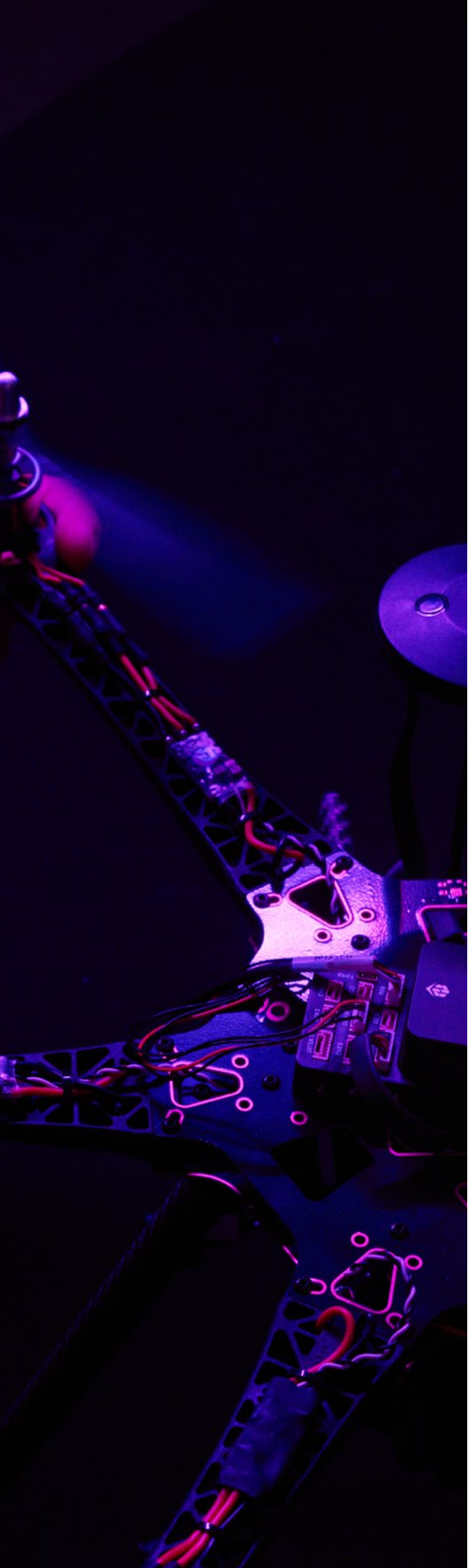
Zhan’s solution for visual odometry has been integrated with other capability for state-of-the-art large scale place recognition developed by AIML staff Dzung Doan, Dr Yasir Latif and Professor Tat-Jun Chin. The combined system is now published as open-source code, available for anyone to use.

For robots and autonomous vehicles, the real value of accurate and efficient capability in visual odometry is realised when it’s combined with place recognition technology.

“When you move, odometry tells you about your location relative to where you started,” Reid says.

“When we combine this with images that pinpoint a robot to a recognised location, then it’s really getting closer to human vision.”

As visual odometry capability continues to improve, robots will get better and better at operating in hostile and remote environments – for example, in places where GPS does not work, such as on Mars, underground or in contested spaces.



FIRST PRIZE IN GLOBAL COMPUTER VISION CHALLENGE

Dr Qi Wu

"Siri, play Queen's Bohemian Rapsody!"

Right now, we can use voice commands to instruct our digital device to play a particular song, or dial the phone number of our best friend.

But computer scientists want to be able to ask technology more complex questions – ones that involve some degree of reasoning. Queries like: "what is the brand of that computer?" or "according to this street sign, how many kilometres is Adelaide from Melbourne?"

It's an approach called Visual Question Answering, often shortened to VQA.

AIML's Dr Qi Wu and his local and international colleagues made significant inroads on VQA capability in 2020.

Wu's work was awarded first prize in the global 2020 CVPR TextVQA Challenge. CVPR is an acronym for Computer Vision Pattern Recognition, one of the leading conferences in the field.

"The CVPR TextVQA Challenge requires computer models to look at images, to read and to reason," explains Qi Wu.

"The challenge provided a series of images and questions, and we applied our trained system to provide the answers."

In 2020, 19 international teams competed in the TextVQA Challenge, with Wu's team taking first prize with a test accuracy of 45.5%.

Wu says there are a number of reasons he chooses to compete in computer science competitions.

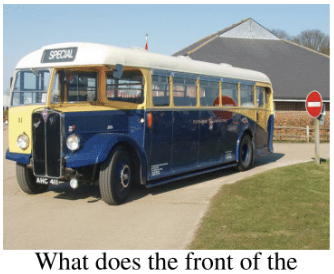
"Challenges help us test our work and benchmark our capabilities against other research groups," Wu says.

"It's like the Olympic Games for our area of expertise."

Wu also sees value in the fact that challenges take place with a limited time frame.

"Compared to publishing research papers, competitions feel more like a test in the real world – this provides good practice for students, and is a good way to help others see the quality of our work," he says.

Better VQA capability is expected to lead to improvements in robot and other vehicular vision systems. It may also provide technology to aid humans; for example, for people who are visually impaired.



What does the front of the bus say at the top?

Ground Truth: Special

Prediction: Canada

(a)

What is the word that comes after golden?

Ground Truth: Curry

Prediction: Cheese

(b)

HELPING SURGEONS NAVIGATE KNEES

Professor Gustavo Carneiro

At least 70,000 knee arthroscopies are performed every year in Australia. It's a delicate surgery, in which orthopaedic surgeons insert instruments through button-sized holes to visualise, diagnose and treat problems inside the joint.

Along with colleagues, Gustavo Carneiro has developed a new system to help surgeons find their way around inside knees.

In 2020 they published their latest findings as part of the 23rd International Conference on Medical Image Computing and Computer Assisted Intervention.

"Even though it's a small space, sometimes surgeons find themselves lost inside the knee joint when they're doing arthroscopic surgery," says Carneiro.

"They're constantly having to work out where their instruments are located in relation to key structures such as bones and ligaments, plus trying to avoid doing any damage."

"Our research aims to provide feedback to the surgeon through live labelling and depth estimation of the knee structure using a stereo arthroscopic camera," says Carneiro.

The machine learning approaches being used are semantic segmentation and depth estimation. An algorithm is trained to estimate the depth and recognise key structures in the knee such as the femur and tibia bones, the anterior cruciate ligament (ACL) and the meniscus (a rubbery structure that acts like a shock absorber in the knee).

"We used more than 8000 images to train our system, with information provided regarding the names of key structures and also depth measurements," says Carneiro.

"We found this method was much more accurate than a previous, simpler approach to the problem."

OUR RESEARCH AIMS TO PROVIDE FEEDBACK TO THE SURGEON THROUGH LIVE LABELLING AND DEPTH ESTIMATION OF THE KNEE STRUCTURE.

NAVIGATING A ROBOT ON THE MOON

NASA's Space Robotics Challenge is designed to identify and develop capability to advance autonomous robotic operations for space exploration missions on the surface of other worlds, such as the Moon and Mars.

AIML members Professor Tat-Jun Chin, Tom Rowntree, Andrew Du, Sam Bahrami, Kiet To and Professor Ian Reid were part of the University of Adelaide team that qualified for Stage 2 of the competition in 2020.

In 2021 the team went on to finish in third place (the only team from a university), receiving one of only two innovation awards in addition to a US$75,000 cash prize.

"The competition is a great way for us to apply our machine learning and artificial intelligence capability to solve space problems, in particular autonomy for lunar exploration," says Tat-Jun, who is Professorial Chair of Sentient Satellites at AIML.

"It's the sort of work that is really exciting, and maybe it will inspire new generations of researchers to study and become involved in machine learning, or the space industry."

Out of 114 registered teams, only 22 successfully addressed the NASA criteria in their entries, allowing them to move on to the final competition round.

"It was not a simple problem," says Tat-Jun.

"We were provided with a simulated moon environment, and we had to design algorithms to control a robot to move around on that surface."

But it wasn't enough to just move around on the moon – the robot should also be able to find and identify valuable resources, and then collect and return them to a lunar processing plant.

THE COMPETITION IS A GREAT WAY FOR US TO APPLY OUR MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE CAPABILITY TO SOLVE SPACE PROBLEMS.

It's the sort of activity that NASA and other space agencies and entities envisage for a future where space mining and remote operations on moons and planets is likely. Valuable resources might one day include water, fuel ingredients, or high value minerals.

So why get involved? Tat-Jun says competitions provide important opportunities for AIML scientists.

"They give us a platform to show others what we're capable of – it's like a skills demonstration to share with other academics, collaborators, potential investors in technology and even the general public who may be interested in our work," he says.

Photo courtesy NASA

FASTER DIAGNOSIS OF ENDOMETRIOSIS WITHOUT NEEDING A SPECIALIST

Professor Gustavo Carneiro

AIML is working with the Robinson Research Institute, at the University of Adelaide, to harness artificial intelligence to help improve diagnosis and care of patients with endometriosis.

Endometriosis – a condition where cells similar to the lining of the uterus grow outside of the uterus – affects an estimated 1 in 10 women world-wide, often causing pain and fertility problems.

Diagnosis can be particularly tricky, especially when doctors aren't specifically trained in how to identify endometriosis in scans of the uterus and surrounding tissues. Often surgery is required as the only reliable diagnostic approach.

AIML medical machine learning researcher Professor Gustavo Carneiro supervised the design and implementation of a program that can read specialist scans and recognise certain imaging markers seen in endometriosis, helping doctors provide surgery-free diagnosis.

Initial tests show the software is capable of diagnostic accuracy approaching that of a specialist doctor, and that's only set to improve as the research develops.

"Machine learning is an iterative process – as you give more and more training samples, the accuracy of the system improves," says Carneiro.

The project is ongoing, and will build as more data becomes available.

Gustavo and his collaborators hope their approach will soon mean patients from all over Australia will have access to high quality, non-invasive screening for endometriosis.

"This is a system that works together with doctors to improve their ability to diagnose endometriosis," says Gustavo.

Endometriosis scanning and interpretation is a specialist skill, and not all gynaecologists have the opportunity to receive the required training.

A machine learning algorithm could hasten identification of endometriosis when a specialist isn't available, easing the burden on women and fast-tracking delivery of surgical, medical and fertility care as appropriate.

Thanks to Ashleigh Geiger for the source material for this story.

PARTNERSHIP WITH THE GOVERNMENT OF SOUTH AUSTRALIA

AIML steers a collaborative partnership between government and academia, established with the purpose of driving our state's economic growth and delivering more jobs across a range of sectors.

Artificial Intelligence Skills Development

Developing a workforce with the appropriate skills is critical if South Australia is to grow an AI industry sector. This program will support undergraduate students making the transition to post-graduate programs, and the attraction and maintence of high quality PhD students.

Defence Industry Engagement

Support AIML's collaborative research partnerships with defence industry partners by allocating 27,000 research hours to address the priority needs of the defence industry and contribute to necessary industrial capabilities.

Government Efficiency Engagement

AIML will liaise with relevant government agencies to identify priority projects for adoption of AI into government processes. Research hours will be used to deliver projects that provide solutions to government, improving productivity and efficiency and service delivery to South Australian citizens.

SME Engagement and Global R&D

AIML will actively engage and work with South Australian SMEs that wish to integrate and adopt machine learning and AI to drive tranformational productivity growth in their business to improve their local and global competitiveness.

AIML IS ALREADY ACHIEVING KEY OBJECTIVES IN OUR PARTNERSHIPS

OBJECTIVE	OUTCOME
Establishment of a new Major in AI within the Bachelor of Computer Science program, or a new Master of Data Science program (or equivalent)	✓ 2 Master Courses in Data Science and Machine Learning ✓ AI Major for BSc(Comp)
Leverage investment of at least $10m from Commonwealth and Industry sources	✓ > $39m in Commonwealth and Industry funding
An additional 20 FTE in staff and students within the AIML over the term of the agreement	✓ +60 members ✓ ~ 80 members in 2017 to 140 members in 2021
Collaboration with South Australian SME's to develop at least five new products or services	✓ 9 new products and services in development
Attraction of at least two international organisations' research and development projects at the AIML	✓ 4 International R&D projects in progress
Delivery of at least three SA Government AI related projects that result in demonstrable benefits in productivity, efficiency and/or service delivery	✓ 7 government efficiency projects, completed and in progress with DIT, PIRSA and DEM
Adoption of AIML technology, intellectual property or know-how into at least five different defense industry projects, products or services	✓ >10 Defence projects, completed and in progress
Adoption of AIML technology, intellectual property or know-how into at least five other industry projects, products or services	✓ 21 industry projects, completed or in progress

WHY WORK WITH US:

AIML experts can help you navigate a world where AI and machine learning are disrupting every area of the economy.

From short consultancies to major technology development, we are able to assist businesses seize the transformative opportunities that machine learning offers.

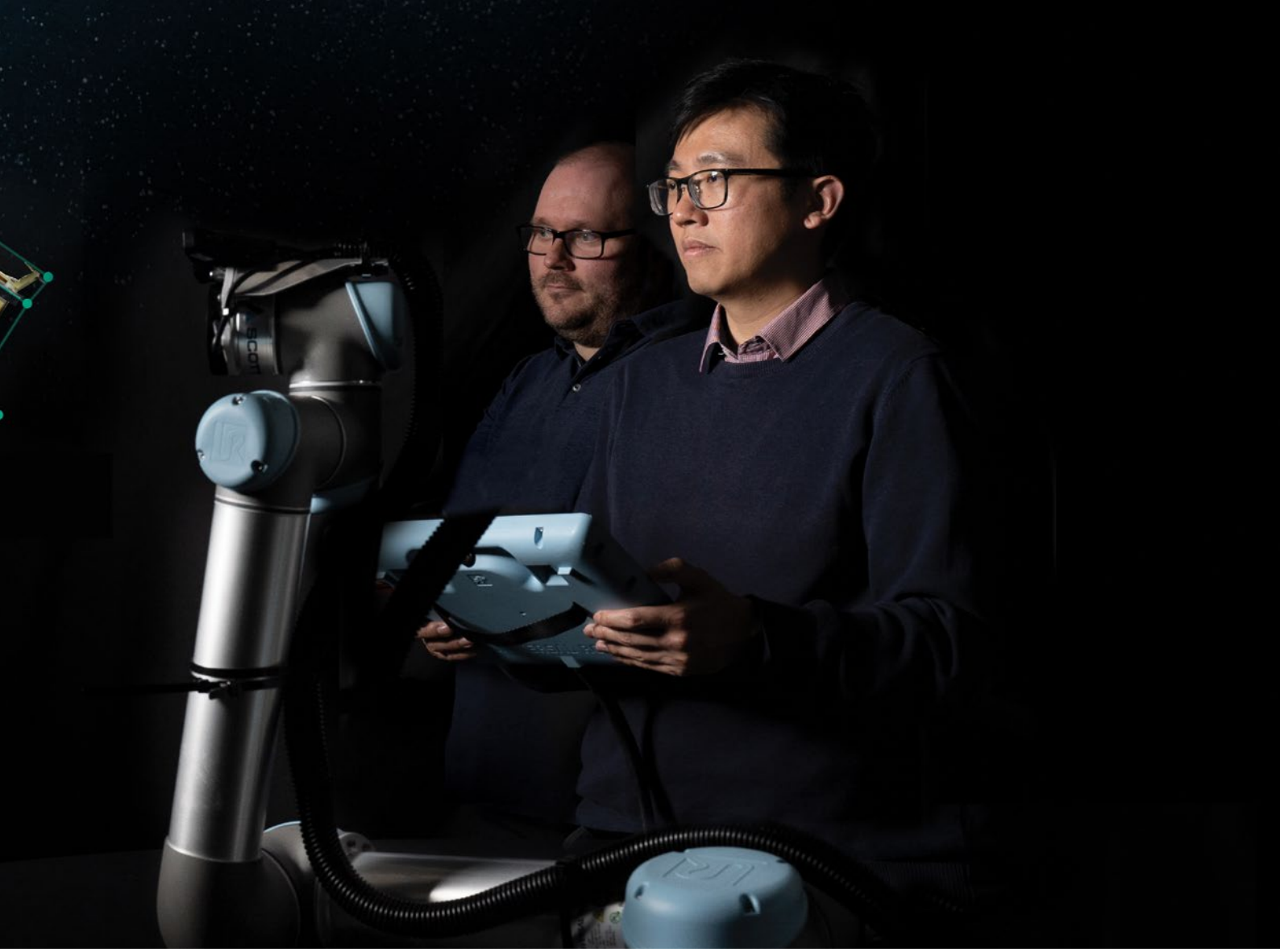
Our innovative capabilities enable us to engage with domestic and international businesses in:

- health and medical
- mining and resources
- agriculture and food
- space
- environment
- advanced manufacturing
- sports science
- transport and infrastructure
- media and entertainment
- finance and commerce
- energy
- social and policy
- ICT.

AIML also works with the University's Defence and Security Institute on sensitive projects related to national security.

With a proven track record of collaborating with local, state and federal governments, universities, multinational organisations and SMEs, our talented researchers can work with you to provide practical solutions including:

- developing deeper insights into customer behaviour
- identifying patterns in large, complex data sources
- predicting future behaviour of consumers and systems
- coaching staff or students on how to improve their performance
- optimising complex systems
- automating the interpretation of video and imagery
- producing computer vision and robotics applications
- deep learning and pattern recognition
- natural language processing
- visual question answering
- generating AI innovation strategies.



Collaborative research and development (R&D)

AIML researchers are working with companies from start-ups to multinationals to develop revolutionary new technology.

We have an impressive track record of successful research and development projects that have been executed under various grants schemes, including ARC Linkage Projects, CRC-P Projects and Defence Innovation Partnerships.

AIML conducts fundamental and applied research, and our specialised staff are experienced in developing and tailoring R&D proposals to suit individual requirements.

AIML's services have seen multiple patents commercialised and intellectual property licenced, forming the foundation of a number of sophisticated products.

Working with us

Whether it is a short-term contract or a major, cross-disciplinary venture, AIML has the expertise and capability to work with industry and government on product commercialisation and development.

We work collaboratively to develop exclusive AI-based products and ensure that our clients are ready to compete in an AI-enabled economy.

WITH A PROVEN TRACK RECORD COLLABORATING WITH LOCAL, STATE AND FEDERAL GOVERNMENT, UNIVERSITIES, MULTINATIONAL ORGANISATIONS AND SMES, OUR TALENTED RESEARCHERS CAN WORK WITH YOU TO PROVIDE PRACTICAL SOLUTIONS.

KAURNA ACKNOWLEDGEMENT

We acknowledge and pay our respects to the Kaurna people, the original custodians of the Adelaide Plains and the land on which the University of Adelaide's campuses at North Terrace, Waite, and Roseworthy are built. We acknowledge the deep feelings of attachment and relationship of the Kaurna people to country and we respect and value their past, present and ongoing connection to the land and cultural beliefs. The University continues to develop respectful and reciprocal relationships with all Indigenous peoples in Australia, and with other Indigenous peoples throughout the world.

FOR FURTHER ENQUIRIES

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