

# AiLECSlab

Highlights 2024



# AiLECS Lab

## A Centre of Applied Research

The AiLECS Lab brings together Australia's largest university and Australia's national policing organisation to undertake research and development in AI for law enforcement and community safety.

We have a broad remit in this regard. This means we examine AI from both technological and socio-technical viewpoints. We are focused on outcomes that are informed by academic research and are directly applicable in relevant agencies.

A collaboration between:



**MONASH**  
University



**AFP**  
AUSTRALIAN FEDERAL POLICE

## Research Themes for 2024

We regularly review our research priorities to adapt to the fast moving world of AI and related technologies. In 2024, our research efforts were primarily, although not exclusively, focussed in the following areas.

### Threat Detection

From analysis of temporal criminal networks through to research into the use of large language models for proactively detecting threatening communications.

### Child Protection

Countering the spread of child sexual abuse material using technological interventions. Convening experts to focus efforts to enhance the safety of children online.

### Ethics and Community Voice

Understanding the broader impact of AI, listening to communities, curating data responsibly, informing and operationalising ethics frameworks.

### Fighting AI Fakery

Generative AI image detection, image poisoning approaching and deepfake audio detection

### Computer Vision

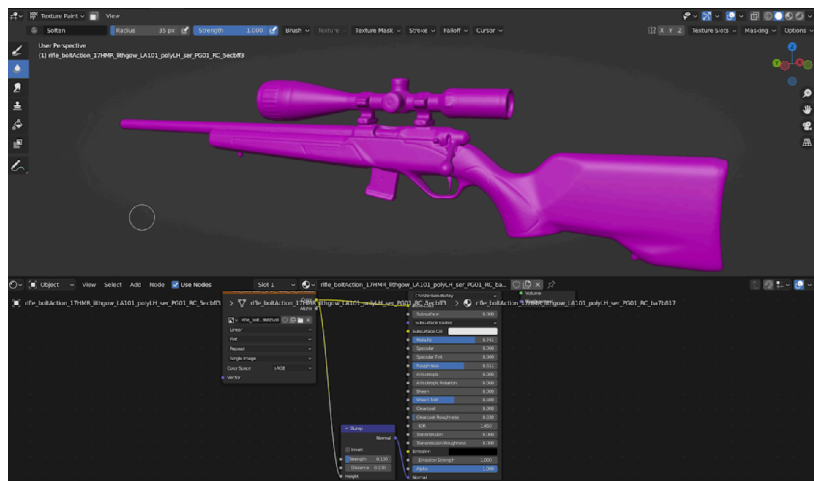
Recognising firearms, characterising the forensic value of images as well as transfer learning methods for sensitive image recognition.



# Technical Product Delivery

At the core of AiLECS is research and development of AI tools that have real-world relevance for law enforcement. A significant portion of the year was spent refining development pipelines such that we have a standardised platform from research prototypes through to potential operational deployment. During 2024 we delivered a number of these tools, across a range of application areas.

AiLECS is a research laboratory and all products we produce are subject to all relevant ethical and privacy reviews before they are considered for operational use. Get in touch with us to learn more. Our contact details are on the last page of this report.

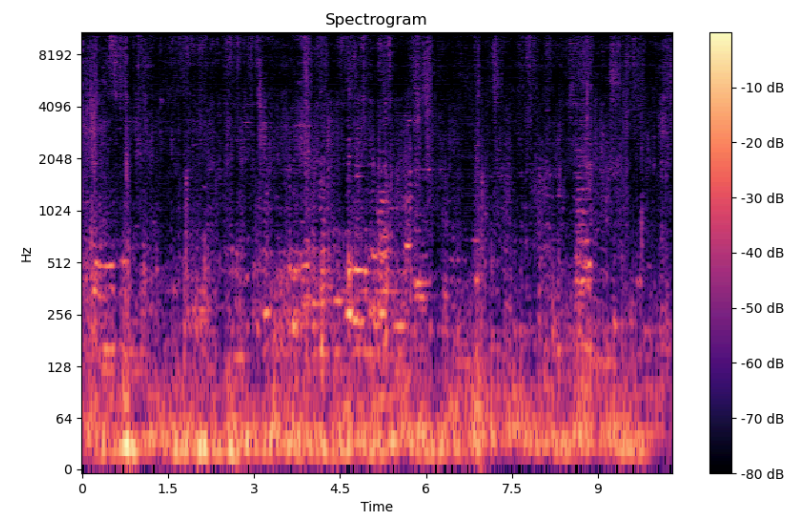


- THREAT-TO-LIFE** Projects involving image similarity and image captioning
- HAND-DETECTION** Detection of hands and hand landmarks such as tattoos, scars and fingerprint
- SANDBOX** A playground for model and code development
- TEMPLATES** A group to describe administration-related projects, tasks and issues.
- ADMINISTRATION** A group to describe administration-related projects, tasks and issues.
- GEOLOCATION** Projects that help detect location from image, video and audio
- DEEFAKE-DETECTION** Deepfake detection related projects
- METIOR-TELMUM** Firearms renderer, object detection and other ML

- IMAGE-SIMILARITY** Projects involving image similarity and image captioning
- SOUND-DETECTION** Projects relating to detection of specific sounds in audio
- UTILITIES** ML-related tools and toolkits
- DATASET-DOCUMENTATION** ML-related tools and toolkits
- EVENTS** Events such as conferences, symposiums and foreign delegations
- VALID** Events such as conferences, symposiums and foreign delegations

## Note

Our technical products will be described in more detail via separate reports published on our website.





**Training for law enforcement agencies in investigating distribution of child sexual abuse material across peer-to-peer networks (in conjunction with ICMEC Australia and Child Rescue Coalition)**



**Professor Michael Salter, Hetty Johnston AM, Grace Tame, Kelly Humphries and Professor Jon Rouse speaking at the 2024 AiLECS Symposium on Countering Online Child Exploitation**

## Collaborating to Protect Children

The AiLECS Lab has long been committed to advancing the fight against child abuse through our socio-technical AI research and development. But this is a fight to be had on several fronts. Governments, law enforcement agencies, academia, industry, advocates, abuse survivors and NGOs in Australia and beyond must unite. It's only together that we can truly address this increasing threat to our most vulnerable. In 2024 we continued our engagement with partners across the sector, delivering tangible outcomes.

### Newly Funded Project in 2024

#### Australian Research Council Discovery Grant

Professor Jonathan Clough (Faculty of Law, Monash University and AiLECS Stream Lead)  
Associate Professor Campbell Wilson (AiLECS Co-Director, Monash University)  
Associate Professor Lennon Chang (Cyber Risk and Policy, Deakin University)

Improving Legal Frameworks to Support Online Child Sex Abuse Prosecutions. This project aims to gain a deeper understanding of the nature and extent of online child sexual abuse prosecutions in Australia. Using empirical studies to draw on the practical experience of law enforcement and other stakeholders, it will generate new knowledge concerning the suitability of Australia's legal and policy frameworks to effectively investigate and prosecute such offences, with a particular focus on the Asia-Pacific region and the use of new technologies. Expected outcomes include evidence-based recommendations on criminal law reform and enforcement policy that aim to improve the international enforcement of online child sexual abuse offences, and to provide a model for other forms of serious transnational online crime.





## Listening to Victims and Survivors

In partnership with leading child protection agency Bravehearts, this initiative seeks to understand the perspectives of victims and survivors of childhood sexual abuse where that abuse has been recorded or depicted in child sexual abuse material (CSAM) and subsequently used by institutions (i.e. investigative, legal, research and broader crime prevention contexts). The research was generously funded by the National Centre for Action on Child Sexual Abuse.

The project has been instrumental in elevating the voices of lived experience in a way which speaks to the inherent need for safe and accountable systems and process where CSAM is used. Moreover, it highlights the need for transparency, safety, integrity, consistency, collaboration and trauma-informed practices and responses which meet the unique needs of victims and survivors of CSAM. These approaches must consider the life altering harm caused through the creation and dissemination of CSAM.

We are very proud to be part of this pivotal research, and more importantly, to impact change in the way institutions engage with victims and survivors of CSAM. Our findings and policy recommendations will be delivered to the National Centre in December 2024.



**The Research Team (L-R):** Nina Lewis (AiLECS), Kelly Humphries (AiLECS), Greg Rolan (AiLECS), Carol Ronken (Bravehearts), Campbell Wilson (AiLECS)



## Putting AI on Trial

Increasingly, courts will be dealing with AI in many aspects of their work. In September 2024, together with the Monash Law School we explored a likely scenario from the near future whereby evidence produced using AI tools was critical to a prosecution.

AiLECS Lab furnished the scenario and the expert witness in a mock trial presided over by Justice John Champion of the Victorian Supreme Court, with highly qualified prosecution and defence barristers undertaking examination and cross-examination. A number of law enforcement and judicial agencies also attended.

A panel of experts from the Victorian Bar, the University of Sydney Law School, the Victorian Supreme Court, Victoria Police Forensic Services and the Victorian Institute of Forensic Medicine subsequently explored the issues raised in the trial, facilitated by Professor Jonathan Clough of the Monash Law School.





# Translating Ethics into Practice

A major focus of AiLECS is the ethical use of technology such as AI, particularly in law enforcement contexts. In May 2024 we were proud to run a symposium and participatory design exercise focusing on ethics in community safety, policing and AI. AiLECS Lab Ethics Lead Dr Nina Lewis chaired this event.

Day one opened with a presentation by the Australia New Zealand Policing Advisory Authority (ANZPAA), sharing insights on ethical AI frameworks and the task of designing and operationalising their AI policing principles. This was followed by keynote talks and panel discussions featuring speakers including Professor Jeannie Patterson (University of Melbourne), Eva Tsahuridu (Police Registration and Standards Board), Professor Lyria Bennett Moses (UNSW) and other speakers from law enforcement, justice, academia, and those involved with the design, delivery and impacts of AI in policing.

Panellists included Grace Tame (Grace Tame Foundation); Elena Campbell and Stan Winford (Centre for Innovative Justice, RMIT), Associate Professor Vicki Sentas (UNSW); representatives from the Queensland Police Service, Victoria Police Service and the Australian Federal Police amongst others.

Day two was a half-day workshop bringing together collective expertise to build on knowledge shared in Day 1. Attendees worked together in groups to surface ethical challenges and human impacts relating to how AI is transforming the practice of policing in our region. They help articulate strategies to effectively operationalise AI principles in ways that achieve safer outcomes for our communities.

Police use of facial recognition tools integrated with body-worn cameras and real-time data







## Capacity building in India

In partnership with the British Asian Trust, Cyberpeace Foundation and UNICEF, the AiLECS Lab was a key partner in a 2024 pilot program seeking to understand and assist with efforts to counter child exploitation in the Indian state of Bihar. AiLECS convened the first partner workshop of the program at Monash University in April 2024 - an opportunity for knowledge sharing and project scoping.

This was followed in October by the second workshop in Patna, Bihar which explored implementation and future directions. During this trip AiLECS researchers also presented to a state-level conference on cybersecurity and met directly with local law enforcement officials to discuss practical measures that may assist in safeguarding local children depicted in online sexual abuse.





## My Pictures Still Matter

Throughout 2024 we continued the **My Pictures Matter** crowdsourcing campaign. We were looking for people aged 18 and over to contribute childhood photos of themselves to a research dataset that will be used to train algorithms to recognise (but not identify) children as part of a suite of tools that can help fight child exploitation.

We are so grateful to those who have contributed their photos. We now have thousands of images that will form the basis of a carefully constructed dataset that will be employed strictly for the purposes we have outlined in the communications to contributors. It is time for us to pause the collection of new images. We will report in 2025 as to how the My Pictures Matter campaign has assisted efforts in countering child exploitation, and our future plans for the campaign.

Watch this space: [mypicturesmatter.org](https://mypicturesmatter.org)







## Outreach

In 2024 AiLECS Lab researchers gave a range of presentations and participated in various consultations.

- Australian Family Violence Network
- Management of Serious Crime Program (AFP and partner agencies)
- Australian Police Technology Forum
- SXSW Sydney
- "Off the Cuff with Kel" Podcast
- Westpac Safer Children Safer Communities Research Roundtable
- Data61 Human-Centred AI and Cybersecurity Seminar Series
- Youth, Technology and Virtual Communities (YTV) Conference
- Global Evidence Based Policing Conference
- IEEE International Conference on System, Man and Cybernetics (SMC2024)
- European Conference on Machine Learning (ECML2024)
- AARNET/ASPI/FPF Seminar Series on Children's Privacy, Security and Online Safety
- Monash University guest lectures
- Monash University Deep Neuron (Student Club) Industry Night
- ICMEC Australia Symposium: Vigilant Disruption of Child Sexual Exploitation
- Queensland Police Service Intelligence and Strategy Capability Conference
- Leadership in Counter-Terrorism Alumni Association Conference
- Australia and New Zealand Policing Advisory Association Conference
- ANZPAA Responsible Use of AI in Policing Forum
- South Australia Police Briefings
- Victoria Police Briefings

## A Trusted Partner

In 2024, AiLECS Lab members have been called upon to participate in a range of initiatives and programs. We thank ICMEC Australia, Thorn and the WeProtect Alliance, The Age Check Verification Scheme, Europol, INTERPOL and INHOPE for the opportunity to be part of their important work.



INTERPOL

DevOps Technical Working Group



EuCB Strategic Group on AI  
EuCB Strategic Group on Ethics

INHOPE

Universal Classification Scheme Expert Council



Global Evolving Technologies Steering Group

Funded by



Australian Government  
Department of Infrastructure, Transport,  
Regional Development, Communications and the Arts

Project by



Age Check  
Certification Scheme

Stakeholder Advisory Board





**Visit to AiLECS by  
The Hon Mark Dreyfus KC  
Attorney-General of Australia**



**Visit to AiLECS by  
Sir Matthew Rycroft KCMG, CBE  
Permanent Secretary of the UK Home Office**



**Visit to AiLECS by  
Mr Aubeck Kam  
Director of HTX  
Ministry of Home Affairs Singapore**

## Engaging with Governments

During 2024 we were pleased to host a number of senior government representatives from Australia and beyond, all of whom were keen to hear about AiLECS work and its impact.



# Student Engagement

Part of our mission is to provide opportunities for Monash University students to work with us. Our students gain experience working in an applied research environment focused on real-world outcomes. In many cases their work, in collaboration with our researchers, is contributing to technical product suite.

As of December 2024, our student engagement profile is as below:

## Undergraduate:

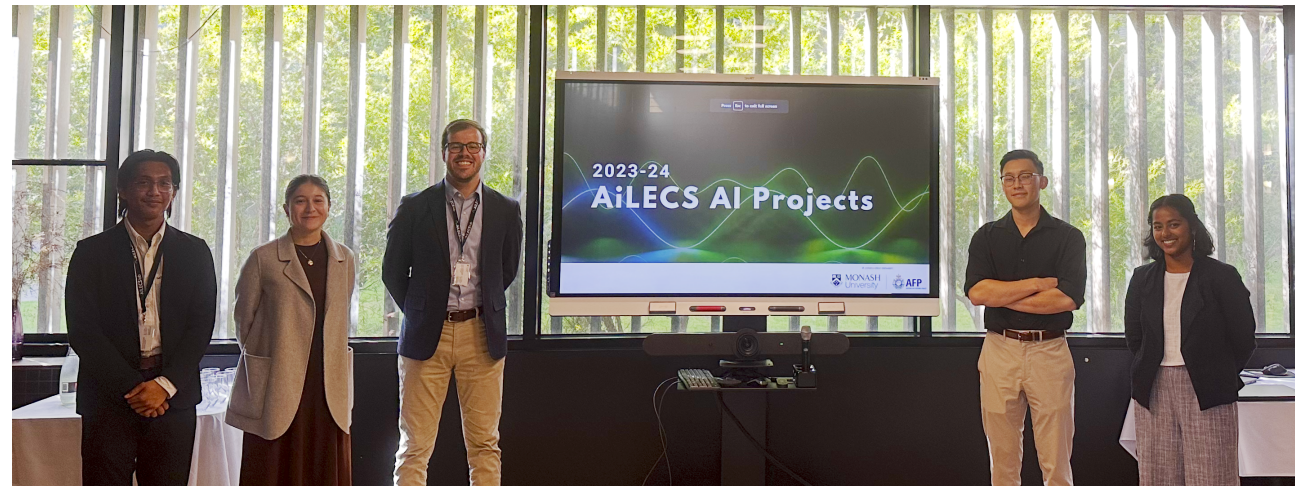
- Bachelor of Applied Data Science, Industry Placement (4 completed, 1 continuing)
- Bachelor of Science, Summer Industry Placement (1 continuing)
- Faculty of Information Technology FIT2082 Program (5 completed)
- 2023/2024 Monash Industry Team Initiative (5 completed)

## Postgraduate Coursework:

- Master of Artificial Intelligence, Minor Thesis (1 completed)
- Master of Data Science, Minor Thesis (1 completed, 2 continuing)

## Higher Degree by Research:

- Doctor of Philosophy (PhD) (2 continuing)



## Our network

Thank you to our partners, funders and all those we worked with during 2024.



Australian Government  
Australian Research Council





## Peer-reviewed Academic Papers (2024)

Nguyen, T. T., Wilson, C., & Dalins, J. (2024). Adaptive Knowledge Distillation for Classification of Hand Images Using Explainable Vision Transformers. In Joint European Conference on Machine Learning and Knowledge Discovery in Databases (ECML/PKDD2024) (pp. 235-252).

Humphries, K.A.M., Lewis, A., Rolan, G., Ronken, C., & Wilson, C. (2024) Hear our voices - survivor perspectives on tackling CSAM. Child Sexual Abuse Reduction Research Network Conference, Leiden, The Netherlands, 5-6 December 2024

Nguyen, T. T., Wilson, C., & Dalins, J. (2024). Fine-tuning Llama 2 large language models for detecting online sexual predatory chats and abusive texts. Proceedings of the 32nd European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning, 613-618.

Humphries, K.A.M., McGillivray, C. and Christophersen, L., (2024). Proposing trauma-informed practice and response in policing: A social innovation narrative for reforming responses to child sexual abuse and exploitation. Journal of Community Safety & Well-Being, 9(3), pp.164-173.

He, H., Wilson, C., Nguyen, T. T., & Dalins, J. (2024). Sensitive Image Classification by Vision Transformers. Proceedings of the 2024 IEEE International Conference on Systems, Man, and Cybernetics (SMC), Sarawak, Malaysia.

Rolan, G. and Lewis, A., (2024). The perpetual twilight of records: consentful recordkeeping as moral defence. Archival Science, pp.1-31.

Nguyen, T. T., Wilson, C., & Dalins, J. (2024). Object Detection Approaches to Identifying Hand Images with High Forensic Values. Proceedings of the 2024 IEEE International Conference on Systems, Man, and Cybernetics (SMC), Sarawak, Malaysia.

Ballin, M., Humphries, K., Lewis, A., Rolan, G. and Ronken, C. (2024) "Survivor Perspectives on Institutional Use of Child Sexual Abuse Material", International Journal for Crime, Justice and Social Democracy. doi: 10.5204/ijcsd.3581



**Get in touch with us:** [hello@ailecs.org](mailto:hello@ailecs.org)

**Find out more:** [ailecs.org](https://ailecs.org)

## **AiLECS Lab 2024 Members**

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Joanne Lee  
Nina Lewis  
Thanh Thi Nguyen  
Sarayu Nousind  
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Elizabeth Perry  
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Jon Rouse  
Ai-Lin Soo  
Quoc Tran  
Derek Villaceran  
Campbell Wilson  
Anthony Wylde

