GO8 SUMMIT: AI COLLABORATION AND COMMERCIALISATION

## PROGRAM

**Thursday 31 October 2019** 07.45–17.00

**Monash University** Room G31, Learning and Teaching Building, 19 Ancora Imparo Way







PROGRAM

# BIOGRAPHIES

SUMMIT PAPER







07.45	Light breakfast on arrival
08.00	Registration
08.30	WELCOME
08.30 - 08.40	Welcome to the Go8 AI Collaboration and Commercialisation Summit
	Summit Host: <b>Professor Margaret Gardner</b> President and Vice-Chancellor Monash University
08.40 - 08.45	Welcome to Country
	<ul> <li>Elder from the Wurundjeri Land &amp; Compensation Cultural Heritage Council Aboriginal Corporation</li> </ul>
08.45 - 08.55	Launch of the Go8 AI Capability Statement
	Professor Dawn Freshwater Vice Chancellor University of Western Australia and Go8 Chair
08.55 – 09.05	The day's three key questions
	Summit Facilitator: Professor Marc Parlange Provost and Senior Vice-President Monash University
09.05 – 09.25	Opening Keynote and Context
	Dr Alan Finkel Australia's Chief Scientist
09.25 – 09.40	Keynote Address: Artificial Intelligence and the implications for Australia (by recorded video)
	Professor Toby Walsh Scientia Professor of Artificial Intelligence UNSW Sydney

SESSION 1	IMPROVING AUSTRALIA'S AI COMMITMENT
	There are extensive opportunities for Australia from the existing strengths in AI and related fields that are within the Go8 and other organisations. As global advances accelerate, Australia will need to keep pace, and preferably be ahead, in niche areas if it is to have a competitive edge in trade, R&D, and across most sectors; including Defence and Space. Considerations range from required investment, much greater industry adoption, and the building of required workforce skills.
09.40 - 10.40	Improving Australia's AI commitment
	Panel Chair: <b>Dr Dean Moss</b> Chief Executive Officer UniQuest University of Queensland and Chair of the Go8 Innovation and Commercialisation Group
	Dr Tony Lindsay Director STeLaRLab Lockheed Martin
	Mr Jonathan Chang Silverpond Chief Executive Officer and Founder
	<ul> <li>Professor Sally Cripps         Director of Centre for Translational Data Science Professor of Statistics School of Mathematics and Statistics University of Sydney     </li> </ul>
	<ul> <li>Mr Nicholas Therkelsen-Terry</li> <li>Max Kelsen Chief Executive Officer and Co-founder</li> </ul>
	<ul> <li>Dr Mike Molinari</li> <li>Managing Director IP Group Australia</li> </ul>
	For open discussion and with panel Q&A
10.40 – 11.00	Morning Tea

#### 11.00 – 12.00

#### Case Studies

#### Panel Chair: **Vicki Thomson** Chief Executive Group of Eight

An industry partner and university partner describe how they worked together to deliver a product for the industry partner. They will highlight the challenges, what the industry partner needed, what the university partner delivered, and lessons learned

#### Case Study 1 – Monash University and Australian Federal Police (AFP)

Case study on AFP collaboration with the university on the dark web and using AI to track down cyber criminals.

#### Dr Campbell Wilson

Associate Dean (International) Co-Director AiLECS (AI for Law Enforcement and Community Safety) research laboratory Monash University

Dr Janis Dalins

AFP Co-Director AiLECS Lab and Data Science Lead for Digital Forensics

Ms Annelize Venter AFP Manager of Information Data Management and Analytics

With Q&A

#### Case Study 2 – Al Startup Hivery

Case study on HIVERY, an AI startup, established by three academics and two associates from Coca-Cola. It will explore how the company started with an experimental mindset and convinced established retailers and CPG companies to think differently about embracing and starting out with AI and operations research. The case study will cover how HIVERY secured customer data and used a unique product development methodology to co-develop software applications that assist them look at retail space management in ways never possible; scaling to the USA, Japan and Latin America (LATAM) in the progress. The session may also discuss skills transfer, attracting people to AI careers and access to data.

- Dr Menkes van den Briel Hivery Data Scientist and Co-founder
- Mr Franki Chamaki

Hivery Chief Operations Officer and Co-founder

With Q&A

#### 12.00 - 12.15

Keynote Address: Artificial Intelligence – the European and French context

# Professor Jean Chambaz President Sorbonne University France and Chair of the League of European Research Universities (LERU)

SESSION 2	IMPROVING AI DEPLOYMENT INTO THE ECONOMY AND SOCIETY				
	How people respond to AI, either by embracing, being concerned, or rejecting it, depends on the degree to which AI is discussed in Australia. The Go8 has a role, with key AI industry innovators, in assisting and informing ways to navigate this societal and industry change.				
12.15 – 13.15	Panel Chair: <b>Dr Alastair Hick</b> Senior Director Monash Innovation				
	<ul> <li>Professor Sarah Pink</li> <li>Professor and Director Emerging Technologies Research Lab</li> <li>Monash University</li> </ul>				
	Ms Narelle Luchetti Acting Head Digital Economy and Technology Division Department of Industry Innovation and Science				
	Professor Anton van den Hengel Director Australian Institute for Machine Learning Chief Investigator Australian Centre for Robotic Vision and Professor of Computer Science University of Adelaide				
	<ul> <li>Dr Stefan Hajkowicz</li> <li>Senior Principal Scientist Strategy and Foresight and Director Data61 Insight Team CSIRO</li> </ul>				
	Dr Jürg von Känel Associate Director IBM Research Australia				
	<ul> <li>Professor Nicole Gillespie</li> <li>KPMG Chair in Organisational Trust Professor of Management</li> <li>School of Business University of Queensland</li> </ul>				
	For open discussion and with panel Q&A				
13.15 – 14.00	Lunch				
	UNSW soccer robots on show				
	<b>Professor Claude Sammut</b> Professor of Computer Science and Engineering and Head of the Artificial Intelligence Research Group UNSW Sydney with:				
	Tripta Kaur Fourth year undergraduate student School of Computer Science and Engineering and School of Mechanical and Manufacturing Engineering Faculty of Engineering UNSW Sydney				
	Ethan Jones PhD Student School of Computer Science and Engineering Faculty of Engineering, UNSW Sydney				
14.00 – 14.30	Keynote Address: Australia AI ethics framework				
	<ul> <li>Dr Stefan Hajkowicz CSIRO Senior Principal Scientist Strategy and Foresight and Director Data61 Insight Team</li> </ul>				

	The expanding role of AI demands Australia be ready to navigate, respond to and incorporate the myriad possibilities from this. There are legal, ethical and regulatory challenges. Trust is essential. A fundamental consideration underpinning policy development, governance and regulation around AI is how trust is established and maintained. Regulatory measures, transparency, and AI clarity, plus visibility regarding 'safe' implementation are key to achieving trust. Trust extends to data collection, access and usage that enables AI. Associated with trust and safety, are the areas of ethics, productivity, employment, health and inequality <sup>1</sup> .
14.30 – 15.45	Panel Chair: <b>Vicki Thomson</b> Chief Executive Go8
	<ul> <li>Mr Edward Santow</li> <li>Human Rights Commissioner Australian Human Rights Commission</li> </ul>
	Dr Jed Horner Strategic Advocacy Manager Standards Australia
	Professor Jeannie Paterson Professor of Law University of Melbourne
	<ul> <li>Associate Professor Paul Henman</li> <li>Associate Professor Digital Sociology and Social Policy,</li> <li>School of Social Science University of Queensland</li> </ul>
	Ms Veronica Scott Director KPMG Law KPMG
15.45 – 16.00	Bringing it together: Opportunities for action with future collaboration and discussions
	Summit Facilitator: <b>Professor Marc Parlange</b> Provost and Senior Vice-President Monash University
16.00 – 17.00	Wrap up drinks

AUSTRALIA'S AI POLICY, GOVERNANCE AND REGULATION

SESSION 3

7

1 ACOLA 2019, The effective and ethical development of artificial intelligence p. 18

#### WELCOME 08.30-08.40

#### LAUNCH OF THE GO8 AI CAPABILITY STATEMENT 08.45-08.55

### WELCOME



### Professor Margaret Gardner AO

President and Vice-Chancellor Monash University

Margaret Gardner has been President and Vice-Chancellor of Monash University since September 2014. Prior to joining Monash, she was Vice-Chancellor and President of RMIT from April 2005 until August 2014. Professor Gardner was Chair of Universities Australia from 2017 to 2019, and is a Go8 Director. She is also a Director of Infrastructure Victoria, the Australia and New Zealand School of Government (ANZSOG) and a member of the Prime Minister and Cabinet Inclusion and Diversity Committee. Professor Gardner was made an Officer of the Order of Australia in recognition of service to tertiary education.

**Professor Dawn Freshwater** Go8 Chair and Vice-Chancellor The University of Western Australia

Dawn Freshwater became Vice-Chancellor of The University of Western Australia (UWA) in January 2017 and is leading the implementation of UWA's 2030 Vision and Strategic Plan. Her contribution to the fields of Public Health (specifically Mental Health and Forensic Mental Health) and her research in Leadership practices won her the highest honour in her field. Professor Freshwater is a Director of the Perth US Asia Centre, Vice-Chair of the Worldwide Universities Network and member of the NHMRC Women in Health Science Committee.

#### SUMMIT FACILITATOR 08.55–09.05



### OPENING KEYNOTE AND KEYNOTE ADDRESS

**Professor Marc Parlange** Provost and Senior Vice-President Monash University

Marc is the Provost and Senior Vice-President of Monash University and is Professor in the Department of Civil Engineering. Prior to his position at Monash, he served as Dean of the Faculty of Applied Science at the University of British Columbia (Canada) and Dean in Switzerland at the École Polytechnique Fédérale de Lausanne (Switzerland) in the School of Architecture, Civil and Environmental Engineering. He was professor and department chair at Johns Hopkins University and Assistant and Associate Professor at the University of California at Davis. He has an MS and PhD from Cornell University, and a BS from Griffith University.



**OPENING KEYNOTE** 09.05–09.25

Dr Alan Finkel AO Australia's Chief Scientist

Alan became Australia's Chief Scientist in January 2016. He is Australia's eighth Chief Scientist. Prior to this he served as President of the Australian Academy of Technology and Engineering (ATSE), and for eight years as Chancellor of Monash University.

As Chief Scientist, Alan is leading the development of the national hydrogen strategy at the request of the Council of Australian Governments. He also led the 2016 National Research Infrastructure Roadmap, the 2017 Review into the National Electricity Market ("Finkel Review") and the 2018 STEM Industry Partnership Forum report. He serves as the Deputy Chair of Innovation and Science Australia.

He has an extensive science background as an entrepreneur, engineer, neuroscientist and educator. He was awarded his PhD in electrical engineering from Monash University and worked as a postdoctoral research fellow in neuroscience at ANU. He was 2016 Victorian of the Year, and received the 2015 IET Mountbatten Medal (UK) and the 2019 IEEE Joseph F. Keithley Award in recognition of his work in advancing the field of scientific instrumentation.

#### KEYNOTE ADDRESS 09.25–09.40



### SESSION 1: IMPROVING AUSTRALIA'S AI COMMITMENT

**Professor Toby Walsh** Scientia Professor of Artificial Intelligence UNSW Sydney

Toby is Scientia Professor of Artificial Intelligence at UNSW, a researcher at Data61, and guest professor at the Technical University of Berlin. He was named by "The Australian" as a "rock star" of Australia's digital revolution, and he is a Fellow of the Australian Academy of Science. He appears regularly on TV and radio talking about AI, and has authored two books on AI for a general audience, the most recent entitled "2062: The World that AI Made".

PANEL CHAIR 09.40–10.40

**Dr Dean Moss** Chief Executive Officer Uniquest University of Queensland

Dean is CEO of UniQuest, Australia's leading university commercialisation entity, managing the University of Queensland's intellectual property. He has more than 30 years' experience in science, academia, business, management and commercialisation in Australia, the US and the UK. He has been managing director or senior business development executive of several health and biotech companies worldwide, including Agen Biomedical, Launch Diagnostics, AMRAD ICT, AMRAD Biotech, and United Drug. Dean established the highly successful York Medical Technologies as a start-up in the UK in 2004. He is a board member of several Australian biotechnology companies and was a member of the investment committee of pre-seed venture funds Uniseed, the Medical **Research Commercialisation Fund** and the New Zealand Government's KiwiNet. Throughout his career, Dean has managed the raising of more than \$100M in venture capital investment. He sits on the NHMRC Health Innovation Advisory Committee and is Chair of the Go8 Innovation and Commercialisation Group. In 2018, Dean was awarded the title of Adjunct Professor in the office of the UQ's Deputy Vice-Chancellor (Research).

### **PANEL** 09.40–10.40

### **PANEL** )9.40–10.40

### **PANEL** 09.4<u>0–10.40</u>



**Dr Tony Lindsay (Panellist)** Director of Science, Technology, Engineering Leadership and Research Laboratory (STELaRLab) Lockheed Martin

STELaRLab is Lockheed Martin's first international multidisciplinary Research and Development (R&D) Laboratory. Prior to his role at Lockheed, Tony was with the Defence Science and Technology Group for 28 years. His last position was Chief of the National Security and Intelligence, Surveillance and Reconnaissance Division. In that role he was responsible for R&D programs supporting Australian Defence Organisation (ADO) ISR Projects including major surveillance acquisitions and intelligence programs.

### Mr Jonathan Chang Chief Executive Officer

and Founder Silverpond

Jonathan is the founder and CEO of Silverpond, a machine learning and artificial intelligence company based in Melbourne. His vision inspires the Silverpond team to create ground-breaking solutions for clients transforming their industries; from asset management and utilities to retail, healthcare, and research.

Jonathan is passionate about harnessing AI to positively transform society. He advocates for responsible AI at speaking events and conferences, and with industry groups and government.

### **Professor Sally Cripps**

Director of the Centre for Translational Data Science Professor of Statistics, School of Mathematics and Statistics University of Sydney

Sally is Director of the Centre for Translational Data Science, University of Sydney and a Professor of Statistics, School of Mathematics and Statistics. She was awarded an Australian Research Council Future Fellow 2014-2018 and is currently Director of the ARC Industrial Transformation Training Centre Data Analytics for Resources and Environments (DARE). She is also Chair of the International Society for Bayesian Analysis's section Bayesian Education and Research in Practice. Her research focus is the development of new and novel probabilistic models which are motivated by the need to solve an applied problem with potential for impact. She has particular expertise in the use of mixture models for complex phenomenon, modelling longitudinal data, nonparametric regression, the spectral analysis of time series and in the construction of transitions kernels in MCMC schemes which efficiently explore posterior distributions of interest.

### **PANEL**



### **CASE STUDIES**

Mr Nicholas Therkelsen-Terry

Chief Executive Officer and Co-founder Max Kelsen

Nicholas co-founded Max Kelsen in 2015 to provide big data and machine learning services and AI to large and small clients. Max Kelsen now employs over 30 machine learning and AI experts and has delivered Al services and solutions to some of Australia's biggest brands. In addition to working with corporate and government clients, the Max Kelsen team has recently attracted millions in funding to further its research into applying state-of-theart AI to treatment selection and outcome prediction for lung cancer and melanoma patients. In 2017, Nick co-founded otso.ai, a platform for enterprises to analyse and process unstructured data from any source. It is now used by thousands across hundreds of teams. Alongside these two roles he heads up Queensland Al, Australia's biggest Al meetup with almost 3,000 members. Nick has a broad range of expertise spanning business, economics, sales, management and law. He has a deep theoretical and applied understanding of cutting-edge machine learning techniques, and has been widely recognised as a domain expert in this field. Nick has a Bachelor of Laws and Bachelor of Economics from the University of Queensland.

Dr Mike Molinari Managing Director IP Group Australia

Mike is the Managing Director of IP Group Australia, a global leader in commercialisation which has partnered with the Go8 and Auckland university and committed to invest a minimum of A\$200M over 10 years in technologies arising from these universities. Mike has deep experience in commercialisation of technology in both Australia and the UK, having both managed university spinouts and been an investor in them. Mike holds a DPhil and MSc in Biomedical Engineering from the University of Oxford.

#### PANEL & CASE STUDY CHAIR 11.00–12.00

#### CASE STUDY 11.00–12.00

# CASE STUDY 11.00–12.00



**Ms Vicki Thomson** Chief Executive The Group of Eight

Vicki is Chief Executive of the Group of Eight (Go8) - Australia's eight leading research-intensive universities. She took up her role in January 2015. Prior to this, she was Executive Director of the Australian Technology Network of Universities (ATN). Ms Thomson's diverse background covers print and electronic journalism, politics, issues management and the higher education sector. She has an extensive media, political and policy background and was Chief of Staff to a South Australian Premier. She is a Board member of the European Australian Business Council and is a member of the Australian Government's New Colombo Plan Reference Group.

### **Dr Campbell Wilson**

Co-director of the AiLECS (AI for Law Enforcement and Community Safety) Research Laboratory Monash University

Campbell is co-director of the AiLECS (AI for Law Enforcement and Community Safety) research laboratory, a joint initiative of Monash University and the Australian Federal Police. His expertise encompasses machine learning, information retrieval and digital forensics. His current research focuses on the application of AI in addressing serious societal issues such as online child exploitation. He also explores the ethical implications of AI technologies in law enforcement applications and their explainability in policing and judicial contexts.

**Dr Janis Dalins** AFP Co-Director AiLECS Lab and Data Science Lead for Digital Forensics

Janis Dalins, PhD, leads the AFP's data science capability and is co-director of the AiLECS lab. He has over seventeen years' law enforcement experience across the AFP, including counter terrorism, uniform policing and digital forensics. In 2018 he received the Commissioner's Medal for Excellence in recognition of his efforts in developing and applying machine learning methodologies to law enforcement.

## CASE STUDY 11.00–12.00

#### CASE STUDY 11.00–12.00

# CASE STUDY continued



**Ms Annelize Venter** Chief Data and Analytics Officer Australian Federal Police

Annelize is a versatile IT senior manager with highly developed leadership skills and 20 plus years' experience across a diverse range of industries, including insurance, financial services, engineering, mining, manufacturing and pharmaceuticals. Most recently she held leadership roles at Anglo American and Suncorp Group, leading distributed agile teams and managing large scale projects and implementations of operational analytics. Currently she leads teams across three divisions in the Technology and Innovation Portfolio of the AFP. This includes the Data Analytics and Data Science teams.

**Dr Menkes van den Briel** Data Scientist and Co-founder Hivery

Menkes is a co-founder at HIVERY, a startup that develops simple web applications around complex business challenges for retail businesses. HIVERY uses AI techniques to generate measurable and repeatable impact. Menkes has a PhD in Industrial Engineering from Arizona State University. His PhD research was in the area of AI planning and his prior work in Operations Research was cited on the front page of The Wall Street Journal and in numerous other media.

### CASE STUDY 11.00–12.00



KEYNOTE ADDRESS: ARTIFICIAL INTELLIGENCE – THE EUROPEAN AND FRENCH CONTEXT

#### KEYNOTE ADDRESS 12.00–12.15



**Professor Jean Chambaz** President Sorbonne University

Jean is a professor of Cellular Biology and former Director of the Cordeliers Research Center. His institutional leadership positions include President of Pierre & Marie Curie University and following the merger with Paris-Sorbonne, he was elected President of Sorbonne University in 2017. His activities in University Associations include: Chair of the League of European Research Universities (LERU) in 2018; board member of the European University Association (EUA) from 2015 to 2018; and President of the Coordination of French Research-Intensive Universities (CURIF) from 2014 to 2018.

**Mr Franki Chamaki** Co-founder and Chief Operations Officer Hivery

Franki Is a founding member of Coca-Cola's first accelerator; a network of entrepreneurs with the aim of building the next generation of billion-dollar businesses with the support of Coca-Cola. Franki later set up Red Garage Ventures, a venture studio which builds startups by connecting them to Coca-Cola's global assets. He is currently the Co-founder and Chief Operations Officer of HIVERY. A Data61/CSIRO backed AI company helping retailers and FMCGs leverage AI in ways never before. Franki specialises in the areas of Marketing, Design Thinking and Lean Startup; and goes by the belief that anyone who tries to improve a situation is a designer.

#### **KEYNOTE & PANEL CHAIR** 12.15–13.15

### SESSION 2: IMPROVING AI DEPLOYMENT INTO THE ECONOMY AND SOCIETY



Dr Alastair Hick Senior Director Monash Innovation Monash University

Alastair is the Senior Director Monash Innovation at Monash University. Since 2006 he has been responsible for developing a successful licensing and spin out program at Monash, with multiple different interventions including proof of concept funds and strategic partnerships with multiple investors. He was the Chair of Knowledge Commercialisation Australasia from 2015–2018. He has developed and run multiple training programs for technology transfer professionals. Following 10 years as a research scientist he has been involved in commercialisation of technologies from universities and research institutes since 1999, including four years at Cambridge Enterprise at the University of Cambridge. Alastair has a BSc (Hons) in Chemistry with Biochemistry, a PhD in Chemical Ecology, an MBA from the Judge Business School. He is a Director of Monash spinout Amaero Engineering and was a founding Director of the \$30M Trans-Tasman Commercialisation Fund. He has recently been appointed Chair of the Research Committee for the \$100M Monash Technology Transformation Institute in Shenzhen, China.

### **Professor Sarah Pink**

Professor and Director of the Emerging Technologies Research Lab Monash University

Sarah is an internationally leading Design Anthropologist, and is Professor and Director of the Emerging Technologies Research Lab at Monash University. Her research brings new knowledge about human futures to the design of emerging technologies, in international, interdisciplinary and industry engaged projects, and through the design and tailoring of innovative new research approaches and techniques. Sarah has numerous scholarly publications and frequently gives keynote and public lectures to academic, industry and other stakeholder audiences around the world

### **PANEL** 2.15–13.1!

### **PANEL** 12.15–13.15



### Ms Narelle Luchetti

Acting Head, Digital Economy and Technology Division Department of Industry, Innovation and Science

Narelle is acting head of the Digital Economy and Technology Division. She leads teams responsible for the digital economy, regulation of emerging technologies, digital adoption and international digital policy. The division supports the growth and productivity of globally competitive businesses by developing and promoting cohesive national digital economy policies and programs. Over the last 10 years Narelle has worked in digital policy and IT implementation across various agencies, including the Digital Transformation Agency, Treasury and in the private sector.

### Professor Anton van den Hengel

Founding Director, Australian Institute for Machine Learning Chief Investigator, Australian Centre for Robotic Vision and Professor of Computer ScienceAustralian Institute for Machine Learning (AIML) University of Adelaide

Anton is the founding Director of The Australian Institute for Machine Learning, Australia's largest machine learning research group. He is also a Chief Investigator of the Australian Centre of Excellence in Robotic Vision, and a Professor of Computer Science at the University of Adelaide. He has been a CI on over \$60m in research funding from sources including Google, Facebook, Canon, BHP Billiton and the ARC. He has authored over 300 publications, and has recently had a medical technology achieve first-in-class FDA approval. Current research interests include deep learning, vison and language problems, interactive image-based modelling, large-scale video surveillance, and medical machine learning. He and his team have developed world leading methods in a range of areas within Computer Vision and Machine learning, including methods. which have been placed first on a variety of international leaderboards.

Dr Stefan Hajkowicz

Senior Principal Scientist Strategy and Foresight Director, Data61 Insight Team CSIRO

Stefan is a senior principal scientist in strategic foresight at CSIRO. He leads the Data61 Insight Team, a group of researchers and consultants helping organisations navigate digital disruption. Stefan's research and consulting work helps companies, governments and communities explore plausible futures and make wise strategic choices. He is a world leading scholar in decision theory and has published seminal works on the use multi-objective decision support. His research has contrasted structured versus intuitive approaches to decision making. His decision models have guided investments worth hundreds of millions of dollars and have been used by Australia's State and Federal Governments to make critical policy choices. Stefan is widely published in international research literature and his most recent book is "Global Megatrends". He has a doctorate in geography from the University of Queensland and postgraduate qualifications in economics from the University of New England. He is a current and recent member of the OECD and World Economic Forum global strategic foresight communities.

# **PANEL** 12.15–13.15



### UNSW SOCCER ROBOTS ON SHOW

**Dr Jürg von Känel** Associate Director IBM Research Australia

Jürg is the associate director of the "IBM Research Australia" lab in Melbourne. He studied math and computer science at ETH Zürich and holds a Ph.D. in Computer Science (1991). He joined IBM in 1985 in Zürich Switzerland. In 1991 he moved to the IBM TJ Watson Research center in the US. In June 2011 , he came to Melbourne to lead the establishment and operation of the IBM Research lab in Australia.

### **Professor Nicole Gillespie**

KPMG Chair in Organisational Trust Professor of Management University of Queensland Business School

Nicole is the KPMG Chair in Organisational Trust and Professor of Management at the University of Queensland Business School, and an International Research Fellow at the Centre for Corporate Reputation, Oxford University. Her research focuses on the development and repair of trust, particularly in challenging contexts such as after during technological disruption and organisational change and after trust failures. Nicole's research and consulting spans the Health, Banking and Finance, Resources, Higher Education, R&D, Defence and Non-Profit industries.

#### ROBOT PRESENTATION 13.15–14.00



### KEYNOTE ADDRESS: AUSTRALIA AI ETHICS FRAMEWORK

### **Professor Claude Sammut**

Professor of Computer Science and Engineering Head of the Artificial Intelligence Research Group UNSW

Claude is a Professor of Computer Science and Engineering at the UNSW, and head of the AI Research Group. He is on the board of trustees of the RoboCup Federation and was general chair of RoboCup 2019, in Sydney. His main research area is machine learning for robotics. He is also coeditor of Springer's Encyclopedia of Machine Learning and Data Mining.

#### KEYNOTE ADDRESS 14.00–14.30



Dr Stefan Hajkowicz

Senior Principal Scientist Strategy and Foresight Director, Data61 Insight Team CSIRO

Stefan is a senior principal scientist in strategic foresight at CSIRO. He leads the Data61 Insight Team, a group of researchers and consultants helping organisations navigate digital disruption. Stefan's research and consulting work helps companies, governments and communities explore plausible futures and make wise strategic choices. He is a world leading scholar in decision theory and has published seminal works on the use multi-objective decision support. His research has contrasted structured versus intuitive approaches to decision making. His decision models have guided investments worth hundreds of millions of dollars and have been used by Australia's State and Federal Governments to make critical policy choices. Stefan is widely published in international research literature and his most recent book is "Global Megatrends". He has a doctorate in geography from the University of Queensland and postgraduate qualifications in economics from the University of New England. He is a current and recent member of the OECD and World Economic Forum global strategic foresight communities.

#### **PANEL** 14.30–15.4

**PANEL** 14.30–15.45

### SESSION 3: AUSTRALIA'S AI POLICY, GOVERNANCE AND REGULATION



**Mr Ed Santow** Human Rights Commissioner Australian Human Rights Commission

Ed has been Human Rights Commissioner at the Australian Human Rights Commission since August 2016. Ed leads the Commission's work on detention and implementing the Optional Protocol to the Convention Against Torture (OPCAT); refugees and migration; human rights issues affecting LGBTI people; counter-terrorism and national security; technology and human rights; freedom of expression; and freedom of religion. He is a Senior Visiting Fellow at UNSW. In 2009 Ed received an Australian Leadership Award, and in 2017 he was recognised as a Young Global Leader by the World Economic Forum. From 2010-2016, Ed was CE of the Public Interest Advocacy Centre, a leading non-profit organisation that promotes human rights through strategic litigation, policy development and education. He was previously a Senior Lecturer at UNSW Law School, a research director at the Gilbert + Tobin Centre of Public Law and a solicitor in private practice.

**Dr Jed Horner** Strategic Advocacy Manager Standards Australia

Jed is the Strategic Advocacy Manager for Standards Australia. He works to enhance Australia's international participation in digital standards and drives engagement with domestic industry. He has been engaged in large scale strategy development for the NSW Government, including on digital transformation and innovation. Prior to working in Government, Jed was instrumental in major commonwealth anti-discrimination law reform and was a project director for the Australian Human Rights Centre at UNSW, Sydney. He continues to serve in a number of advisory capacities in relation to social impact, including as a Board Member in the NGO sector.



**Professor Jeannie Paterson** Professor of Law University of Melbourne

Jeannie is a Professor of Law at the University of Melbourne specialising in contract, consumer protection and consumer credit law, as well as new technologies in these fields. Jeannie's research and teaching covers three inter-related themes: equitable support for consumers experiencing hardship, marginalisation or vulnerability; the ethics of AI and automation in influencing consumer choice, and legislative design in regulating consumer and credit markets and new technologies in those markets.

### Associate Professor Paul Henman

Digital Sociology and Social Policy School of Social Science University of Queensland

Paul is Associate Professor Digital Sociology and Social Policy at the University of Queensland. Holding degrees in computer science and social science, Paul has examined the role of digital technologies in public policy and public administration for over 20 years. His publications include Governing Electronically (2010-2019, Palgrave) and Performing the State (Routledge 2018). His research funding includes ARC CoE for Automated Decision Making & Society (2020-27) and ARC Discovery Project Government Web Portals as new Government Actors (2017-2020).

**Ms Veronica Scott** Director of KPMG Law Data, Privacy and Digital KPMG

Veronica has recently joined KPMG Law's Data, Privacy and Digital team. She was previously special counsel in a major law firm's insurance, media & corporate risk team and lead of its national privacy team. She advises clients on complex and sensitive legal issues, risks and disputes relating to data, digital content and media & communications laws, with a focus on data protection (including GDPR), privacy and confidentiality, health records, freedom of information and freedom of speech laws, defamation, social media risks and cyber security. Her work includes advising the education sector on strategic and sensitive projects including clinical trial and research, data breach and crisis management and cross border data flows. Her recent work includes leading the execution of a large and complex Privacy Impact Assessment on the Victorian Parkville Precinct Electronic Medical Record, advising on HREC applications, advising on the response to major cyber security breaches, the monitoring of drones in airport space, data governance for mega-digital studies, international student exchange agreements, establishing alumni programs and the representing media publishers in relation to contempt charges. Veronica was on the Advisory Committee to the Australian Law Reform Council's inquiry into 'Serious invasions of privacy in the digital age'.

### CONTEXT AND RATIONALE

Artificial intelligence (AI) is a topic of immense interest. It has been described as the biggest commercial opportunity today, with global GDP predicted to be 14 per cent higher in 2030 due to accelerating AI development and take-up, equating to an additional US\$15.7 trillion<sup>1</sup>.

It has also been estimated that digital innovation, including AI and related technologies, presents a \$315 billion economic opportunity for Australia over the next decade; if Australia can close the current gap, so it can be at AI par with the average of advanced economies, in 2028<sup>2</sup>.

It is therefore an obvious economic 'gamechanger'. It is also regarded as a tool for political and/or military supremacy, and it is the subject of ethical consideration<sup>3</sup>. In Go8 universities it is of significant strategic focus.

The Group of Eight (Go8) does recognise that Australia as a nation has a way to go in AI global status – and in Government funding – when compared with competitor nations. But Australian universities have focussed assiduously regardless; contributing for many years with determination, and with international success, especially in niche areas. Twenty-nine Australian universities achieved a rating of world standard or more for Artificial Intelligence and Image Processing in the latest Australian Government review of university research performance<sup>4</sup>. **Seven of** those achieved the highest rating of 'well above world standard' – six of which were Go8 universities, with the University of Queensland and the University of Western Australia achieving the next highest rating of 'above world standard'.

The Go8 commitment and contribution to, and interest in, AI does extend beyond R&D; to economics, societal impacts, and how universities can assist shape Australia's responsible, and effective response.

Meanwhile, the global AI focus has delivered a global index of Governments' AI readiness<sup>5</sup> and a 100-year AI study<sup>6</sup>. This year the OECD<sup>7</sup> and the G20 have developed and endorsed AI principles<sup>8</sup> and an independent

- 1 PwC 2017, Sizing the Prize: What's the real value of AI for your business and how can you capitalise? (https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf)
- 2 AlphaBeta Advisors 2018, Digital Innovation: Australia's \$315 billion opportunity, commissioned by CSIRO Data61
- 3 ACOLA 2019, The effective and ethical development of artificial intelligence, p.22
- 4 Australian Research Council 2019, State of Australian University Research 2018
- 5 Created 2017 by Oxford Insights, the Government AI readiness index asks how well placed are national governments to take advantage of the benefits of AI in their operations and delivery of public services
- 6 Stanford University launched the One hundred year study on AI in 2014 to 'study and anticipate how the effects of artificial intelligence will ripple through every aspect of how people work, live and play'
- 7 OECD 2019, OECD Council Recommendation on Artificial Intelligence
- 8 On 9 June 2019, the G20 adopted human-centred AI principles that draw from the OECD principles

### **OBJECTIVES**

high-level AI group was set up by the European Commission to make policy and investment recommendations for trustworthy AI<sup>9</sup>.

In Australia, an AI report, part of ACOLA's Horizon Scanning series, *The Effective and Ethical Development of Artificial Intelligence: An opportunity to Improve our Wellbeing*, this year provided a comprehensive Australiancontextualised view.

The Government is establishing an AI ethics framework, while Standards Australia is expected to recommend to Government standards required to support AI.

Regardless of the nature of AI and its various technological forms<sup>10</sup>, preparedness depends in part on the knowledge generation, and the adaptation and translation that resides in universities and other research organisations.

A core question for Australia is whether it should lead – at least in niche areas, or whether it can afford to lag in Al. A core question for the Go8 is what can it better provide, via collaboration and commercialisation, to assist build and secure the nation's Al advantage.

That is the focus of the Go8 AI Collaboration and Commercialisation Summit.

This Summit provides industry, government, investors, researchers and innovators with a forum to discuss and consider key AI challenges and opportunities.

The Go8's pre-eminence in AI deliberations, research and innovation, and what that can deliver for industry and government partners, will be examined through three specific areas outlined below.

The Summit also provides the opportunity for existing and future partners to gain a consolidated appreciation of where there is future joint activity, because AI is not an area for delay or for wasting existing commitment. It is an area where standing still means being left behind.

9 https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence

<sup>10</sup> The 2019 ACOLA report for example notes there is lack of consensus on a universal definition however defines it as a collection of interrelated technologies used to solve problems and perform tasks that, when humans do them, requires thinking. It expands further to note four types of AI: Narrow AI; Emerging and Disruptive AI; Generalised AI and Superhuman AI

### PRIORITY AREAS FOR DISCUSSION

Summit discussion will focus on what is needed immediately, and in the short-term, from Go8 universities, building on their capacity and knowledge.

### TOPIC 1 IMPROVING AUSTRALIA'S AI COMMITMENT / LIFTING AUSTRALIA'S GAME IN AI

There are extensive opportunities for Australia from existing AI strengths and related fields in the Go8 and other organisations. As global advances accelerate, if Australia is to have a competitive edge in trade R&D and most sectors, it must commit and keep pace, and preferably remain ahead in niche areas.

Considerations range from investment needed, to greater AI industry adoption, and building necessary workforce skills.

Go8 R&D already makes a wide contribution to AI. This ranges, as examples, from machine learning and robotics, data science and autonomous systems, computer vision and natural language processing, to augmented reality and pattern recognition.

It occurs across many different spheres of activity – such as agriculture, banking, cybersecurity and cybercrime, energy, home and health care, military, mining, quantum, space, suicide prevention and underwater environments.

Work includes industry partnerships and examining the implementation aspects of AI, be they economic, social, ethical, or cultural, as well as collaborating on regulation, public policy and governance.

How opportunities are taken up depends on what the supportive environment is.

Many countries, though not yet Australia, have announced major investments in AI research. Currently Australia is estimated to spend around 0.001 per cent of its GDP on AI<sup>11</sup>.

"probably the one big country that is not investing lots of money in AI is actually Australia"

Professor Hugh-Durrant Whyte, Chief Scientist and Engineer, NSW Government<sup>12</sup>

"China has committed to becoming a world-leader in Al by 2030, expecting \$210 billion domestic industry. In 2016 alone, North America attracted \$15-23 billion in private sector Al investments. The European Union has set a 2020 target for a \$20 billion investment program in Al. In addition, countries like France and Germany have separately announced significant national investments in AI. The UK has launched a \$1.8 billion program which adds to significant private sector investment. In Asia, economies such as Japan, Korea and Singapore are also making large investments into AI technology."

### AlphaBeta Advisors<sup>13</sup>

In addition to ranking 11<sup>th</sup> on the Government AI Readiness Index (Oxford Insights), Australia ranks 10<sup>th</sup> on the Automation Readiness Index which measures the extent to which the policy environment in 25 countries meets an ideal policy response to intelligent automation<sup>14</sup>.

14 https://www.automationreadiness.eiu.com/

<sup>11</sup> https://www.adelaide.edu.au/aiml/system/files/media/documents/2019-05/AIML%20final%20release.pdf

<sup>12</sup> Durrant-Whyte, H. 2019. Can AI make the world a better place? Speech to Ashurst series of AI Forums, 30 July 2019 (<u>https://www.ashurst.com/en/news-and-insights/insights/the-state-of-ai-in-australia/</u> <u>can-ai-make-the-world-a-better-place-transcript/</u>)

<sup>13</sup> AlphaBeta Advisors 2018, Digital Innovation: Australia's \$315 billion opportunity, commissioned by CSIRO Data61

For Australia to thrive, the ACOLA report calls for the establishment of a robust, harmonised regulatory environment that is designed to support local innovation, help start-up companies to commercialise AI technologies and to foster economic development.

Healthcare, agriculture, mining and advanced manufacturing are areas the report proposes could present key opportunities<sup>15</sup>. It is also suggested that human services, financial services, transport and logistics are other existing sectors that may be transformed by Al<sup>16</sup>.

A September 2019 report commissioned by the Federal Minister for Industry, Innovation and Science assesses that new technologies such as data analytics, automation and robotics in the mining, oil and gas industries could add over \$70 billion to the economy in 2030 and create thousands of new jobs domestically<sup>17</sup>.

Access to data, and the effective digital infrastructure to make this possible, as well as appropriate data collection policies and procedures are considered necessary<sup>18</sup>. The National Data Commission was in September 2019 consulting on Data Sharing and Release legislative reforms to improve data sharing and use across the public sector and to enable government agencies to safely share public sector data with trusted users, including academics, scientists and innovators<sup>19</sup>. The Australian Government has also introduced a consumer data right, to apply firstly to the banking sector, followed by the energy sector and potentially the telecommunications sector. This would give Australians greatly improved access to their own data, with accredited trusted service providers to be allowed access<sup>20</sup>.

Meanwhile, the Australian Information Industry Association (AIIA), the peak member body for the information and communications technology (ICT) industry, has called for skills development and an effective R&D Tax Incentive to encourage a more favourable business environment for innovation, commercialisation and export of Australian AI products<sup>21</sup>.

In its 2018–19 Budget, the Australian Government committed \$25 million in additional funding for the Cooperative Research Centres (CRC) program to support additional CRC projects with a focus on AI.

The intent of the CRC investment is to strengthen the link between research organisations engaged in AI and machine learning, and industry seeking solutions or exploring opportunities<sup>22</sup>. It formed part of a broader Government \$29.9 million measure, which included AI and machine learning (ML) funding-focused PhD scholarships, and school related learning to address skill gaps<sup>23</sup>.

However, such investment may need to be significantly boosted if Australia is to "close the gap" with comparable economies, let alone achieve AI leadership.

- 15 ACOLA 2019, The effective and ethical development of artificial intelligence p.13
- 16 Standards Australia 2019, Developing standards for AI Hearing Australia's Voice
- 17 AlphaBeta Advisors 2019, Staying Ahead of the Game, and The Hon Karen Andrews MP 2019, 'New Technologies to accelerate resources industry', 16 September (media release)
- 18 ACOLA 2019, The effective and ethical development of artificial intelligence p.13
- 19 https://www.datacommissioner.gov.au/resources/discussion-paper
- 20 https://treasury.gov.au/consumer-data-right
- 21 https://www.aiia.com.au/documents/aiia-news/2019/digital-skills-shortages-and-r-and-d-tax-incentives-remainobstacles-to-artificial-intelligence-ai-development-in-australia,-says-aiia
- 22 Department of Industry, Innovation and Science, Factsheet: Additional Funding for CRC projects in Artificial Intelligence
- 23 The Treasury 2018, Budget Measures 2018–19 Part 2: Expense measures

### PRIORITY AREAS FOR DISCUSSION

### QUESTIONS

Threshold Al Question: Is there a frank discussion to be had on the consequences of Al inaction for Australia? If we support action (as the Go8 does), how do we differentiate (if at all) from competitor nations, to deliver Australia a competitive advantage? Or, doesn't Australia need to be at the forefront of Al, and if not why not? Even if we don't lead, can we adopt Al effectively unless we participate to some extent in its development?

- How could Australia make an AI difference, and how could the Go8 contribute?
- How could conditions that help to translate and commercialise AI be improved?
- What foundational science, alongside significant technology, is required to support and ensure Australian AI performance?
- What talent is required? How can the Go8 assist address this and recruitment challenges?

### TOPIC 2 IMPROVING AI DEPLOYMENT INTO THE ECONOMY AND SOCIETY

How people respond to AI, either by embracing, being concerned, or rejecting it, depends on the degree to which AI is discussed in Australia. The Go8 has a role, with key AI industry innovators, in assisting and informing ways to navigate this societal and industry change.

"Al systems should be designed in a way that respects the rule of law, human rights, democratic values and diversity, and they should include appropriate safeguards to ensure a fair and just society." OECD Principle on Al. No. 2<sup>24</sup>

'attitudes towards AI are mostly positive or neutral. However, there were concerns about the risks of driverless vehicles, the use of robots in the armed forces and the use of AI in financial markets. The potential for robots and AI to replace jobs was also viewed negatively by the majority of respondents.' ACOLA 2019 report, p.190

'while the impact of AI is often described as 'revolutionary' and 'impending', there is no guarantee that AI technologies such as autonomous vehicles will have their intended effects, or even that their uptake in society will be inevitable or seamless.'

ACOLA 2019, The effective and ethical development of artificial intelligence, p.22

"Al is a very important thing and it's seriously impacting everything at the moment (...) it is nevertheless on a cycle."

Professor Hugh-Durrant Whyte, Chief Scientist and Engineer, NSW Government^{25}

24 https://www.oecd.org/science/forty-two-countries-adopt-new-oecd-principles-on-artificial-intelligence.htm

25 Durrant-Whyte, H. 2019. Can Al make the world a better place? Speech to Ashurst series of Al Forums, 30 July 2019 (<u>https://www.ashurst.com/en/news-and-insights/insights/the-state-of-ai-in-australia/can-ai-make-the-world-a-better-place-transcript/</u>)

26

Expertise that can help governments, organisations and people understand how to navigate AI appears essential.

- For example, Monash University has examined how the hype of self-driving vehicles can be separated from the reality of how they can become part of society<sup>26</sup>.
- The National Facility for Human-Robot Interaction Research examines how people interact with technological devices including robots. This builds on previous work by UNSW's Creative Robotics Lab to test robots including in the workplace<sup>27</sup> in collaboration with Fuji Xerox Technology Group<sup>28</sup>.
- In 2018, the University of Adelaide's Institute of Machine Learning submitted a discussion paper on the Impact of AI to the Senate Select Committee on the Future of Work and Workers<sup>29</sup>.
- A University of Queensland researcher received Facebook funding to examine how human involvement to support AI can help adjust AI use, and identify fake news<sup>30</sup>.

External to the Go8 a recent report by Deloitte Australia, indicates that while Australian businesses are the most concerned of seven surveyed countries (Australia, Canada, China, Germany, France, the UK and the US) about potential AI risks, they are the least prepared to deal with them, with the top two concerns (reflecting global views) being AI cybersecurity vulnerabilities and incorrect AI-based decision making<sup>31,32</sup>.

In January 2019, an open letter from key business leaders raised the need for a governing body to set standards and guidelines for the ethical use of AI<sup>33</sup>. And ACOLA recommended an independently led AI body with membership from government, academia and the private sector to provide leadership and skills in a holistic manner<sup>34</sup>.

Sectoral analyses also contribute to an understanding of any potential AI impact for industry<sup>35</sup>. How Australian industry will navigate its uptake of AI depends on how well informed and resourced it is, including by accessing academic expertise or researchbased AI approaches.

"Unless you think it through, artificial intelligence will have very serious consequences. [There will be] wholesale loss of jobs UNLESS you retrain your workforce, and challenge them to train up, give them the time and give them the ability and the remuneration while they train so they can get into higher skills and better paid, more interesting jobs."

Andrew Forrest, Chairman Fortescue Metals<sup>36</sup>

- 26 <u>https://lens.monash.edu/@design-architecture/2019/07/05/1375635/emerging-technology-and-artificial-intelligence-separating-the-hype-from-reality</u>
- 27 PwC 2017, Sizing the Prize: What's the real value of AI for your business and how can you capitalise?
- 28 Go8 AI Capability Statement and https://newsroom.unsw.edu.au/news/science-tech/being-human
- 29 https://www.aph.gov.au/DocumentStore.ashx?id=2f5995c3-6fc3-4d45-9d52-df58c7cce7c8&subId=611580
- 30 https://theconversation.com/users-and-their-bias-are-key-to-fighting-fake-news-on-facebook-ai-isnt-smartenough-yet-123767
- 31 Deloitte Insights 2019, Future in the Balance: How Countries are pursuing an Al advantage.
- 32 https://www2.deloitte.com/au/en/pages/media-releases/articles/australia-unprepared-for-ai-risks-070519.html
- 33 Nott, G. (2019) 'AI ethics debate urgent say Aussie business chiefs and academics', Computerworld, 25 January, retrieved from <u>https://www.computerworld.com.au/article/656724/ai-ethics-debate-urgent-say-aussie-business-chiefs-academics/</u>
- 34 ACOLA 2019, The effective and ethical development of artificial intelligence p. 13
- 35 PwC 2017, Sizing the Prize: What's the real value of AI for your business and how can you capitalise?
- 36 Kerr, P (2019) 'Forrest sees long life at FMG's Eliwana', The Australian Financial Review, 25 July 2019

### PRIORITY AREAS FOR DISCUSSION

"these frontier technologies are all about augmenting human intelligence, not taking jobs."

Shaun Gregory, Senior Vice-president and Chief Technology Officer, Woodside Energy<sup>37</sup>

Achieving trust has been shown to be important. For example, workers' trust in AI technologies depends on algorithm transparency, having positive AI experiences, and technology responsiveness to people, as well as the control level workers can have<sup>38</sup>.

The European Commission recently recommended that, to understand AI's societal impact, research on potential impact should be encouraged, R&D of tools should be supported to enable independent testing of AI systems, and to inform people of the most trustworthy AI solutions, and that monitoring mechanisms are needed to continually analyse, measure and score impact<sup>39</sup>. Appropriate skills are also a prime consideration, with 72 per cent of Australian businesses surveyed indicating there were moderate to extreme AI skills gaps in Australia.

The ACOLA report notes demand for AI Skills and expertise has resulted in an international race to attract AI talent. Australia is potentially able to take advantage of this if it positions itself as a world leader, plus on where it can excel, and through strategic investment<sup>40</sup>.

The Go8, as a core contributor of AI research and skills, can potentially play a large role in achieving this goal. Beyond research, cognitive, and technical skills, the ACOLA report also emphasises the necessity for human skills such as emotional literacy, communication, creativity and negotiation skills to assist in adapting to AI, as well as contextbased skills such as ability to detect poor or malicious AI or health specific skills in Al<sup>41</sup>.

#### QUESTIONS

- Should the Go8's approach to AI be different to any other ethically and value-affected endeavour of this scale such as space or genomics advancement?
- How should the Go8 plan to help Australian society and industry adjust to Al?
- What major gaps need to be addressed to achieve optimal industry adoption of AI?
- How can societal and industry AI trust be effectively achieved and maintained, and how can the Go8 support this?
- How should people be educated about AI, and what how can the Go8 assist to ensure appropriate AI-oriented skills in adopters?

41 ACOLA 2019, The effective and ethical development of artificial intelligence Chapter 3

<sup>37</sup> Gregory, S. (2017) 'Woodside says robots and AI will make, not take, jobs', *The Australian Financial Review*, 14 August

<sup>38</sup> ACOLA 2019, The effective and ethical development of artificial intelligence p.77

<sup>39</sup> High-Level Expert Group on AI (AI HLEG) 2019, Policy and Investment Recommendations for Trustworthy AI

<sup>40</sup> ACOLA 2019, The effective and ethical development of artificial intelligence p. 5

### TOPIC 3 AUSTRALIA'S AI POLICY, GOVERNANCE AND REGULATION

The expanding role of AI demands Australia be ready to navigate, respond to and incorporate the myriad possibilities from this. There are legal, ethical and regulatory challenges.

Trust is essential. A fundamental consideration underpinning policy development, governance and regulation around AI is how trust is established and maintained. Regulatory measures, transparency, and AI clarity, plus visibility regarding 'safe' implementation are key to achieving trust. Trust extends to data collection, access and usage that enables AI. Associated with trust and safety, are the areas of ethics, productivity, employment, health and inequality<sup>42</sup>.

'Governments need to implement AI in a way that builds trust and legitimacy, which ideally requires legal and ethical frameworks to be in place for handling and protecting citizens' data and algorithm use.'

Oxford Insights Ai Government Readiness Index 2019,  $p.28^{\rm 43}$ 

For consideration are:

responsibility for decisions made by Al systems, especially if they are independent of humans and traditional legal concepts such as ascribing 'fault' to someone, potentially no longer relevant. Al systems working in combination with an increasingly digital world when any incorrect, incomplete or biased data may lead to incorrect Al decisions.

Ownership rights beyond IP and ensuing obligations, human rights, privacy, consent, data and cyber security, are some of the areas to be harnessed to ensure effective AI governance, policy and regulation.

There have been recent undertakings to AI principles by several countries including Australia. In May 2019, Australia as one of 36 OECD countries, along with six other countries, formally adopted OECD AI principles, the first set of intergovernmental AI policy guidelines. As a G20 economy, Australia has also endorsed the G20 AI Principles based on the OECD principles<sup>44</sup>.

Australia's response to AI in terms of policy and legal reforms to support and regulate its use is considered to be fragmented<sup>45</sup>, and Australia dropped in ranking from 8<sup>th</sup> in 2017<sup>46</sup> to 11<sup>th</sup> in 2019 on the Oxford Insights Government AI Readiness Index<sup>47</sup>.

Measures in Australia's 2018–19 Budget forms the current basis, with two aspects (below) well underway and a third, a technology roadmap, forthcoming.

42 ACOLA 2019, The effective and ethical development of artificial intelligence p. 18

- 43 Oxford Insights and the International Development Research Centre 2019, Government Artificial Intelligence Readiness Index 2017 accessed from <u>https://www.oxfordinsights.com/government-ai-readiness-index</u>
- 44 https://www.oecd.org/about/secretary-general/2019-g20-leaders-summit-digital-osaka-june-2019.htm
- 45 ACOLA 2019, The effective and ethical development of artificial intelligence p. 189
- 46 Oxford Insights and the International Development Research Centre 2019, Government Artificial Intelligence Readiness Index 2017 accessed from <u>https://www.oxfordinsights.com/government-ai-readiness-index</u>
- 47 Oxford Insights and the International Development Research Centre 2019, Government Artificial Intelligence Readiness Index 2019

### PRIORITY AREAS FOR DISCUSSION

Work is occurring on an Australian ethics framework, led by CSIRO's Data61. It will be the first national Australian framework to address AI uptake<sup>48</sup>. The work proposes AI principles:

- Generate net-benefits
- 📕 Do no harm
- Regulatory and legal compliance
- Privacy protection
- Fairness
- Transparency and Explainability
- Contestability
- Accountability

Meanwhile Standards Australia is set to deliver its AI Standard roadmap this year<sup>49</sup>. Standards, as an adaptive form of regulation, may provide a practical solution to meeting principle-based obligations such as proposed by CSIRO Data61.

In addition to the recognised legislative and governance expertise that exists across the Go8, there is significant work being undertaken by Go8 researchers. There is, for example, Monash's work with the Australian Federal Police to examine and classify dark web usage for potential use in law enforcement. The University of Adelaide project to improve and optimise traffic management systems based on state government datasets<sup>50</sup>. Targeted work also occurs to examine implications of autonomous systems in the defence context (University of Queensland), of robotics and intelligent systems in several sectors (University of Sydney), expanding AI in care or social robots (UNSW) or of facial recognition technology (Monash).

#### QUESTIONS

- To what extent do Go8 universities have a role in prompting, setting and establishing an effective regulatory environment for AI – and what form should such a role take?
- How can humanities or social science perspectives be used to better inform AI development and implementation, including for and by the business sector?
- How can the Go8 best contribute to an effective understanding of AI benefits or potential risks to assist in establishing processes to address these?
- What Go8 capacity exists, both human and infrastructure, to help address the many data-based AI areas?

<sup>48</sup> An international comparison of countries' national policies by Standards Australia (2019, Developing Standards for AI) shows that China, Canada, Japan, Germany and Singapore have national strategies, while the United States, the United Kingdom, and the European Union had made major statements and commitments on AI

<sup>49</sup> Standards Australia was expected to report to the Australian Government in September 2019

<sup>50</sup> Go8 AI Capability Statement

### EXPECTED OR DESIRED OUTCOMES

Expected outcomes are:

- A greater or nuanced understanding by participants of each other's needs and capabilities, in collaborating in AI.
- Go8 expertise is more evident and transparent to non-Go8 participants, and opportunities to capitalise on this, including to grow Australia's industry for commercial, strategic, and global prominence have been identified.

How to improve collaboration or drive partnerships, fine-tune identifying capability, and building gaps in Al capability to serve the national agenda.

- Potential collaborations among Go8 universities that can address identified needs.
- New connections and relationships among participants.

# **STAKEHOLDERS**

- Government including the Industry & Science portfolio, Defence, Education portfolios (Ministers and bureaucracy)
- Industry key companies and SMEs, with a focus on current space providers
- Key research/innovation initiatives including Cooperative Research Centres (CRCs), Industry Growth Centres
- Innovation and Science Australia
- Australia's and state Chief Scientists
- Go8 executive, research and collaboration experts
- Investors venture capitalists and others

### APPENDIX – BACKGROUND

### **GO8 PARTICIPATION IN ARTIFICIAL INTELLIGENCE**

The Go8 universities collectively have a wide spanning AI footprint, as noted in the Go8 AI Capability Statement.

In the latest Australian Government review of university research performance, Excellence in Research for Australia 2019, six Go8 universities have achieved the highest rating of 'well above world standard' in Artificial Intelligence and Image Processing. The remaining two Go8

universities achieved the next highest ranking of 'above world standard'<sup>51</sup>.

Computer Science Rankings (Csrankings) also show that Go8 universities are prominent internationally<sup>52</sup>:

#### Number of institutions in the global top ten (csrankings.com)

	AI	Computer Vision	Machine Learning Theory	Natural Language Processing	Total
USA	1	5	8	6	20
China	7	1	1	2	11
Australia*	1	2	_	1	4
UK	1	-	-	1	2
Germany	_	1	_	_	1

\* These institutions are the University of Adelaide, ANU, the University of NSW and Melbourne University

Some Go8 highlights in AI research and industry include:

- the Australian National University with Reposit Power, an energy software SME, and Tasnetworks, a Distribution Network Service Provider, on grid integration of renewables, in particular the problem of coordinating consumer-owned distributed energy resources such as rooftop solar and batteries\*
- Monash University with the Australian Federal Police, to fight cybercrime worldwide. Researchers conducted an extensive crawl of the dark web to test a classification model to capture user behaviour and motivation that can be applied in law enforcement.
- Monash University with Turning Point and the Eastern Health Foundation to develop a national suicide monitoring

52 Cited in Australian Institute of Machine Learning 2019, Australia falling behind in intelligence race, 15 May retrieved from <a href="https://www.adelaide.edu.au/aiml/system/files/media/documents/2019-05/AIML%20final%20">https://www.adelaide.edu.au/aiml/system/files/media/documents/2019-05/AIML%20final%20</a> release.pdf

<sup>51</sup> Australian Research Council 2019, State of Australian University Research 2018–19: ERA National Report. The six universities are Monash University, the Australian National University, the University of Adelaide, the University of Melbourne, UNSW, and the University of Sydney; with the seventh non-Go8 university being University of Technology Sydney. University of Queensland and University of Western Australia achieved the next highest ranking of 'above world standard'

system. Professor Dan Lubman received an US\$850,000 grant from Google to establish the world-first suicide monitoring system. The project will involve using AI methodologies to streamline coding of national suicide-related ambulance data and held to prevent suicides as a health risk in the future<sup>53</sup>

- University of Adelaide with LBT Innovations, to develop one of the first AI medical devices approved by the US Food and Drug Administration (FDA). The Automated Plate Assessment System (APAS®) is an innovative platform technology that automates culture-plate screening and interpretation
- The Australian Institute of Machine Learning (University of Adelaide) – with Bayer CropScience: image-analysis technology has been tailored to estimate potential new cereal varieties' yields accurately after only very short periods of growth to select quickly for the most productive lines
- The University of Adelaide with State govt of SA development of a pastoral assessment tool to better understand and predict the impact of grazing on the dryland pastoral areas of South Australia, making better use of satellite imagery. This will lead to better intelligence on the condition of land across the pastoral lands of South Australia and lower the costs of pastoral assessment to government
- The University of Queensland with Sullivan Nicolaides Pathology Rapid precisionscanning technology to speed up medical diagnoses and help address Australia's shortage of trained pathologists<sup>54</sup>

The University of Sydney with Qantas – with its Australian Centre for Field Robotics developing flight-planning systems to help the airline fly optimised routes, reduce fuel consumption and improve operational effectiveness<sup>55</sup>

Major initiatives or collaborations led by Go8 universities or in which Go8s participate include:

- The Australian Centre for Robotic Vision (ACRV), housed at the Australian National University
- Data to Decisions Cooperative Research Centre (D2D CRC) – includes the Australian National University, UNSW Sydney, and the University of Adelaide as participants
- CSIRO Data61 all Go8 universities are part of Data61's collaboration
- The Autonomy, Agency and Assurance Innovation Institute (3A Institute) – the Australian National University
- Monash Data Futures research institute
- Australian Research Council (ARC) Training Centre in Cognitive Computing for Medical Technologies – University of Melbourne
- ARC Centre of Excellence for Automated Decision-Making and Society – RMIT led, involves Monash University, University of Melbourne, University of Queensland, University of Sydney, University of New South Wales, Swinburne University, and Queensland University of Technology
- ARC Centre of Excellence for Mathematical and Statistical Frontiers of Big Data, Big Models, New Insights – University of Melbourne, Monash University, University of Adelaide, University of Queensland, UNSW Sydney are collaborators

54 See also https://www.uq.edu.au/news/article/2018/11/new-technology-speeds-pathology-workflows

<sup>53</sup> See also https://www.easternhealth.org.au/media-events/media-releases/item/865-google-grants-eastern-health-sturning-point-1-2-million-to-establish-world-first-suicide-monitoring-system

<sup>55</sup> See also https://sydney.edu.au/news-opinion/news/2016/06/23/researchers-help-qantas-fly-cleaner-andcheaper.html

### APPENDIX – BACKGROUND

- National Facility for Human-Robot Interaction Research – Partners are UNSW Sydney and University of Sydney with University of Technology Sydney, and St Vincent's Private Hospital
- Defence Cooperative Research Centre (CRC) for Trusted Autonomous Systems – University of Queensland and others
- UBTECH Sydney Artificial Intelligence Centre – University of Sydney
- Australian Centre for Field Robotics (ACFR)
   University of Sydney with industry and government
- Centre for Intelligent Information Processing Systems – University of Western Australia

Some postgraduate degrees offered by Go8 universities in AI are noted below:

- Monash offers a Masters in Artificial Intelligence<sup>56</sup>
- The Australian National University offers a Master in Machine Learning and Computer Vision<sup>57</sup>
- The Australian National University will offer from 2020 the 3Ai Masters<sup>58</sup>, an immersive small cohort program
- University of Queensland offers a Master in Data Science<sup>59</sup>
- University of Sydney offers a Master in Data Science<sup>60</sup>

### **CURRENT DEVELOPMENTS**

# ACOLA REPORT ON ARTIFICIAL INTELLIGENCE

The ACOLA report on AI, The effective and ethical development of artificial intelligence: An opportunity to improve our wellbeing, was released in July 2019 as part of ACOLA's Horizon Scanning series commissioned by the Australian Government National Science and Technology Council and Australia's Chief Scientist. It examined the potential that AI technologies have in enhancing Australia's wellbeing, lifting the economy, improving environmental sustainability and creating a more equitable, inclusive and fair society. The report notes that AI offers broad-reaching opportunities, but uptake also carries serious implications for human capital, social inclusion, privacy and cultural values which must be considered to pre-empt responsible deployment. Key findings were:

- Al offers major opportunities to improve our economic, societal and environmental wellbeing, while also presenting potentially significant global risks, including technological unemployment and the use of lethal autonomous weapons. Further development of Al must be directed to allow well-considered implementation that supports our society in becoming what we would like it to be – one centred on improving prosperity, reducing inequity and achieving continued betterment.
- 2. Proactive engagement, consultation and ongoing communication with the public about the changes and effects of AI will be essential for building community awareness. Earning public trust will be critical to enable acceptance and uptake of the technology.

- 59 https://my.uq.edu.au/programs-courses/program.html?acad\_prog=5660
- 60 https://sydney.edu.au/courses/courses/pc/master-of-data-science.html

<sup>56</sup> https://www.monash.edu/study/courses/find-a-course/2020/artificial-intelligence-c6007

<sup>57</sup> https://programsandcourses.anu.edu.au/2019/program/MMLCV

<sup>58 &</sup>lt;u>https://3ainstitute.cecs.anu.edu.au/#apply</u>

- 3. The application of AI is growing rapidly. Ensuring its continued safe and appropriate development will be dependent on strong governance and a responsive regulatory system that encourages innovation. It will also be important to engender public confidence that the goods and services driven by AI are at, or above, benchmark standards and preserve the values that society seeks.
- 4. Al is enabled by access to data. To support successful implementation of AI, there is a need for effective digital infrastructure, including data centres and structures for data sharing, that makes AI secure, trusted and accessible, particularly for rural and remote populations. If such essential infrastructure is not carefully and appropriately developed, the advancement of AI and the immense benefits it offers will be diminished.
- 5. Successful development and implementation of AI will require a broad range of new skills and enhanced capabilities that span the humanities, arts and social sciences (HASS) and science, technology, engineering and mathematics (STEM) disciplines. Building a talent base and establishing an adaptable and skilled workforce for the future will need education programs that start in early childhood and continue throughout working life and a supportive immigration policy<sup>61</sup>.
- 6. An independently led AI body that brings stakeholders together from government, academia and the public and private sectors would provide a critical mass of skills and institutional leadership to develop AI technologies, as well as promote engagement with international initiatives and to develop appropriate ethical frameworks.

### STANDARDS AUSTRALIA DEVELOPMENT OF STANDARDS FOR AI

Work is being undertaken by Standards Australia, through a consultation process with key stakeholders across industry, government, civil society and academia to examine how standards, and related material (such as technical specifications and handbooks), can support artificial intelligence in Australia.

Feedback from stakeholders will be used to inform the Standards Australia Artificial Intelligence Roadmap Report, which will be completed in September 2019.

### CONSUMER DATA RIGHT<sup>62</sup>

On 26 November 2017, the Australian Government announced the introduction of a consumer data right in Australia. The consumer data right will improve consumers' ability to compare and switch between products and services. An excerpt of its key features is below:

The Consumer Data Right will give consumers the right to safely access certain data about them held by businesses. They will also be able to direct that this information be transferred to accredited, trusted third parties of their choice.

The right will allow the consumer to access data about themselves in a readily usable form and a convenient and timely manner. It will also allow consumers better access to information on the products available to them.

Both individual and business customers will be entitled to the Consumer Data Right.

The right will only apply in relation to specified data sets and specified classes of data holders.

<sup>61</sup> China is reported to have officially adopted AI into its college institutional system following a guideline calling for promotion of AI education in elementary and high school, with some private institutions starting to provide basic AI instruction to kindergarten children. It is also reported it will open around 400 majors related to AI, big data and robotic in universities in 2019. See <a href="http://www.globaltimes.cn/content/1144165.shtml">http://www.globaltimes.cn/content/1144165.shtml</a> and <a href="http://www.globaltimes.cn/content">http://www.globaltimes.cn/content</a> and <a href="http://www.globaltimes.cn/content">http://www.globaltimes.cn/content</a> and <a href="http://www.globaltimes.cn/content">http://www.globaltimes.cn/content</a> and <a href="http://www.global

<sup>62 &</sup>lt;u>https://treasury.gov.au/consumer-data-right</u> and https://treasury.gov.au/sites/default/files/2019-09/190904\_cdr\_booklet.pdf

### APPENDIX – BACKGROUND

- The Consumer Data Right will be implemented according to four key principles:
- The Consumer Data Right should be consumer focussed. It should be for the consumer, be about the consumer, and be seen from the consumer's perspective.
- The Consumer Data Right should encourage competition. It should seek to increase competition for products and services available to consumers so that consumers can make better choices.
- The Consumer Data Right should create opportunities. It should provide a framework from which new ideas and business can emerge and grow, establishing a vibrant and creative data sector that supports better services enhanced by personalised data.
- The Consumer Data Right should be efficient and fair. It should be implemented with security and privacy in mind, so that it is sustainable and fair, without being more complex or costly than needed.

The right will not require a business to hold consumer data that they would not otherwise hold, other than the keeping of records in relation to a consumer's use of the right.

### OECD AI PRINCIPLES (SUMMARISED)<sup>63</sup>

On 22 May 2019, 36 OECD countries adopted the OECD AI principles when they approved the OECD Council Recommendation on Artificial Intelligence. Six other countries adhered to the principles at the time<sup>64</sup>. The principles promote AI that is innovative and trustworthy and that respects human rights and democratic values.

- 1. Al should benefit people and the planet by driving inclusive growth, sustainable development and well-being.
- 2. Al systems should be designed in a way that respects the rule of law, human rights, democratic values and diversity, and they should include appropriate safeguards – for example, enabling human intervention where necessary – to ensure a fair and just society.
- 3. There should be transparency and responsible disclosure around AI systems to ensure that people understand when they are engaging with them and can challenge outcomes.
- Al systems must function in a robust, secure and safe way throughout their lifetimes, and potential risks should be continually assessed and managed.
- 5. Organisations and individuals developing, deploying or operating AI systems should be held accountable for their proper functioning in line with the above principles.

The OECD recommends that governments:

- Facilitate public and private investment in research & development to spur innovation in trustworthy AI.
- Foster accessible AI ecosystems with digital infrastructure and technologies, and mechanisms to share data and knowledge.
- Create a policy environment that will open the way to deployment of trustworthy AI systems.
- Equip people with the skills for AI and support workers to ensure a fair transition.
- Co-operate across borders and sectors to share information, develop standards and work towards responsible stewardship of AI.

63 https://www.oecd.org/science/forty-two-countries-adopt-new-oecd-principles-on-artificial-intelligence.htm

64 The six other countries were Argentina, Brazil, Colombia, Costa Rica, Peru and Romania

### EUROPEAN COMMISSION ETHICS GUIDELINES FOR TRUSTWORTHY AI<sup>65</sup>

This includes four ethical principles in the context of AI Systems:

- i. Respect for human autonomy
- ii. Prevention of harm
- iii. Fairness
- iv. Explicability

Based on fundamental rights and ethical principles, the Guidelines list seven key requirements that AI systems should meet in order to be trustworthy:

- Human agency and oversight
- Technical robustness and safety

- Privacy and Data governance
- Transparency
- Diversity, non-discrimination and fairness
- Societal and environmental well-being
- Accountability

### **GLOBAL INVESTMENTS IN AI**

The Australian Institute of Machine Learning estimated in May 2019 that Australia's investment in AI as a proportion of GDP is nowhere near comparable countries like South Korea, Singapore, France, Germany and Japan. AIML director Professor Anton van den Hengel said other countries are investing billions of dollars in AI research. See below graph.



### Al Investment Per Annum as a Percentage of GDP\*

\* Does not include top spenders of the US and China, where AI investment is estimated at over US\$7 billion annually. China is expected to surpass the US in AI R&D investment by 2020

#### 65 Ethics Guidelines for Trustworthy Artificial Intelligence (AI)

### APPENDIX – BACKGROUND

Countries' investments are partly reflected through Government statements as noted below, though significant private investment is also occurring:

- In its 2018–19 Budget the Australian Government announced a \$29.9 million investment in Al<sup>66</sup>.
- In February 2019, US President Trump announced the American AI initiative<sup>67</sup>, which provided no details on additional Government investment, nor did the follow-up AI R&D Strategic Plan released in June 2019<sup>68</sup>. The federal government is reported to be expected to spend almost US\$1 billion in non-defence AI R&D in fiscal year 2020<sup>69</sup> or US\$4.9 billion in unclassified AI and machine-learning R&D that year<sup>70</sup>.
- China released in 2017 a development plan to become the world leader in AI by 2030 and build a domestic industry worth almost \$150 billion<sup>71</sup>.
  - » The government's latest venture capital fund will reportedly invest more than US\$30 billion in AI and related technologies within state-owned firms, and that fund joins even larger statefunded VC funds. One Chinese state

has promised to invest US\$5 billion in AI, and the government of Beijing has committed US\$2 billion to an AI development park<sup>72</sup>. A major port, Tianjin, plans to invest \$16 billion in its local AI industry<sup>73</sup>. China reportedly has the world's second-highest number of AI companies, behind the United States – and is home to the world's most highly valued AI company, SenseTime Group Ltd<sup>74</sup>.

- France will spend €1.5 billion euros (\$2.4 billion) of government funding in AI by 2022<sup>75</sup>.
- In 2018, South Korea's government announced it would spend 2.2 trillion won (\$2.7 billion) on R&D in AI and expanding AI-related infrastructure<sup>76</sup>.
- Announced in the 2017 federal budget, Canada has committed Can\$125 million to a Pan-Canadian AI Strategy<sup>77</sup>.
- Denmark has allocated DKK 1 billion till 2025 for implementation of its Strategy for Denmark's Digital Growth (released January 2018), focused not just on AI advances but also on big data and the Internet of Things<sup>78</sup>.
- 66 <u>https://www.minister.industry.gov.au/ministers/cash/media-releases/budget-2018-new-opportunities-and-jobs-</u>australian-industry
- 67 https://www.whitehouse.gov/ai/executive-order-ai/
- 68 https://www.nitrd.gov/pubs/National-AI-RD-Strategy-2019.pdf
- 69 https://www.nextgov.com/emerging-tech/2019/09/administration-projects-agencies-will-spend-1-billionartificial-intelligence-next-year/159781/
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- 71 https://www.nytimes.com/2017/07/20/business/china-artificial-intelligence.html
- 72 https://www.nytimes.com/2018/02/12/technology/china-trump-artificial-intelligence.html
- 73 https://theconversation.com/china-is-catching-up-to-the-us-on-artificial-intelligence-research-112119
- 74 Deloitte 2019, State of AU in the Enterprise Future in the balance? How countries are pursuing an AI advantage: Insights from Deloitte's State of AI in the Enterprise, 2nd Edition survey
- 75 <u>https://www.reuters.com/article/us-france-tech/france-to-spend-1-8-billion-on-ai-to-compete-with-u-s-china-idUSKBN1H51XP</u>
- 76 https://www.opengovasia.com/south-korea-to-invest-2-2-trillion-won-in-bid-to-seize-the-lead-in-ai-technologyby-2022/
- 77 https://www.cifar.ca/ai/pan-canadian-artificial-intelligence-strategy
- 78 https://eng.em.dk/news/2018/januar/new-strategy-to-make-denmark-the-new-digital-frontrunner/

- The European Union was presented with recommendations to reach more than €20 billion per year (private and public) investment in AI over the next decade<sup>79</sup>.
- Singapore will invest up to SG\$150 million over five years in AI in Singapore<sup>80</sup>.
- The United Kingdom announced in April 2018 a £1 billion deal to put the country at the forefront of the AI industry, including almost £300 million of private sector investment and £300 million of 'newly allocated' government funding for AI research.

In terms of private investment, highlights from the top two countries are:

- Al investments by venture capitalists topped \$8 billion in 2018 in the US<sup>81</sup>.
- The Chinese AI industry was reported to post US\$27.1 billion investment<sup>82</sup>. In 2017, Chinese AI startups were reported to have received 48 percent of global AI venture funding, outpacing the United States for the first time<sup>83</sup>.

<sup>79</sup> https://ec.europa.eu/digital-single-market/en/artificial-intelligence

<sup>80</sup> https://www.nrf.gov.sg/programmes/artificial-intelligence-r-d-programme

<sup>81</sup> Loucks J, Hupfer S, Jarvis D, Murphy T 2019, 'Future in the balance? How countries are pursuing an AI advantage: Insights from Deloitte's State of AI in the Enterprise, 2nd Edition survey', *Deloitte Insights*, 1 May retrieved from <a href="https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/ai-investment-by-country.html">https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/ai-investment-by-country.html</a>

<sup>82</sup> China Institute for Science and Technology Policy at Tsinghua University 2018, China AI Development Report 2018, downloaded from <u>http://www.sppm.tsinghua.edu.cn/eWebEditor/UploadFile/China\_AI\_development\_</u> report\_2018.pdf

<sup>83</sup> Loucks J, Hupfer S, Jarvis D, Murphy T 2019, 'Future in the balance? How countries are pursuing an AI advantage: Insights from Deloitte's State of AI in the Enterprise, 2nd Edition survey', *Deloitte Insights*, 1 May retrieved from https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/ai-investment-by-country.html



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