




The age of artificial intelligence



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 <http://www.tinyurl.com/milfordm>

 <https://goo.gl/rczslc>

Overview

- What's just happened in AI?
- What can it do?
- What are the implications and impacts?
- How can we plan and respond?

Fundamental and Applied Research on Robots and Autonomous Platforms

Aerospace | Environment | Manufacturing | Defence | Agriculture | Mining | Medical | Infrastructure | Logistics



Distinguished Professor Peter Corke is working with MDA, designing a logistics robot for the Lunar Gateway.

Air



Land



Sea

Major Centres and Projects

QUT Centre for Robotics

Australian Cobotics Centre

ARIA M Australian Robotic Inspection and Asset Management Hub

SAEF Securing Antarctica's Environmental Future

Joint Biomechanics Training Centre

ARM Advanced Robotics for Manufacturing HUB

Neuro-Autonomy: Neuroscience-Inspired Perception, Navigation, and Spatial Awareness for Autonomous Robots

Australia-US International Multidisciplinary University Research Initiative (AUSMURI)

Australian Research Council Laureate Fellowship

2014-20 Headquarters of the Australian Centre for Robotic Vision

Australian Government Australian Research Council

Re-Evolving Nature's Best Positioning Systems for People and Their Machines

Education, Outreach and Expert Advising

Fellows of Learned Academies and Bodies

Board Roles

ATSE Australian Academy of Technology & Engineering

Bachelor of Engineering (Honours) (Mechatronics)

Master of Robotics and Artificial Intelligence

ROBOT ACADEMY

Math Thrills

Book Cover: Robot, Vision and Control

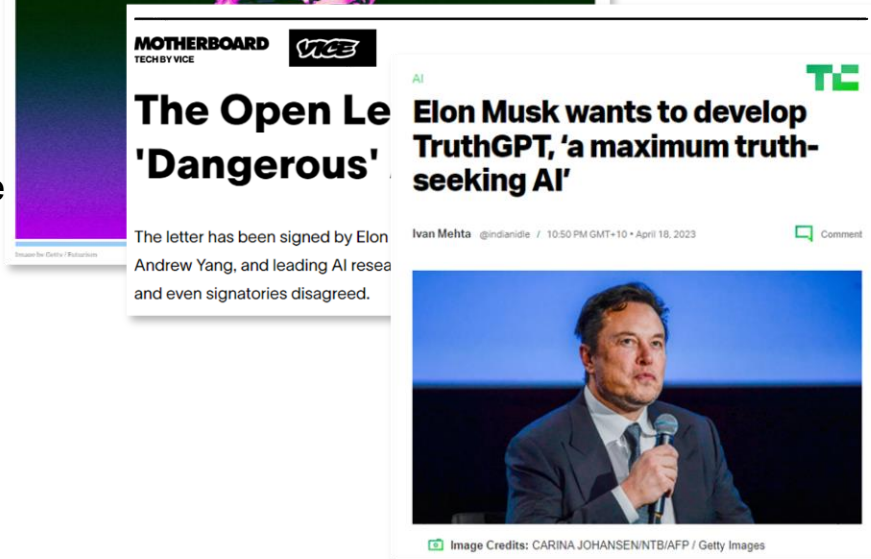
Associate Professor Laurianne Sitbon



- Current projects include how to support people with intellectual disability in the selection of visuals (eg. emojis) for communicating, how systems can use visuals (eg. emojis) to better communicate with people with intellectual disability, how to investigate the requirements of multi-modal conversational systems that can best support the needs of people with intellectual disability, and more generally how people, such as experts, can "converse" with systems, which analyse data and make predictions, to assist them in making decisions.
- l.sitbon@qut.edu.au

AI in 2023: What's Happened

- Generative AI and Large Language Models / “Foundation” models
- Trained on huge amounts of data plus many other innovations
- Demonstrate highly variable (superhuman to substantially subhuman) – capability across an unprecedented range of tasks
- Have entered wider public psyche at a **speed**, **depth** and **breadth** that is unprecedented
- Impact is near-impossible to “nail down” because of rapidity of sustained development and consequent improvements in capability
- On top of that, unprecedented noise, hype, politicization, misinformation, opportunism, vested interests making planning extremely difficult



Approximate Snapshot of Generative AI Investors, March 2023



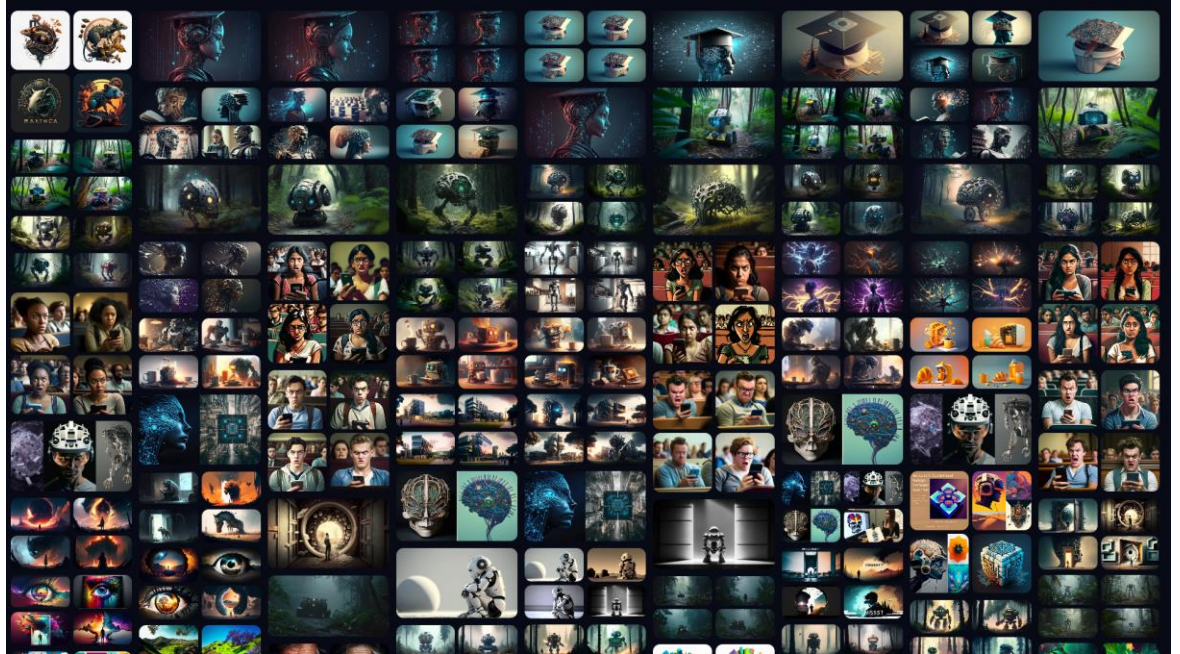
Kelvin Mu (He/Him) · 2nd
Early-stage Technology Investor

SELECT TOP INVESTORS IN GENERATIVE AI (MARCH 2023)

Investor	Typical Stage	Apps – Text / Audio / Code	Apps – Image / Video / Design	Apps – Others (e.g. search, health)	Enablement / MLOps / Dev Tool	Infra / Data / Model / Research
SOMA CAPITAL	Seed	trufi, cogram, FATHOM, Pilot	tavus, Pengin AI	ClipDrop, durable, SoftScale	slai, Monterey, stack	generally, intelligent
TIGERGLOBAL	Stage-Agnostic	copy.ai, ada, Wroteor, DEEPGRAM	avr	CRESTA, Grain, ushur	aporia, Invidio, slai, OctoML, REPLY INTELLIGENCE	cohere, Pinecone, scale
SEQUOIA	Seed – Series C	copy.ai, Twiish, warp	tavus, pencil, VEED.IO	Motiny, CRESTA, obviously.ai, glean, neeva	lifelicate, Hugging Face, slai, REPLY INTELLIGENCE	
AI Ventures	Seed / Series A	Replika	Omneky, Facet	ATOMIC AI, Profluent, Perplexity	mutable.ai, Hugging Face, Weights & Biases	Character.AI
andressen horowitz	Stage-Agnostic	dialpad, replit	descript, reface, YTPIC	CRESTA, BigKit, mem, metaphor	lifelicate, anyscale	
khosla ventures	Stage-Agnostic	trufi, Replika, bloop, tabnine, Fireflies	R, Simplified	regie.ai, menden AI, SPLASH		OpenAI
South Park Commons	Pre-seed / Seed	Speak, replit	Facet, Product Hub, LUMA AI, Storytime	regie.ai, Forethought, durable	DASHWORKS, GANTRY	
Alumni Ventures	Seed – Series B	agolo, lang.ai, replicant	chooch	Webot Health, sorceror, moises, Monterey	slai, BANANA	Synthesis AI
INSIGHT FUTURE PARTNERS	Stage-Agnostic	Jasper, AssemblyAI, WRITER, reepub.ai	Hour One, Lightricks, Uizard	Profluent, Motiny	Weights & Biases	TOHIC
8VC	Seed – Series B	casetext	tome, Rephrase.ai, METAPHYSIC	BigKit, ushur, Forethought		AI21 labs
Amplify	Pre-seed / Seed	Primer	runway, LUMA AI	metaphor	Magic, anyscale, GANTRY, OctoML	Outerbounds
COATUE	Later-Stage/ Buyout	Jasper, replit	tome, runway		Hugging Face, Weights & Biases, GANTRY, Lightning**	scale, stability.ai

Partile fund	Pre-seed / Seed	copy.ai, HyperWrite, LOVO, TALES	BIFROST, detail	OASIS, CALA, onloop	slai	
Index Ventures	Stage-Agnostic		Twelve Labs, PolyAI	Hebbio, moises	GANTRY, Lightning**, Humanloop	cohere, scale
SAMSUNG NEXT	Series A - B	tabnine, Fireflies		Forethought	mutable.ai, mosaic**, aporia	dotagen, TOHIC, stability.ai
Accel	Stage-Agnostic	AssemblyAI, Locafy	Facet	ada, Prodigal, timelyAI, The.com	Dhilise	scale
Bloomberg BETA	Pre-seed / Seed	Primer, replit, textio	PolyAI	ProtenDure, COLIV	lifelicate, Weights & Biases	TOHIC
greylockpartners.	Seed – Series B		tome, Product Video	CRESTA, neeva	gretel	Adept, Inflection
L2 VENTURES	Seed	Jasper, FATHOM, OBSERVE-AI	tavus, PhotoRoom	Motiny, Attention, needl		
Lux+	Seed – Series C	Primer	runway, BIFROST	A-ALPHA BIO, Enveda, ATOMIC AI	Hugging Face, mosaic**	
Section 32	Series A - C	dialpad, Primer	METAPHYSIC, inworld	BigKit, XOXKind	gretel	cohere
VILLAGE ALBANY	Pre-seed / Seed	lang.ai	Omneky	Enveda, Forethought, Aide	gretel	SYNTECSA
Investor Capital	Pre-seed / Seed	Speechify, copy.ai	tavus, Beur, RIVERSIDE	SoftScale		
foundation capital	Seed / Series A	Jasper	D-ID	regie.ai	anyscale, Booth.ai	Outerbounds
FOUNDERS FUND	Seed / Series A	Speak	tome, inworld	OASIS, REPLICA, SIMI		AI FOUNDATION, scale

Generative AI e.g. Midjourney v5



Text to video generative AI

<https://www.theverge.com/2023/3/20/23648113/text-to-video-generative-ai-runway-ml-gen-2-model-access>



An example video generated by Runway's Gen-2 model. The text input prompt was "A shot following a hiker through jungle brush." Image: Runway

NVIDIA



NVIDIA



<https://twitter.com/nonmayorpete/status/1648548301292072962?s=20>



<https://www.vox.com/future-perfect/2019/5/31/18645993/ai-deepfakes-gan-explained-machine-learning>

Audio and Music

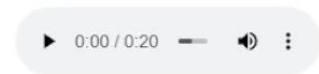
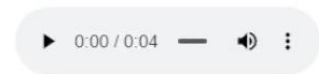
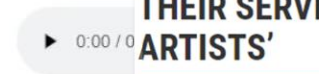
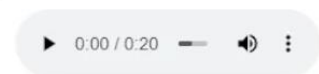
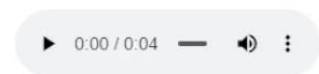
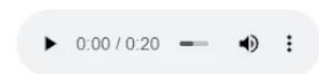
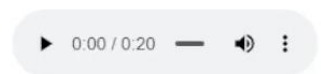
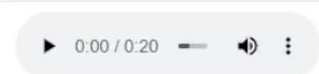
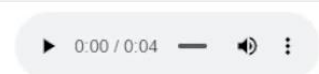
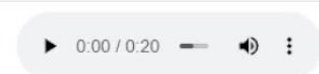
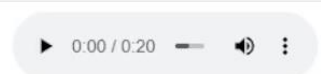
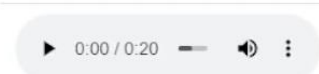
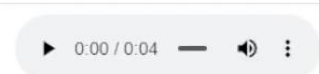
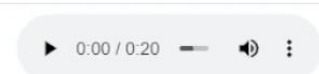
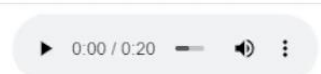
Piano continuation

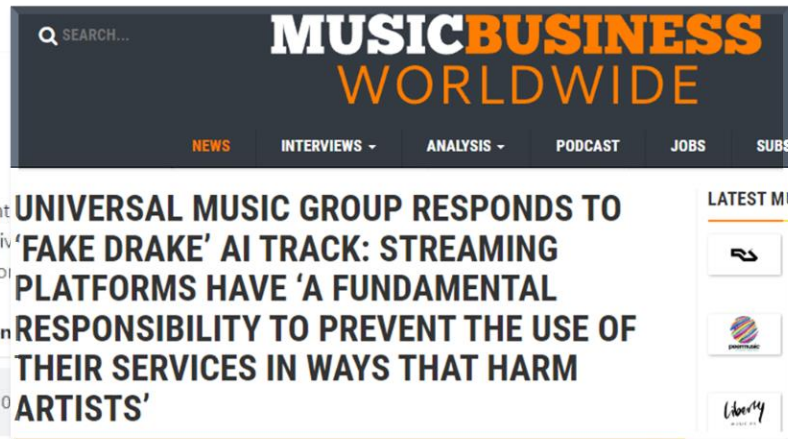
AudioLM is not limited to modeling speech. It can also learn to generate coherent piano music continuation from a short audio prompt. We also show the continuations produced by a version of the model trained exclusively on piano music, stressing the importance of the semantic tokens in our framework. The 4-second prompts come from

Original

Prompt

Continuation




SEARCH...

MUSIC BUSINESS WORLDWIDE

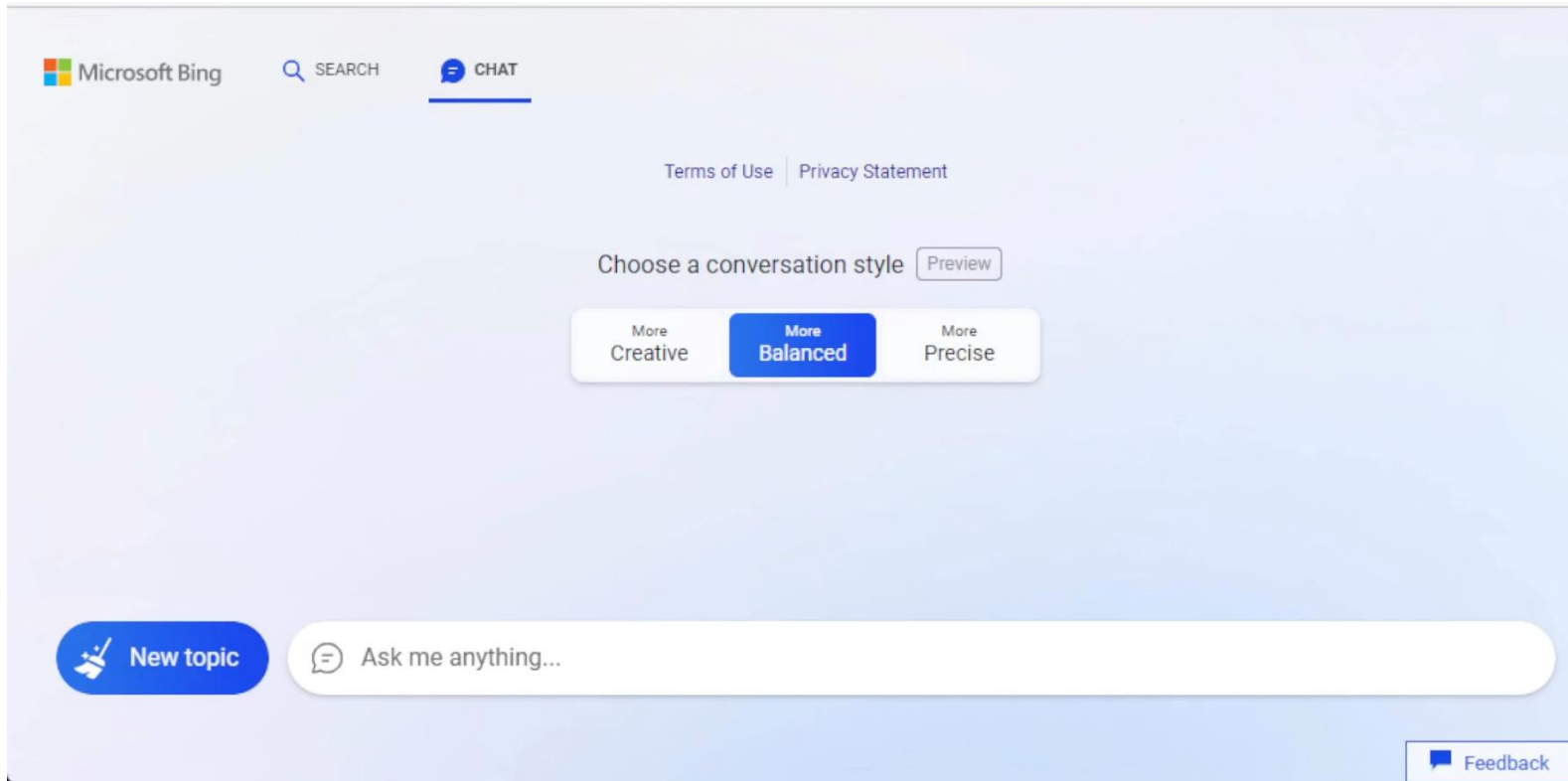
NEWS INTERVIEWS ANALYSIS PODCAST JOBS SUBS

UNIVERSAL MUSIC GROUP RESPONDS TO 'FAKE DRAKE' AI TRACK: STREAMING PLATFORMS HAVE 'A FUNDAMENTAL RESPONSIBILITY TO PREVENT THE USE OF THEIR SERVICES IN WAYS THAT HARM ARTISTS'

LATEST MU



Large Language Models



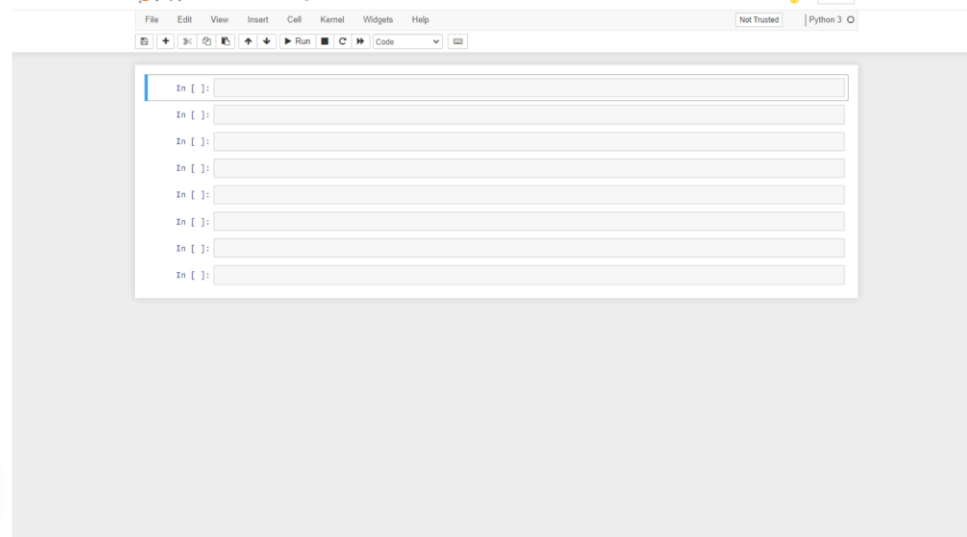
Simple Coding Example Using ChatGPT4

Model
GPT-4

ChatGPT PLUS

GPT-4 currently has a cap of 25 messages every 3 hours.

Send a message...



Rapidly Evolving Capabilities

HOME > TECH INSIDER
OpenAI just announced GPT-4, an updated chatbot that can pass everything from a bar exam to AP Biology. Here's a list of difficult exams both AI versions have passed.

Transforming Assessment



An example video generated by Runway's Gen-2 model. The text input prompt was "A shot following a hiker through jungle bushes." Image: Runway

Generative AI – almost all types of content. But also full text & audio-based interaction.



Exemplar rapidity – the “hands” problem

Regulation, copyright (especially music industry for example) may slow down some of these... but hard to see it stopping them medium term

WILL KNIGHT BUSINESS MAR 30, 2023 12:00 PM WIRED

Let the AI Coding Wars Begin!

The way artificial intelligence can rewrite software will have huge implications for the tech industry—and everyone else, too.

A whole new way to work

CoPilot... for Everything

ars TECHNICA SUBSCRIBE SIGN

RISE OF THE LARGE LANGUAGE ROBOTS — Google's PaLM-E is a generalist robot brain that takes commands

ChatGPT-style AI model adds vision to guide a robot without special training.

Will It Enter the Physical World?

<https://twitter.com/fabianstelzer/status/1636348973815300099?s=20>
<https://www.sciencefocus.com/future-technology/why-ai-generated-hands-are-the-stuff-of-nightmares-explained-by-a-scientist/t>

What's Different This Time? (In Terms of Impact on Professions)



- **Breadth**
- **Depth**
- **Accessibility**
- Confrontational
- Massive reduction in barriers to disruption – both a **threat** and an **opportunity** for many sectors

Early Large Scale Quantified Evidence

GENERATIVE AI AT WORK

Erik Brynjolfsson
Danielle Li
Lindsey R. Raymond

Working Paper 31161
<http://www.nber.org/papers/w31161>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2023

- ~5000 contact centre agents
- 14% productivity increase:
 - Shorter chat times & hence more chats / hour
 - Slight increase in successful chat resolution rate
- Lowest skill level agents benefited the most
 - 35%
- New workers using assistant with 2 months experience = 6 month experience workers without assistant
- Implications for workforce, training of workforce, agility of workforce...

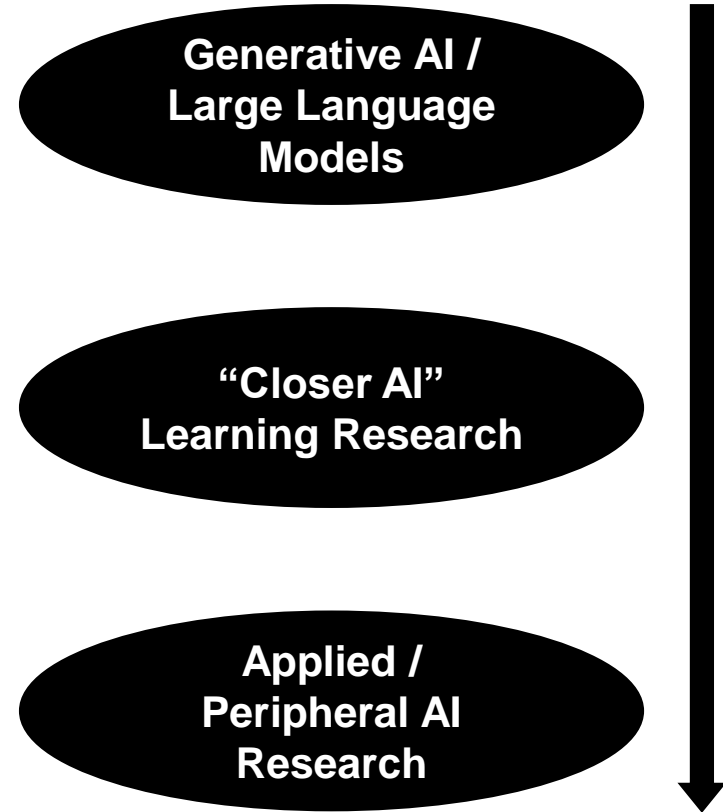
What's in Our Response Toolkit?

- We have a limited toolkit for responding, and past thinking and rules of thumb are of limited use this time around:
 - Analogies “just like the calculator” - *inappropriate*
 - Generalisms like “some jobs disappear, new jobs are generated” – *efficiency multipliers don't guarantee a sector suddenly grows by a factor*
 - Generalisms like “freeing up people to do the more creative part of their job” – *these systems are now often quite capable at the creative parts of many roles*
 - “Prompt engineers are a new highly paid profession” – *not much certainty that this will endure in the medium to long term*



There Are Australian Specific Issues

- Australia is strong in robotics, computer vision, data science, responsible AI, but has relatively little critical mass in generative AI / Large Language Models technical research.

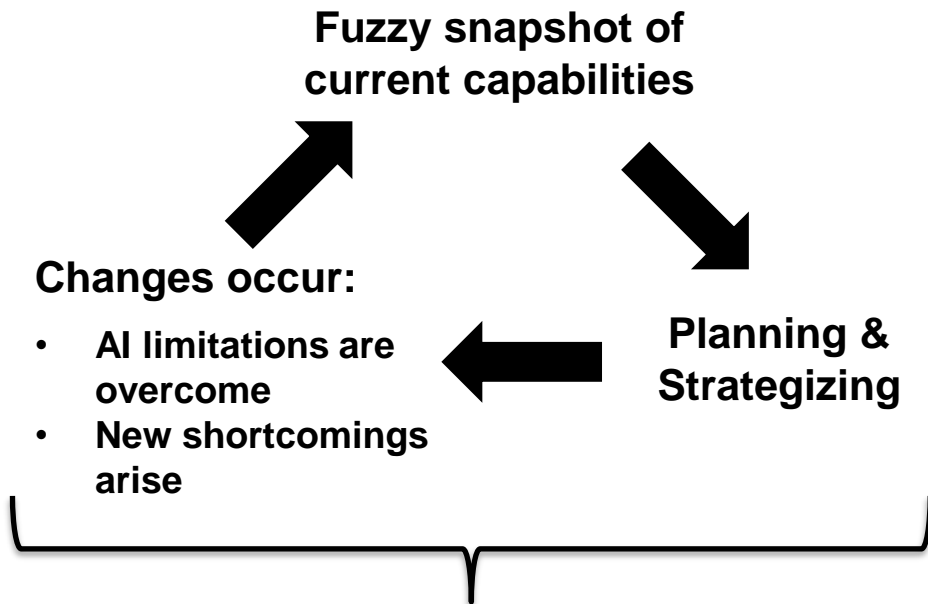


Some generalist predictions

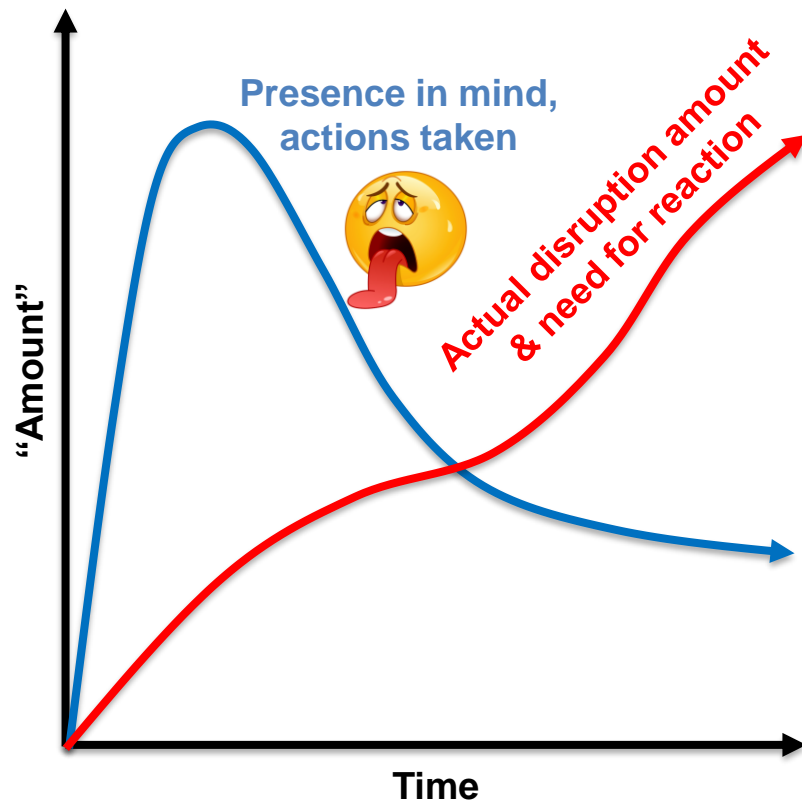
- Will likely enhance capabilities of a significant fraction of workers, especially white collar
- May or may not affect quantity of jobs in a particular sector / geographic location / market (up or down)
- Is likely to both reduce and exacerbate inequity depending on sector and situation

Reaction Speed and Fatigue

Assess/Plan/Change Cycle




**Need an Unprecedented Iteration
Speed, that is Sustained**



Four Mistakes We Want to Avoid


1. Buy in blindly to the hype
2. Extrapolate that substantial flaws, ethical issues are guaranteed to slow the rapid, widespread deployment and adoption of these technologies
3. Under react
4. Over react, prematurely exhaust ourselves, and jeopardize our ability to **continue to plan, leverage opportunities and generally react**


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 <https://goo.gl/rczslc>