

EMCR Research Insights: Generative AI

10th Sept 2024

Dr Gordon McDonald

Sydney Informatics Hub

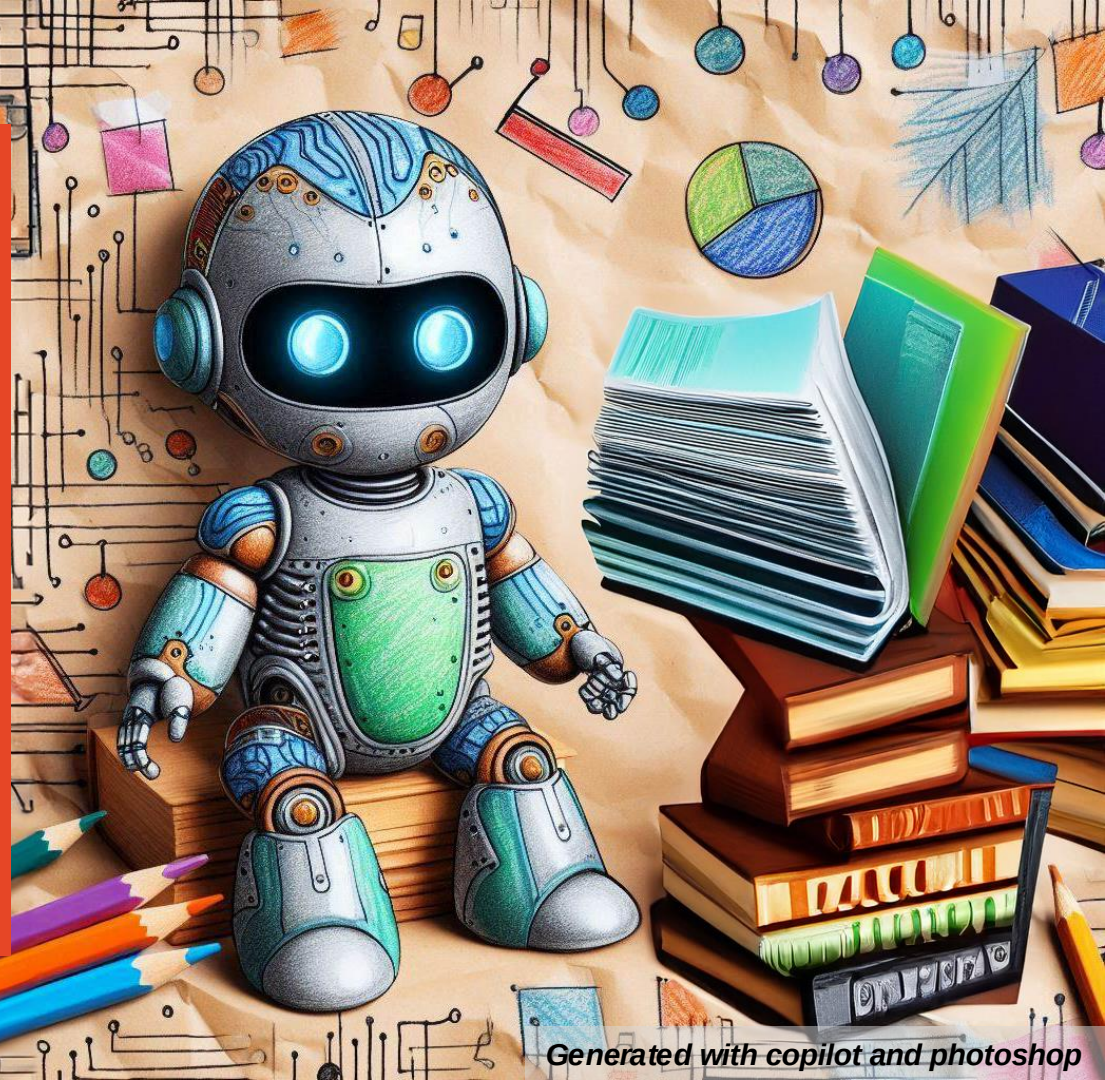
sydney.edu.au/informatics-hub



THE UNIVERSITY OF
SYDNEY

Sydney
Informatics Hub

CRICOS 00026A TEQSA PRV12057



Generated with copilot and photoshop

Sydney Informatics Hub

Sydney Informatics Hub is a **Core Research Facility** within PVC-RI, enabling excellence in computational and data-driven research through advanced digital infrastructure, expert data consultancy and analytics training.



Statistics



*Data Science,
AI & Software*



*Research
Computing*



Bioinformatics



SIH Training

64

Different offerings, in person, online, and hybrid content in a variety of formats from webinars to interactive workshops.



Attendees at all career levels, from undergraduate students to senior professors, and representation from every Faculty and School.



Partnerships with national organisations like Australian BioCommons:
biocommons.org.au/training-cooperative.



Find out more on our training calendar:
sydney.edu.au/informatics-hub/training. Or stay up to date with our newsletter.



sydney.edu.au/informatics-hub/training

Statistics	Data Science	Research Computing	Bioinformatics	Events
Fundamentals	Machine Learning	High Performance Computing	'omics Techniques	Hacky Hour
Modelling	Visualisation	Cloud Computing	Reproducible Pipelines	Summer Schools
Specialist	Natural Language Processing	Containers	Data Analytics	Coding Challenges
	Geospatial Analysis	Workflows	National Compute Infrastructure	

What is AI?

"A friendly koala cyborg"

Generates...

Images, Video

Text

Audio

3D structures
or molecules



what is the best way to peel a mandarin?

Input

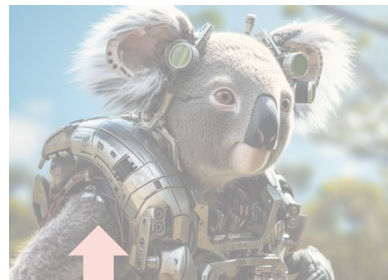
"Hello"



AI

has an internal representation
of meaning or content

[0, 1, .5, .2]

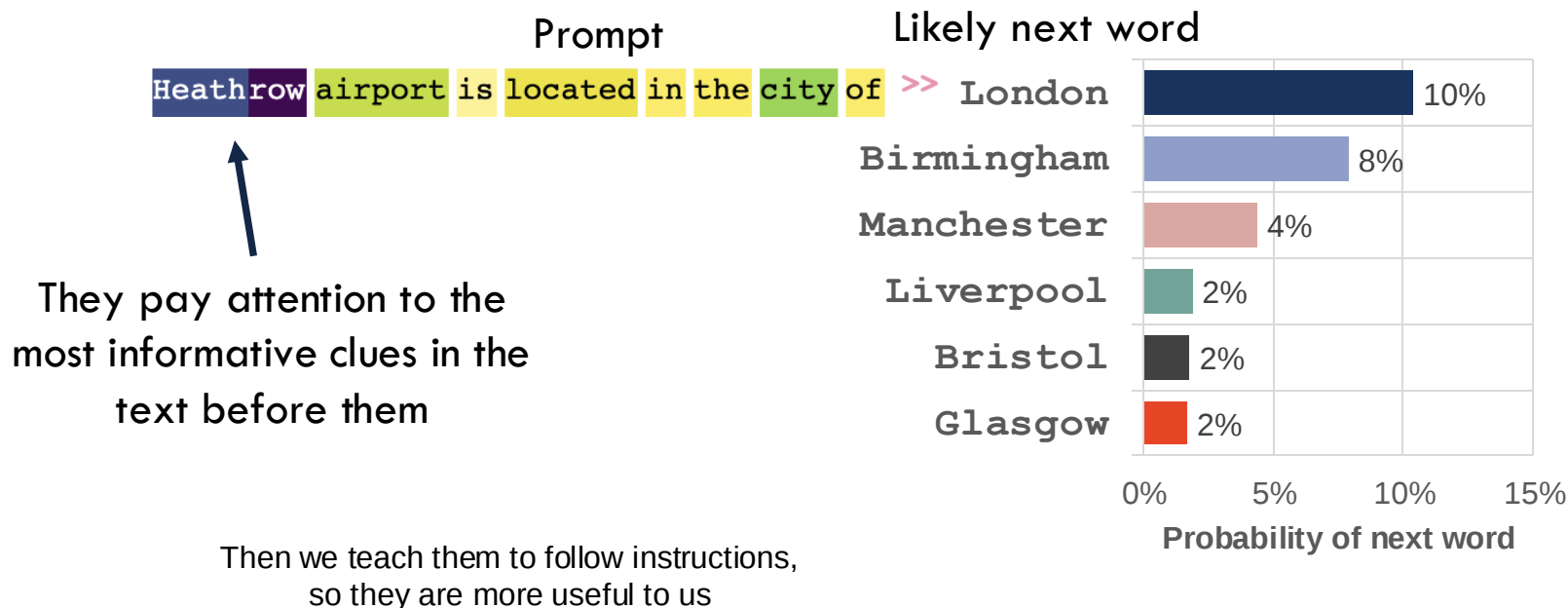


Output

"你好"



Language models (like ChatGPT)



Blessing

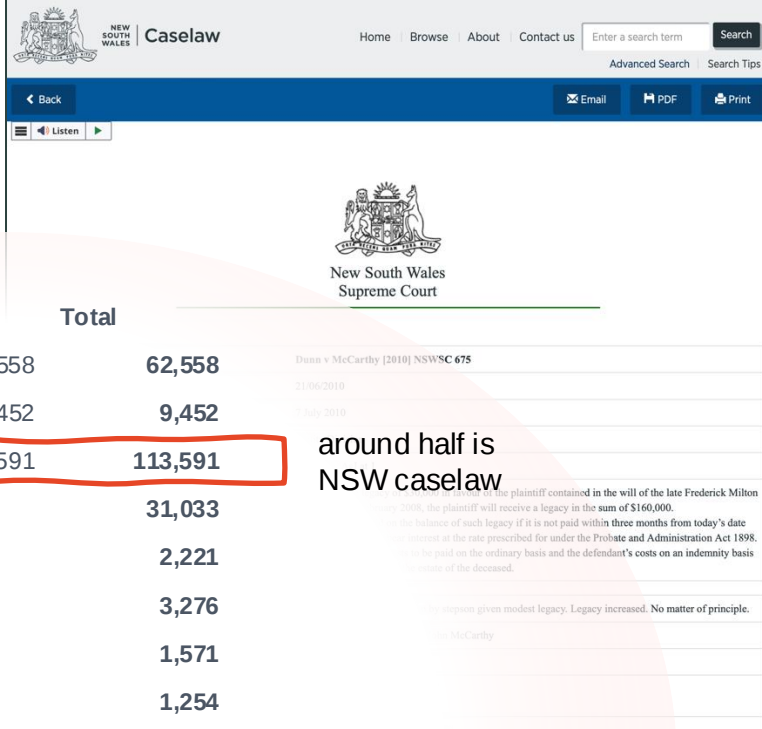
- Mostly ok results in far less time/effort
- Well-suited to poorly defined and ambiguous problems

Curse

- Results can be unfeasible, wrong, creative ('hallucinated'), biased etc.
- You need a way to check the answer.
- Best models are proprietary and/or hosted on cloud in other jurisdictions

Appetizer

Topic Mapping with AI



Open Australian Legal Corpus

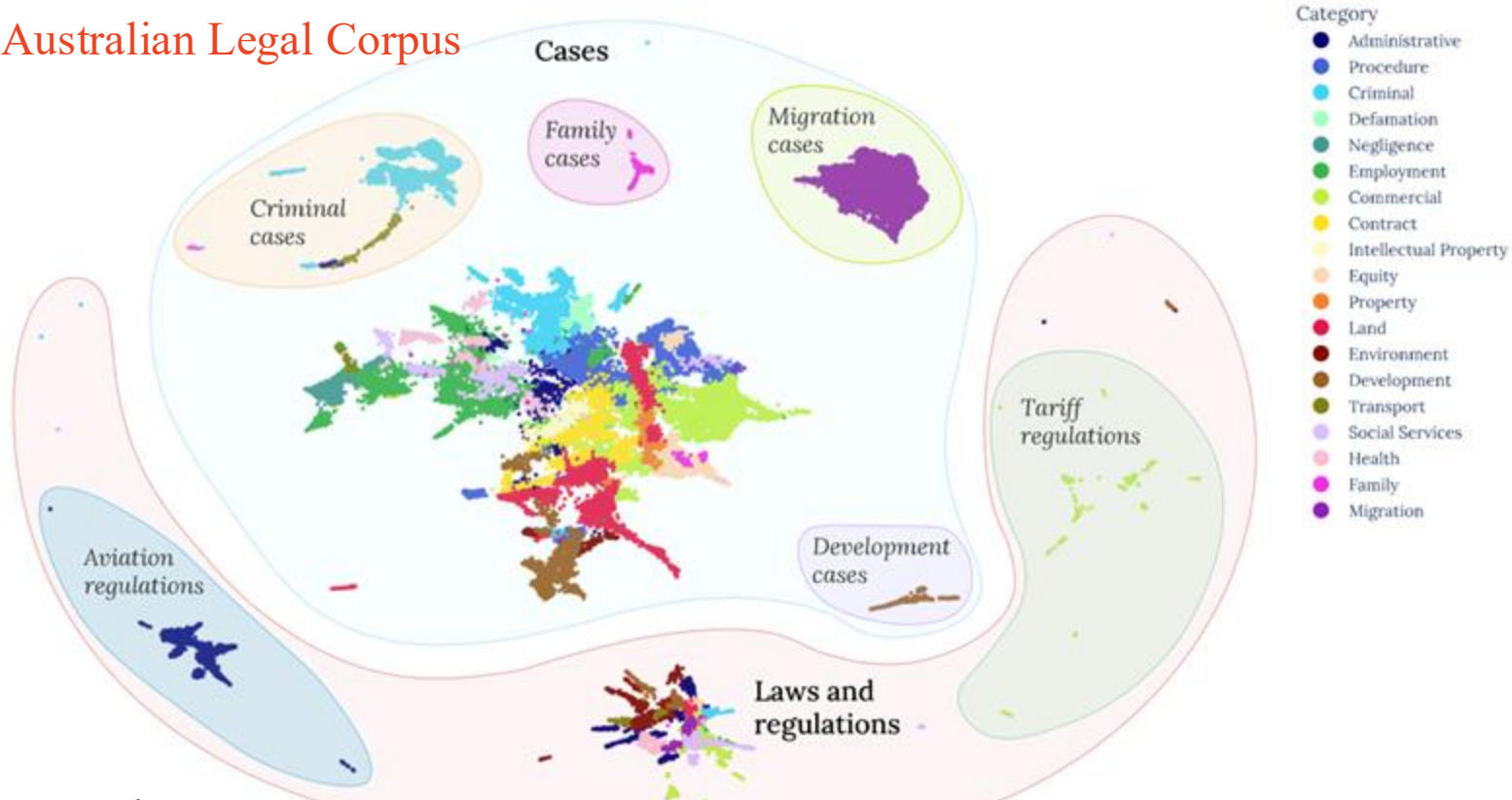
Source	Primary Legislation	Secondary Legislation	Bills	Decisions	Total
Federal Court of Australia				62,558	62,558
High Court of Australia				9,452	9,452
NSW Caselaw				113,591	113,591
Federal Register of Legislation	4,733	26,300			31,033
NSW Legislation	1,423	798			2,221
Queensland Legislation	571	428	2,277		3,276
Western Australian Legislation	817	754			1,571
South Australian Legislation	566	492	196		1,254
Tasmanian Legislation	856	1,676			2,532
Total	8,966	30,448	2,473	185,601	227,488

around half is
NSW caselaw

*Chief Parliamentary Counsel of Victoria rejected Umar's request to publish their data under CC4.0 licence, and ACT and NT never responded.

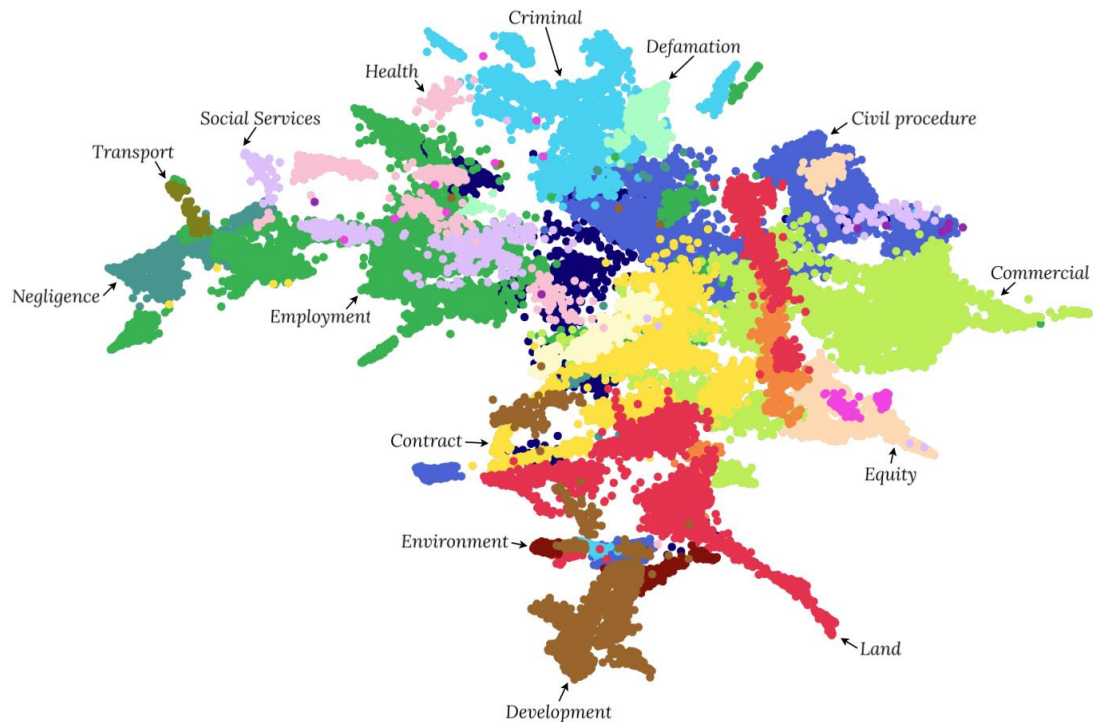
Blog post: <https://umarbutler.com/how-i-built-the-largest-open-database-of-australian-law/>
Dataset (10Gb) available at: <https://huggingface.co/datasets/umarbutler/open-australian-legal-corpus>

Open Australian Legal Corpus



Blog post: <https://umarbutler.com/mapping-almost-every-law-regulation-and-case-in-australia/>

Open Australian Legal Corpus



Topic Modelling, Map Your Corpus



u/mrx-ai • 1 yr. ago

How ChatGPT actually works

A lot of buzz around ChatGPT –but not too much

Actually, OpenAI did not release much technical methodology is based on previous research.

I tried my best to describe in some detail how ChatGPT works in this article:

<https://www.assemblyai.com/blog/how-chatgpt-actually-works/>

It also contains my personal criticism on some technical details and as relevant references and a link to a cool open source repo for RLHF

What is the best piece of technical content you read so far about ChatGPT?

r/LanguageTechnology

text nlp model
language would

u/Guilty-History-9249 • 10 mo. ago

pytorch is bundling an old libcudnn.so.8 file causing perf drop on a 4090.

This was known at least as far back of Oct by the A1111 github folks the the spread far.

I had to independently discover this. I was getting about 13.8 it/s during SD Imagen and now I get 39.5. For a long time many of us thought Torch 2.0 was somehow involved in this huge improvement that we knew a few were getting. However, it isn't the Torch version at all. On Linux if I replace the libcudnn.so.8 file in pytorch with the same file from the cuDNN version 8.7 the perf jumps 3X. This is even with torch 1.12 cu113.

This isn't a tech support post but just information that might help some folks.

r/pytorch

self torch
pytorch nn
model

r/Python

python github
code project
use

r/investing

market stock
would stocks
like

u/deepking17 • 1 mo. ago

You should know these f-string tricks

F-strings are faster than the other string formatting methods and are easier to read and write. Here are some tricks you may not have known.

1. Number formatting :

You can do various formatting with numbers.

```
>>> number = 150
>>> # decimal places to n -> .nf
>>> print(f"number: {number:.2f}")
number: 150.00
>>> # hex conversion
```

u/MorningTendies • 9 mo. ago

We Just Witnessed the Largest U.S. Bank Failure since the Global Financial Crisis

Silicon Valley Bank (SVB) Shares Dropped Over 60% Before Trading was Halted

The Effect Was Felt Throughout the Financial Sector
In the Past 5 Days:

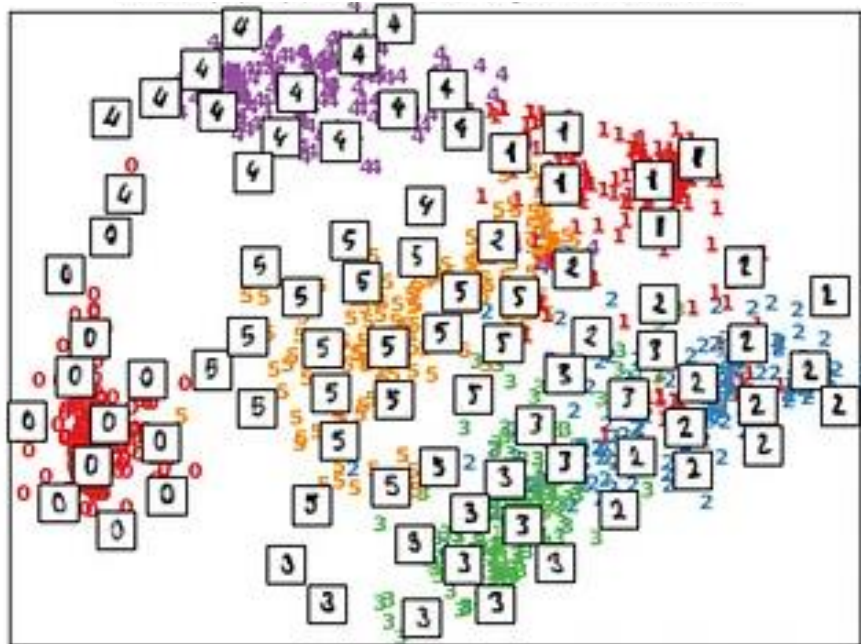
SVB down 51%
JP Morgan 23.75%
Wells Fargo 11.9%
Bank of America 8.08%

Silicon Valley Bank surprised the market by announcing it needed to raise capital. The bank had been forced to sell all of its available-for-sale bonds at a loss as clients withdrew deposits, it said.

That the efforts to raise capital had failed and that SVB had

[View full post](#)

Topic Modelling, Map Your Images



MNIST handwritten digits

0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9

AI tools @ Sydney

and what you can use them on

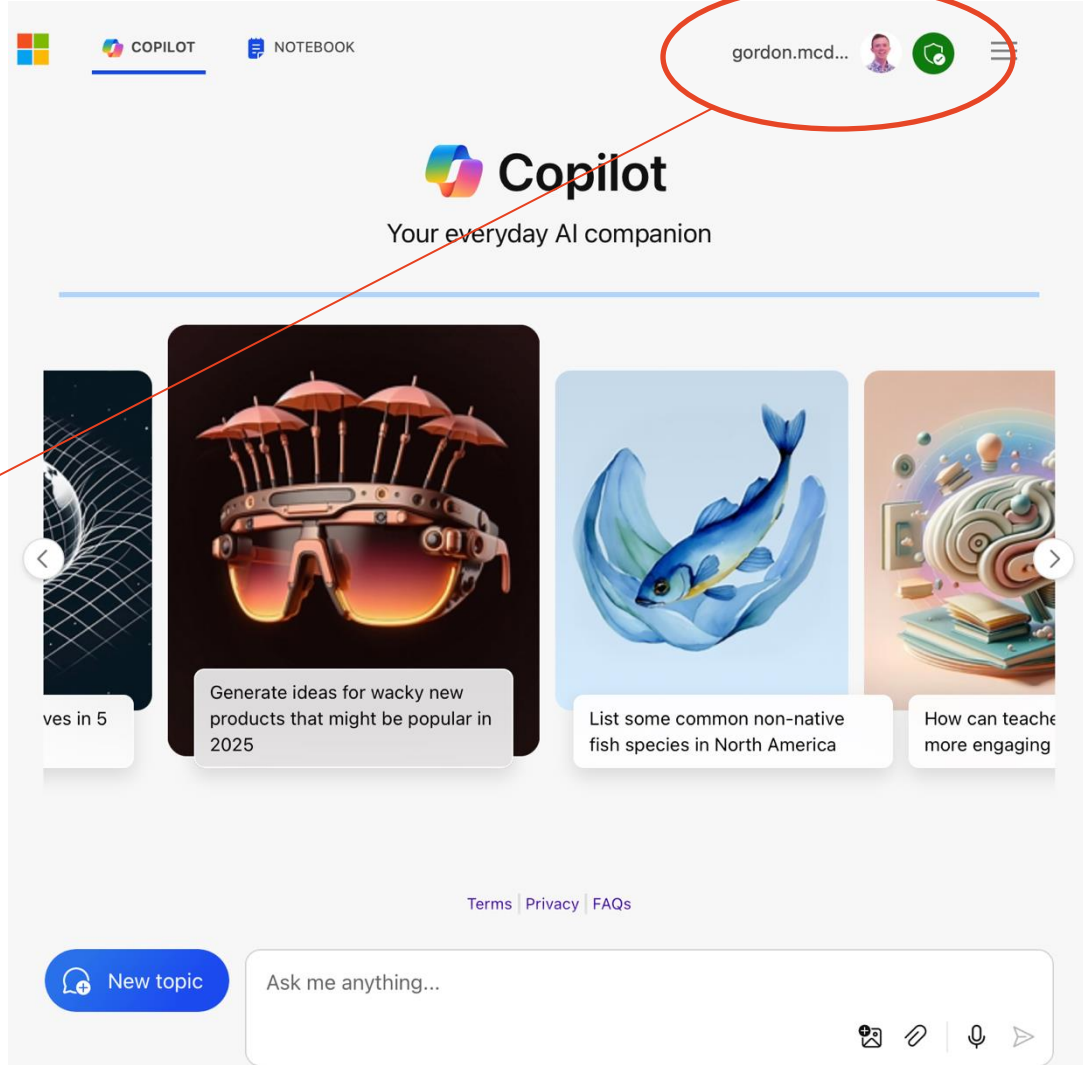
Copilot

University rated for public or
protected data

“Safer ChatGPT”

⚠ **Not** for highly protected data!

⚠ Make sure you log in with your
email name@sydney.edu.au and
look for the green ‘protected’ badge



<https://copilot.microsoft.com>

Photoshop

Generative Fill in Photoshop
allows you to create and
edit images



www.adobe.com

Cogniti

Make your own guided chatbots!

University rated for student and teaching use.

Can provide a prompt to guide the chatbot, and relevant (public) documents for it to search when replying.

 **Do not** use with protected data!

app.cogniti.ai and
cogniti.sydney.edu.au



I have a corpus of caselaw that I want to analyse to extract certain pieces of information, then group it according to what topics are in the documents. who can help me?

For your research problem involving the analysis of a corpus of caselaw to extract information and categorize it by topics, you may benefit from the following techniques:

1. **Natural Language Processing (NLP):** This involves using computer algorithms to understand and manipulate human language. NLP techniques can help you extract entities, concepts, and relationships from your legal documents.
2. **Text Mining and Machine Learning:** These techniques can be used to discover patterns and trends within large sets of text data. Machine learning models can be trained to classify documents into topics.
3. **Data Visualization:** After extracting and categorizing the information, visualizing the data can help in understanding the distribution of topics and the relationships between them.
4. **Database Management:** Properly storing and indexing the extracted information will be crucial for efficient retrieval and analysis.
5. **Statistical Analysis:** This can be used to quantify the significance of the findings and to understand the distribution of topics within the corpus.

The **Sydney Informatics Hub** at the University of Sydney could assist you with some of these techniques, particularly in the areas of research data analysis, AI, bioinformatics, statistics, and high performance computing. They offer support and training in these areas, which could be very beneficial for your project.

Contact details for Sydney Informatics Hub:

- Website: [Sydney Informatics Hub](#)
- Email: sih.info@sydney.edu.au

Please note that while the University of Sydney Core Research Facilities provide a wide range of services, the specific

Enter your message



Cogniti

Make your own guided chatbots!

University rated for student and teaching use.

Can provide a prompt to guide the chatbot, and relevant (public) documents for it to search when replying.

 **Do not** use with protected data!

app.cogniti.ai and
cogniti.sydney.edu.au

Edit agent: Research Facility Navigator    

Details

Prompts

AI engine

Resources

Limits

Chat access

Plugins

Styling

Sharing

Privacy and security

Ownership

Agent prompts

System message

You are an assistant designed to direct academic researchers at the University of Sydney to the appropriate University of Sydney research facilities relevant to their research.
Ask the user about their research problem.
Consider up to five appropriate techniques that might help them with their research problem.
If any of these techniques are provided by University of Sydney research facilities, list the technique and the facility, along with links for contacting the facility as listed below.
Provide only website links and email addresses that are listed in this prompt or resources.
Make sure that all information you provide about research facilities is from the resource documents or links.
Do not make up new research facilities, web sites or email addresses.
If a suggested technique is not offered by a University of Sydney research facilities you may list these last.
If you don't know what techniques are offered just reply that you don't know and users can look at the website at [University of Sydney Core Research Facilities]

Initial user message

Optional first message to send the AI on behalf of the user

Save agent

Try chat with this agent

Sydney Informatics Hub Example Projects

Information harvesting, integrating, and storytelling.

Large language models for literature review, synthesis, and text analysis.

Extracting information from text with language models



OpenAI GPT-4o
(May '24)

Caselow

Home Browse About Contact us Enter a search term Search

Advanced Search Search Tips

Back Email PDF Print

Listen

New South Wales Supreme Court

CITATION : Dunn v McCarthy [2010] NSWSC 675

HEARING DATE(S) : 21/06/2010

JUDGMENT DATE : 7 July 2010

JURISDICTION : Equity Division

JUDGMENT OF : Macready AsJ at 1

DECISION :
1. In lieu of the legacy of \$30,000 in favour of the plaintiff contained in the will of the late Frederick Milton Gear dated 20 February 2008, the plaintiff will receive a legacy in the sum of \$160,000.
2. Interest to be paid on the balance of such legacy if it is not paid within three months from today's date and if not so paid, to bear interest at the rate prescribed for under the Probate and Administration Act 1898.
3. That the plaintiff's costs to be paid on the ordinary basis and the defendant's costs on an indemnity basis be paid or retained from the estate of the deceased.

CATCHWORDS : Family Provision. Application by stepson given modest legacy. Legacy increased. No matter of principle.

NSW Supreme Court
Inheritance law judgments

Name	James Nevill Dunn
Role in trial	Plaintiff
Costs	\$40,000 (p6)
Natural person?	true
Relationship to deceased	stepson (p1)
Was dependent on deceased?	partly dependent (p32)
Alleged misconduct?	false
Estranged from deceased?	briefly estranged due to a misunderstanding (p43)
Financial circumstances	receives a pension of \$520 per fortnight, wife earns \$800 per fortnight, owns a house with a \$15,000 mortgage (p39-40)



Inheritance Case Law – Dr. Ben Chen
SIH: Mike Lynch, Xinwei Luo

Semantic search on private data

Digital Criminal Justice Project–
Dr. Carolyn McKay



SIH: Nathaniel Butterworth,
Gordon McDonald, Marius Mather
bit.ly/sih_search

Local language model
(not in the cloud)

Survey and Interview transcripts
⚠️ Highly protected data

The University of Sydney

Semantic Query
food



Find

100%

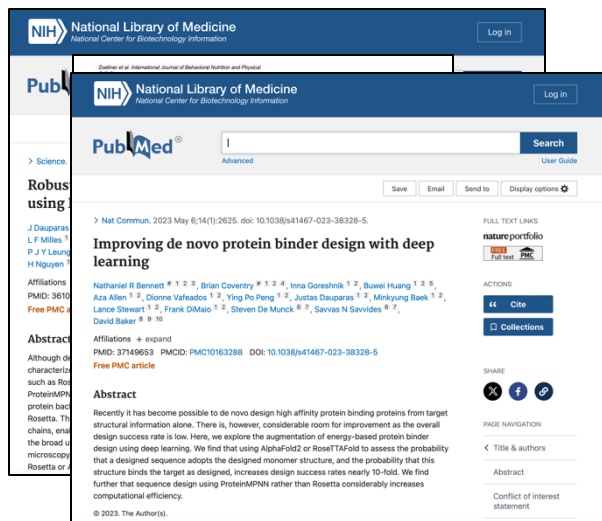
Before the sun had risen, the wife came and awakened the two children, saying, "Get up, you lazy bones; we are going into the forest to cut wood." Then she gave each of them a piece of bread, and said, "That is for dinner, and you must not eat it before then, for you will get no more." Grethel carried the bread under her apron, for Hansel had his pockets full of the flints. Then they set off all together on their way to the forest. When they had gone a little way Hansel stood still and looked back towards the house, and this he did again and again, till his father said to him, "Hansel, what are you looking at? take care not to forget your legs."

6 "O father," said Hansel, "I am looking at my little white kitten, who is sitting up on the roof to bid me good-bye." - "You young fool," said the woman, "that is not your kitten, but the sunshine on the chimney-pot." Of course Hansel had not been looking at his kitten, but had been taking every now and then a flint from his pocket and dropping it on the road. When they reached the middle of the forest the father told the children to collect wood to make a fire to keep them, warm; and Hansel and Grethel gathered brushwood enough for a little mountain; and it was set on fire, and when the flame was burning quite high the wife said, "Now lie down by the fire and rest yourselves, you children, and we will go and cut wood; and when we are ready we will come and fetch you."

7 So Hansel and Grethel sat by the fire, and at noon they each ate their pieces of bread. They thought their father was in the wood all the time, as they seemed to hear the strokes of the axe: but

Classifying text with language models

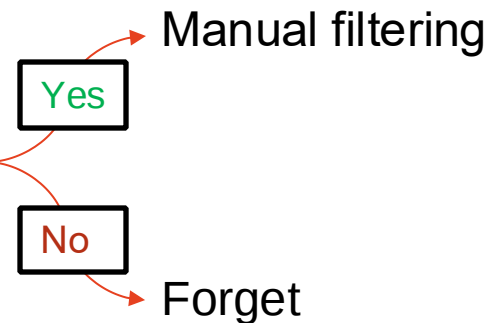
PubMed articles



Does this paper report
on an inherited trait?

OMIA

Online Mendelian
Inheritance in Animals



omia.org

OMIA Text Mining
Professor Frank Nicholas, Associate Professor Imke Tammen
SIH: Marius Mather, Sony Jufri, Joel Nothman, Di Lu

Searching for information

policy-navigator.techlab.works

University of Sydney Policies

Which policy document answers the question?

**LEAVE POLICY 2023**

**REASONABLE AND NON-ALLOWABLE EXPENSE PROCEDURES 2022**

Issued by: Chief Financial Officer
Dated: 27 October 2022
Last amended: 23 January 2024 (administrative amendments)
Signature: _____
Name: Wayne Andrews

1 Purpose and application

(1) These procedures are to give effect to the *Procurement Policy 2019* ("the policy"), and support compliance with probity, value for money and legislative requirements.

(2) These procedures apply to:

- (a) the University, students, staff and affiliates;
- (b) all foundations, centres, associations and institutes not separately incorporated;
- (c) all wholly owned subsidiaries.

**Policy Navigator Beta**

What does the research code of conduct say about using generative AI like Microsoft copilot for my research on personally identifiable information such as sensitive interview transcripts?

Based on your question, it looks like the [Research Code of Conduct 2023](#) might apply, which says:

...the Code of Conduct provides guidelines for the use of generative AI like Microsoft Copilot in research involving personally identifiable information such as sensitive interview transcripts. Researchers must ensure that any personal information arising from the research is collected, stored, used, and disclosed in accordance with privacy laws and university policies. Additionally, researchers must handle confidential material, including personal information, with care by clearly identifying it, storing it securely, recording access details, and

Type a new question

You are chatting with a generative artificial intelligence. It may provide you with inaccurate or out of date information. Ensure you verify important information with trusted sources. All conversations are recorded. Do not enter any highly protected or personal information.

[About](#) [Privacy](#) [Feedback](#)

Adjust Regenerate

Thought process Supporting content **Citation**

Document Document Section Policy Register

**RESEARCH CODE OF CONDUCT 2023**

The Deputy Vice-Chancellor (Research), as delegate of the Senate of the University of Sydney, adopts the following policy:

Dated: 26 July 2023
Last amended: 3 November 2023 (administrative amendments)
26 April 2024 (administrative amendments)
Signature: _____
Position: Deputy Vice-Chancellor (Research)

CONTENTS

1	Name of policy	2
2	Commencement	2
3	Policy is binding	2
4	Statement of intent	2
5	Application	2
6	Definitions	3
PART 1 – PROPER CONDUCT OF RESEARCH		7
7	Principles of responsible research conduct	7
8	General responsibilities of researchers	9
9	Recordkeeping and management of research data and primary materials	13
10	Supervision of research trainees	17
11	Publication and dissemination of research findings	17
12	Authorship	19
13	Peer review	21
14	Conflicts of interests	22
15	Collaborative research	23
16	Tissue banks and collection, storage and use of human tissue	25
17	Notification of research subject to specific statutes and other restrictions	26
PART 2 – MANAGING AND INVESTIGATING ALLEGED BREACHS		27
18	Relationship with other instruments and procedures	27
19	Breaches of the policy	27
20	Definition of research misconduct	28
21	Roles and responsibilities	28
22	Receipt of allegations	29

Policy Navigator (Beta)
SIH: Henry Lydecker, Gordon McDonald
TechLab: Iqbal Chowdhury, Jim Cook
OGC: Lauren Myers, Deb Hook

Contextualizing information and storytelling

Papers, patents, PR, ...

What is the impact of this stream of research?

The image shows two overlapping screenshots. The top one is a research paper titled 'Tropoelastin Improves Post-Infarct Cardiac Function' from the journal 'Circulation Research'. The bottom one is a news article from the University of Sydney titled 'Allergan to acquire University of Sydney spinoff Elastagen'. A red arrow points from the news article towards the right side of the slide.

Research Impact Assessment Framework Case Study

Organisation Details		
Organisation name:	University of Sydney Charles Perkins Centre	
Title of case study:	Elastagen	
Period when research was undertaken:	2013 – 2023	
Period when the claimed impact occurred:	2013 – 2023	
Names and roles of staff:	Staff name	Role
	Anthony Weiss	McCaughey Chair in Biochemistry, University of Sydney, NHMRC Leadership Fellow, Founder of Elastagen, and leader of Tissue Engineering & Regenerative Medicine in the Charles Perkins Centre, University of Sydney.

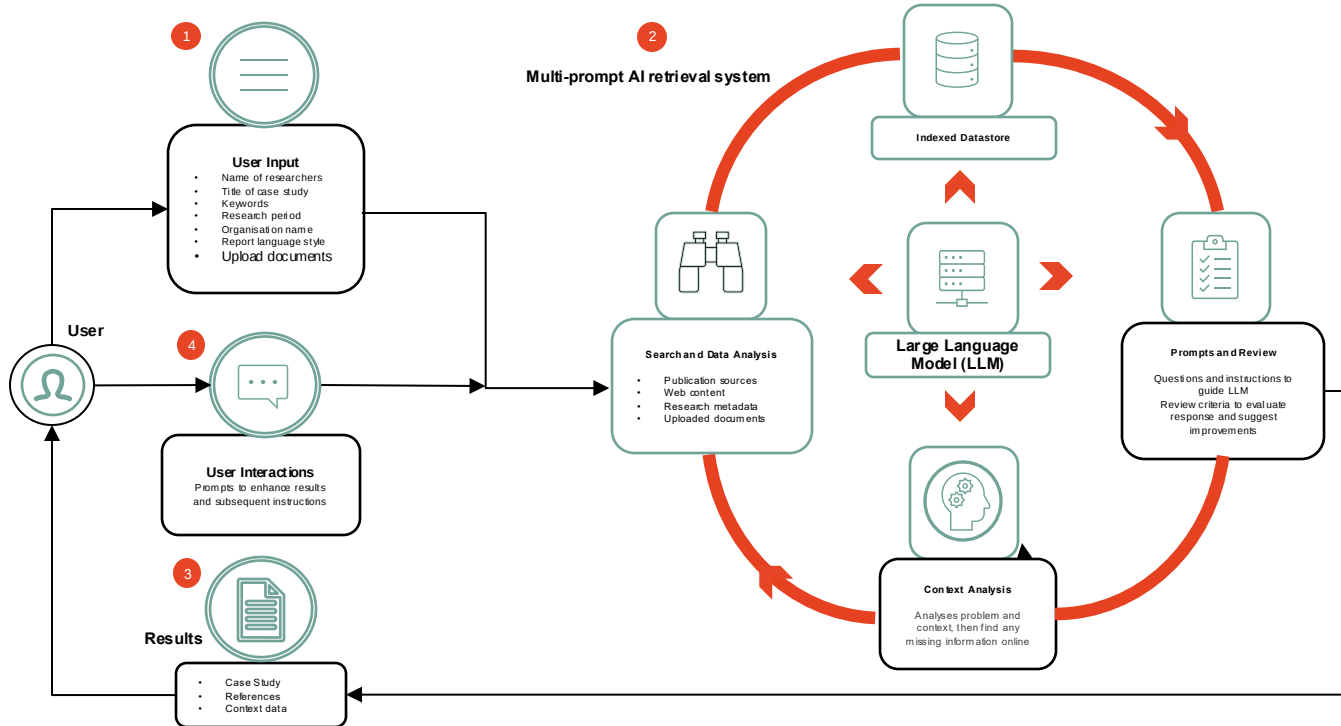
1. What is the problem your research seeks to address? Why is it significant? (250 word limit)

The research by Anthony Weiss and his team on Elastagen seeks to address the significant challenge of replicating the properties of human elastin, a key protein in the human body that provides elasticity and resilience to tissues such as skin, lungs, and arteries[1]. Human elastin's unique mechanical properties and biocompatibility make it difficult to mimic synthetically, which is a significant barrier in tissue engineering and regenerative medicine[2]. The significance of this research lies in its potential to revolutionize the field of biomedical engineering by providing a synthetic alternative to human elastin that can be used in a variety of medical applications, including wound healing, tissue repair, and the improvement of skin quality[1]. The development of Elastagen represents a breakthrough in the creation of biomaterials that can closely match the properties of natural human tissues, thereby enhancing the effectiveness of medical treatments and improving patient outcomes[2].

Research Impact Assessment Framework
SIH: Sebastian Haan, Nathaniel Butterworth, Gordon McDonald
FMH: Mona Shamshiri, Janine Richards, Prof. Robyn Ward
NSW Health

Contextualizing information and storytelling

Agent-based model



Australian Text Analytics Platform

Text analysis tools for all researchers



www.atap.edu.au

Some tools on the platform:



Document and corpus similarity tool

- Compare differences between documents, e.g. to eliminate near-duplicates.



Quotation tool and semantic tagging

- Extract quotes from text e.g. news articles
- www.atap.edu.au/posts/quotation-tool/



Discursis

- An analysis and visualisation tool for conversational data
- www.atap.edu.au/posts/discursis/

Facebook and Instagram, which Facebook owns, followed up in the evening, announcing that Trump wouldn't be able to post for 24 hours following two violations of its policies

This is where this document is different

Facebook and Instagram, which Facebook owns, followed up in the evening, announcing that Trump wouldn't be able to post for 24 hours following two violations of its policies

The White House did not immediately offer a response to the actions

... people were on ventilators and people were dying at that stage, and that's the context in

QUOTE

anceston. " I was n't aware of the decisions. " Former finance minister Simon Birmingham said

QUOTE

SPEAKER

PERSON

/ whether Mr Morrison should leave. Nationals leader David Littleproud said Australians should

PERSON

SPEAKER

ORG

PERSON

QUOTE

NORP

Albanese is awaiting advice from the solicitor - general on whether Mr Morrison's actions have any lar



Australian Research Data Commons

Picture This

AI in Geospatial, Microscopy, Medical, Agriculture, & Conservation imagery

Image Classification
Object Detection
Instance Segmentation
Multi-Modal Models

“We have a lot of images, and we want a way to automate analyzing them”

Multimodal Models

Language + Vision

Ecology/Conservation



What animal is in this photo?

A koala is in this photo.

Geospatial



“Trees”

Medical Imaging



What is this image?

This image is a black and white photograph of a baby's chest, showing the baby's heart and lungs.

What is unusual about this child's chest x-ray?

The unusual aspect of this child's chest x-ray is that it has a small metal object inside the baby's chest, which is not typically seen in a normal chest x-ray.

Greater Sydney Dataset



THE UNIVERSITY OF
SYDNEY

Sydney
Informatics Hub

>2 million tree patches
1 million buildings

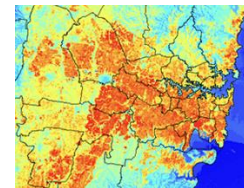
bit.ly/aigis

Understanding cities with computer vision

Prof. Ben Eggleton, NSW Smart Sensing, SIH: Henry Lydecker, Sahand Vahidnia, Thomas Mauch, Xinwei Luo



Urban Heat ML Model

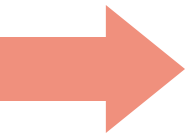


Geospatial Features

Local Climate Zone = “2: Compact Midrise”

(49% class confidence)

Input Image



Computer Vision

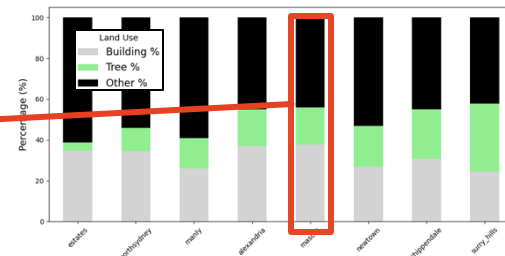
RGB Visual Light
Satellite Imagery
Aerial Imagery (Best)



bit.ly/aigis

Insights, ML,
Analysis

Compare neighborhoods

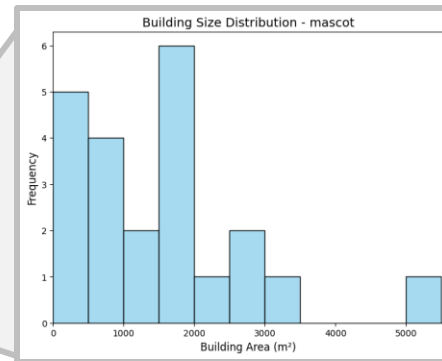


Tree Patches

- 101 tree patches
- 15% coverage

Building Outlines

- 22 buildings
- 38% coverage
- building footprint area distribution



Agricultural land use models, urban ecology



This tool will use the produced datasets to compare the soil moisture of a farm against historic data. Please select the desired comparison method and dates to make the comparison as in section A. Then choose the visualisation in section B to see the results.

A

Remain ☒

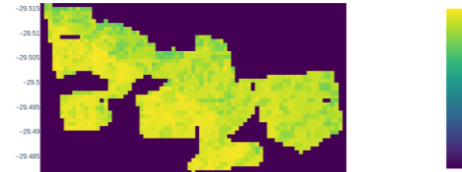
Select soil layer: Select the historic years to compare against: Select the most recent window of dates to analyse:

Select window aggregation method: Select historic aggregation method:

B

Select visualisation name: Select your palette:

Results



Detecting wildlife with NSW National Parks

SIH: Henry Lydecker, Nathaniel Butterworth, Gordon McDonald



Key Highlights



Fine-tuned family of YOLOv5 models on **2.16 million** camera trap images.



Detect and identify up to **72 different species**, with **94% precision** and **95% recall** on the top 33 most common.



GPU-accelerated prediction pipeline **1371x faster** than manual labeling.

marsupial-ai.github.io/web/

The University of Sydney



Ecological researchers like Dr. Aaron Greenville, conservation agencies, and governments make extensive use of camera traps to monitor wildlife. Processing this data requires an immense amount of time.

We implemented an AI pipeline for automatically detecting & identifying animals in camera trap images, dramatically speeding up speed of data processing.

Speeding up microscopy data processing

SIH: Sebastian Haan, Nathaniel Butterworth

bit.ly/sih-micro

Key highlights



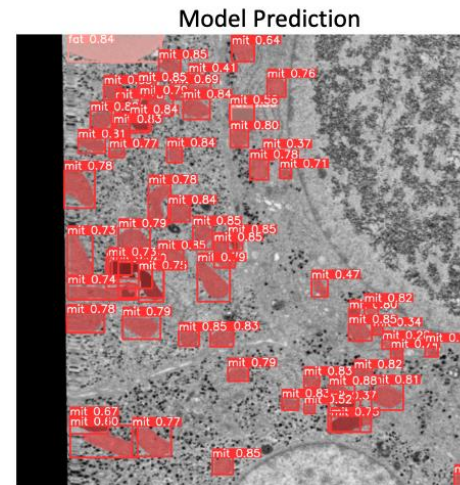
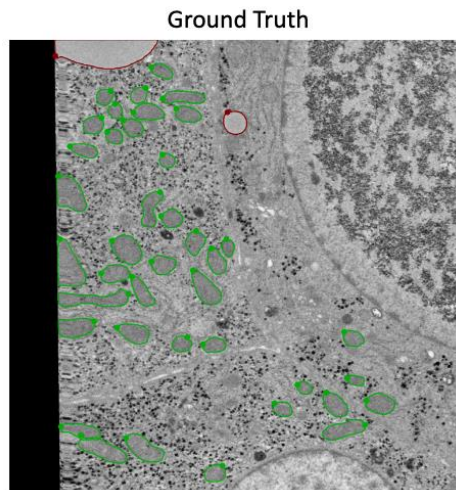
Sped up annotation process by up to 10x existing approaches



Full technology review of existing solutions with best practice solutions provided to clients



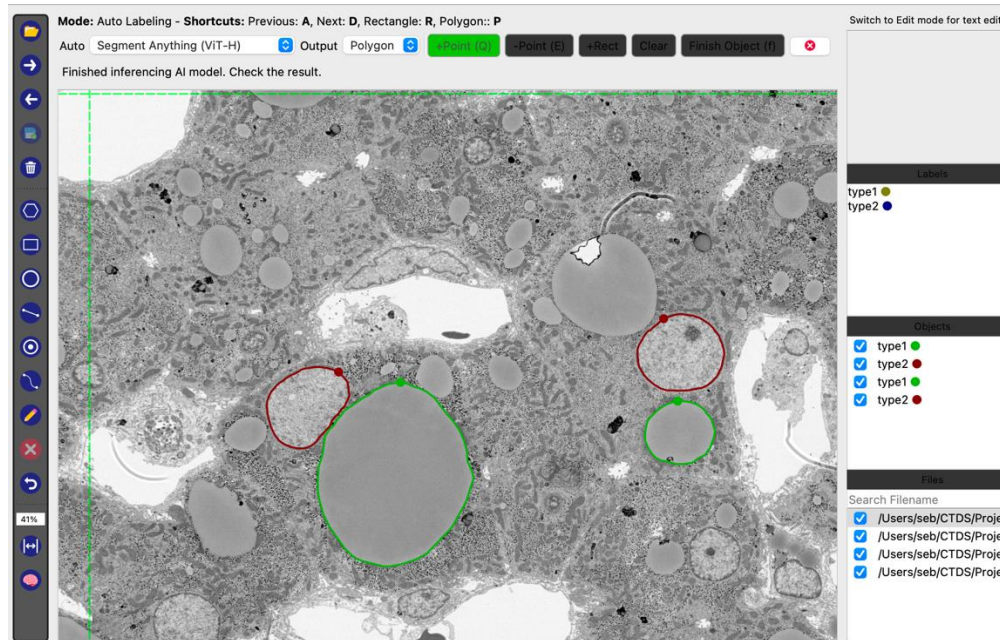
Strategic collaboration between SIH and SMM



Sydney Microscopy & Microanalysis collects immense amounts of data at the micro, nano, & atomic scales. We developed AI pipelines to speed up cell segmentation in electron microscopy images, automating 3D cell tomography.

AI-assisted segmentation

Anylabelling:



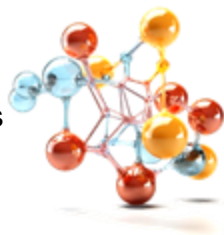
Advantages:

- ONE-point and click polygon segment generation using auto segmentation
- Open-source and free
- Available as binary installers
- Image annotation for polygon, rectangle, circle, line, and point
- Export polygon labels in standard json format.

Generative X

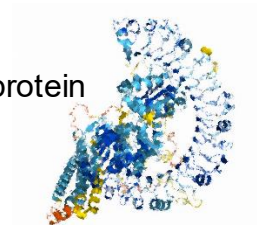
Drug discovery

Design your own chemicals



Biology

Design your own protein
synthetic biology

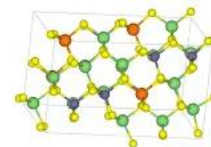


Manufacturing

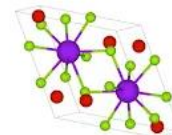
Design me a diffraction grating / micro resonator / widget with these properties...

Material discovery

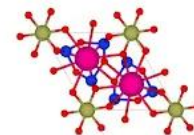
AI mineral discovery and
autonomous material synthesis



$\text{Li}_4\text{MgGe}_2\text{S}_7$



KV_2Se_3



$\text{Rb}_2\text{HfSi}_3\text{O}_9$

How to Engage with Us



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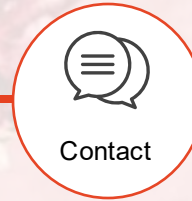
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Research project support



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And fill out our request form

Or send us an email:



sih.info@sydney.edu.au

So what will you build?



Sydney Informatics Hub

Dr Gordon McDonald, Informatics Team Lead

gordon.mcdonald@sydney.edu.au

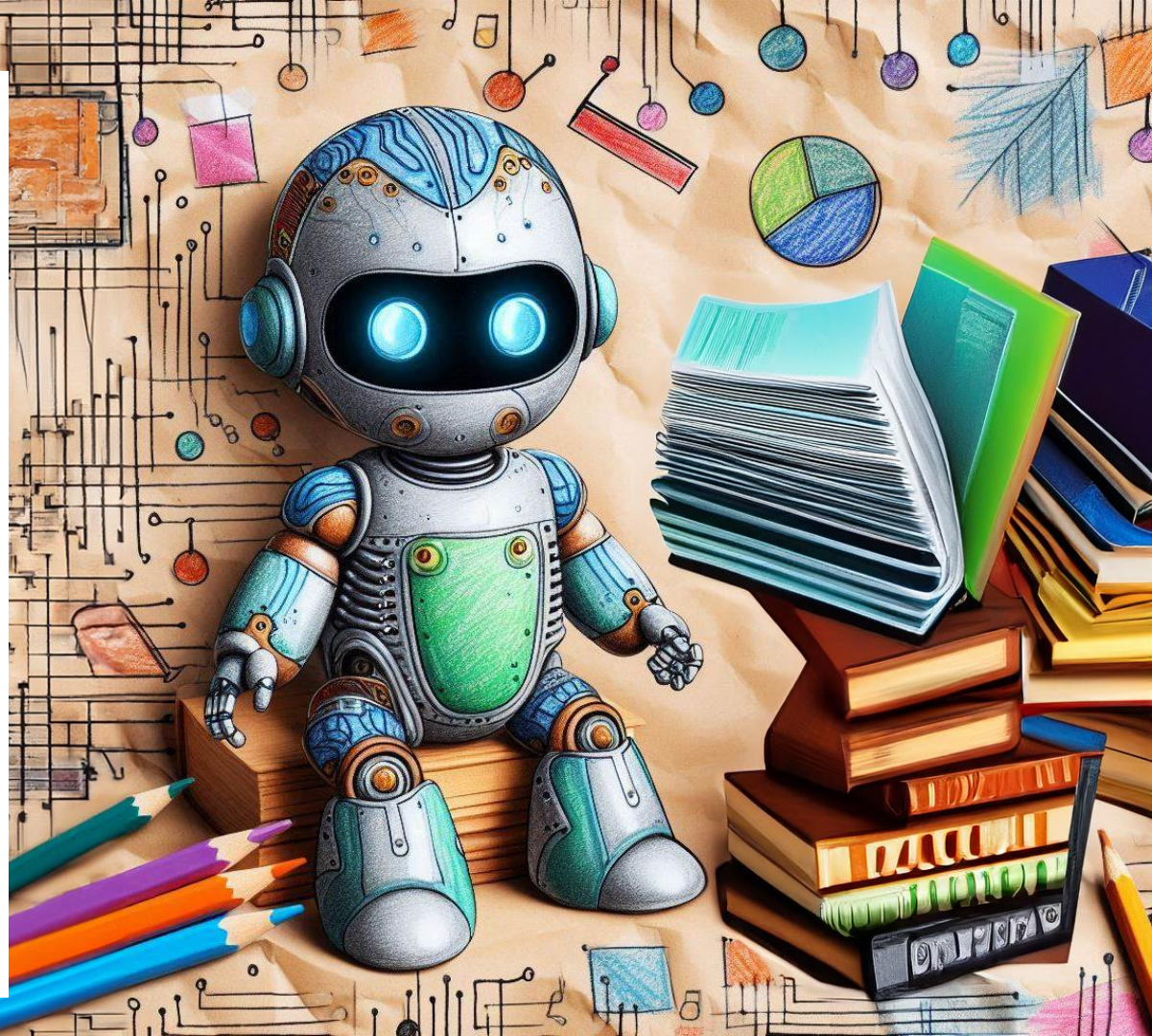
sydney.edu.au/informatics-hub

sih.info@sydney.edu.au



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Some Tools and Platforms

Audio

Translate audio between different languages, keeping your tone of voice

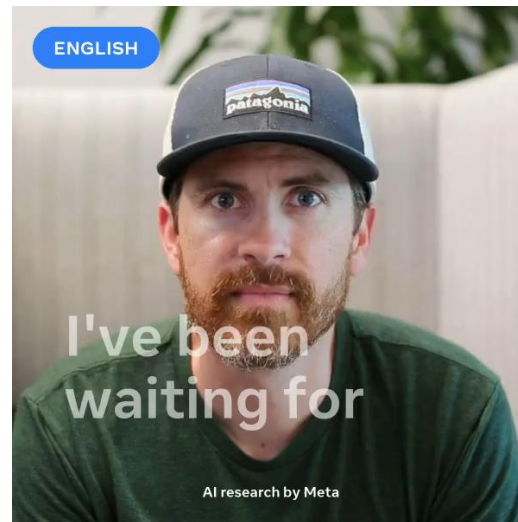
<https://seamless.metademolab.com/expressive>

Generate Speech

<https://elevenlabs.io>

Generate Music

<https://suno.com>



On-device video transcription

If you're on a mac

sindresorhus.com/aiko

Data and model runs in your browser – word level timestamps

huggingface.co/spaces/Xenova/whisper-word-level-timestamps

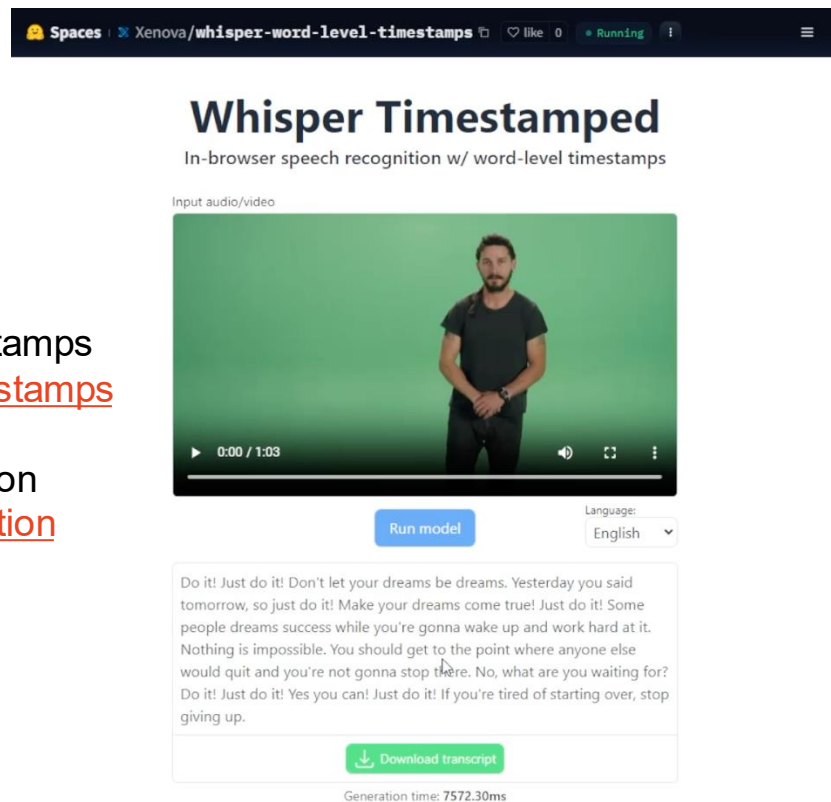
Data and model runs in your browser – speaker diarization

huggingface.co/spaces/Xenova/whisper-speaker-diarization

If you're ok with code and installs

github.com/ggerganov/whisper.cpp

(Not on device) Sharepoint automatic video transcription



The screenshot shows the Hugging Face Spaces interface for a model named 'Whisper Timestamped' by Xenova. The header bar is dark blue with the 'Spaces' logo, the user 'Xenova', the model name 'whisper-word-level-timestamps', and a 'Running' status indicator. Below the header, the title 'Whisper Timestamped' is displayed in a large, bold font, followed by the subtitle 'In-browser speech recognition w/ word-level timestamps'. A video player is embedded, showing a man speaking against a green background. Below the video player, there is a 'Run model' button and a language dropdown menu set to 'English'. A text box contains the transcribed audio: 'Do it! Just do it! Don't let your dreams be dreams. Yesterday you said tomorrow, so just do it! Make your dreams come true! Just do it! Some people dreams success while you're gonna wake up and work hard at it. Nothing is impossible. You should get to the point where anyone else would quit and you're not gonna stop there. No, what are you waiting for? Do it! Just do it! Yes you can! Just do it! If you're tired of starting over, stop giving up.' Below the text box is a 'Download transcript' button. At the bottom, it shows 'Generation time: 7572.30ms'.

Image segmentation

Segment a human

huggingface.co/spaces/facebook/sapiens-seg

Segment images

sam2.metademolab.com

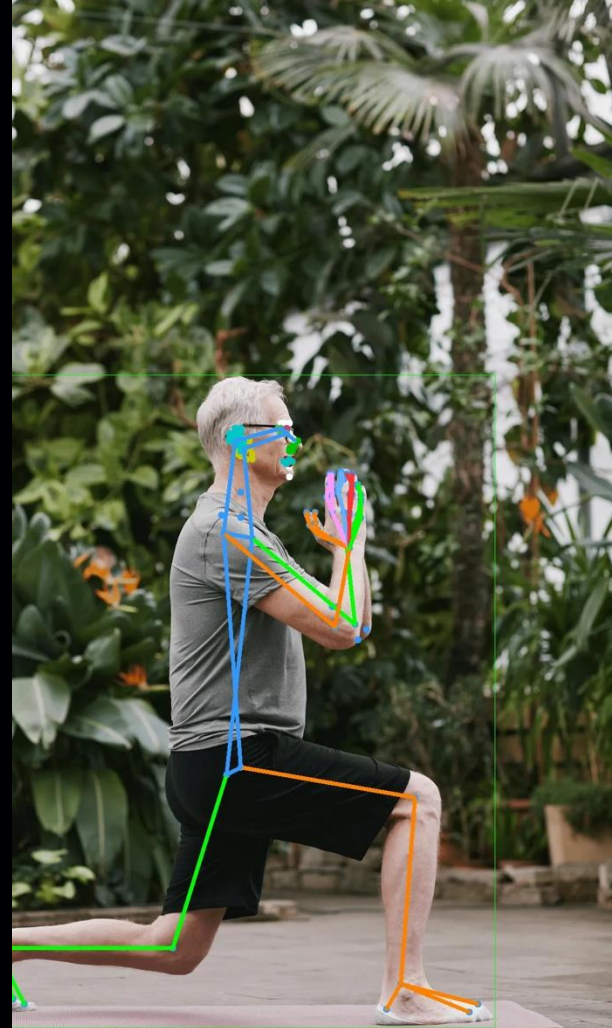
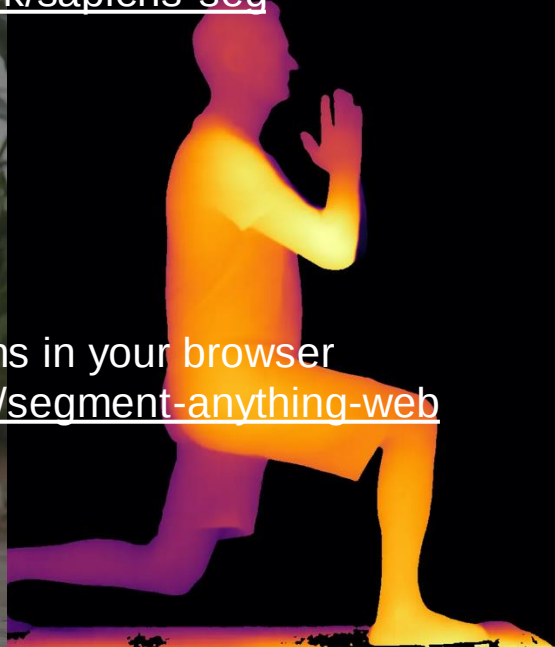
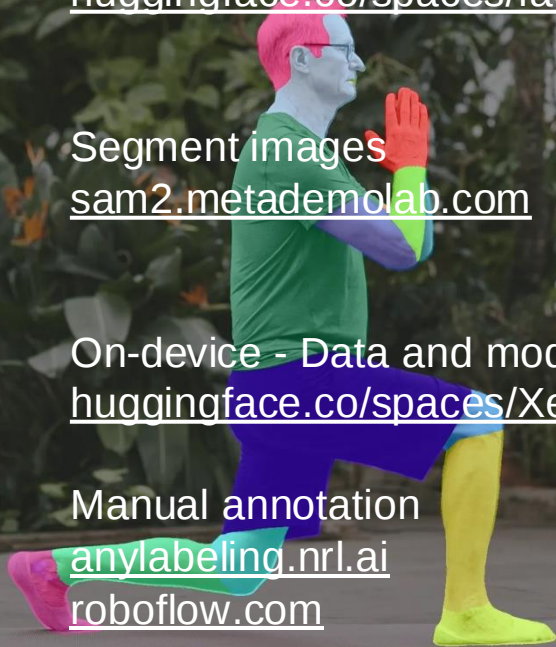
On-device - Data and model runs in your browser

huggingface.co/spaces/Xenova/segment-anything-web

Manual annotation

anylabelling.nrl.ai

roboflow.com



Platforms & Tools

- [Huggingface](#) – Open & free tools for AI proof of concepts
- [Papers with code](#) – compare state of the art models' performance
- [Colab](#) – free Jupyter notebook interface from Google
- [Weights & Biases](#) – Model training and evaluation diagnostics
- [Roboflow](#) – Very easy to use dataset utilities
- [PaddlePaddle](#) - frameworks for AI use cases

Literature Search

Research Rabbit – free for researchers, operates on donation model

Elicit free trial, then \$10/month

Rayyan \$8/month researcher, \$4/month student

Scite Free trial then \$13-\$22/month

SciSpace

Scopus-AI

Coding assistance

Free (ish)

Aider

Jupyter-AI

Open Interpreter

MetaGPT

Copilot

Paid

ChatGPT

Github Copilot

Best language models to use
with these tools now (10-09-24):

- claude-3.5-sonnet (via API)
- gpt-4o (via API)
- DeepSeek 2.5 (via API)
- Local models? (none of them are quite good enough yet to be useful) ☹️

Agent building



Agents

to reduce
time to science

Free (ish)

Cogniti

Flowise

MetaGPT

Paid

ChatGPT Custom GPTs

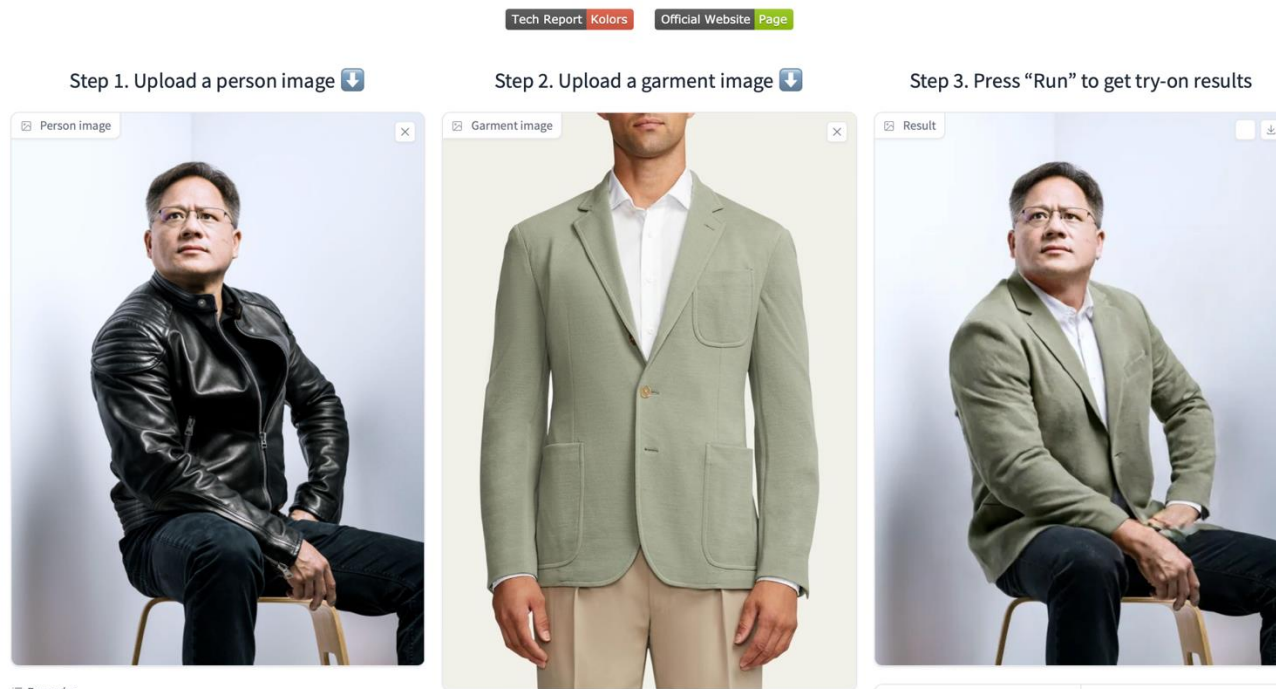
Azure Promptflow

Try on virtual clothes!

To find more new models as they are released:

<https://huggingface.co/spaces>

Kolors Virtual Try-On in the Wild





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