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Deconstructing AI literacy for librarians

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Virtual Seminar
CONCERT Open Future Communication
Hosted by 科技政策研究與資訊中心



Deconstructing AI Literacy for Librarians

為圖書館員解構AI素養

Samantha Seah (佘秀清)

Digital Innovation Librarian (數位創新館員)
Singapore Management University Libraries (新大圖書館)

2024年8月27日



Overview 議程

- I. Introduction
簡介
- II. SMU Libraries' AI Literacy efforts
新加坡管理大學圖書館開設人工智慧素養課程
- III. Information Literacy and AI Literacy
資訊素養與人工智慧素養
- IV. Mechanics of AI and the issues surrounding it
人工智慧的機制及相關問題
- V. Questions & Answers
問答環節

Introduction

簡介

About me 自我介紹

- Joined SMU Libraries in January 2023 as Digital Innovation Librarian
- Previous experience as Research Librarian (學科館員), User Access (借閱服務) Librarian, lead for the Service Innovation & Excellence (服務創新與卓越) team
- Recipient of Outstanding Newcomer Award 2021 by Library Association of Singapore



AI Literacy efforts:

- Presented “*Responsible practices for responsible libraries: The role of libraires in a world of generative AI*” at the Library Association of Singapore, Professional Sharing, May 2023
- Mentor for SMU Libraries’ Hackathon 2023 where she advised on Alma/Primo APIs, Power Automate, library datasets, and responsible use of data
- Developed workshop “*When AI Goes Wrong*” with SMU Centre for AI and Data Governance
- Presented about AI Literacy workshop “*When AI Goes Wrong*” at Chulalongkorn University’s webinar series on Navigating the AI Implementation at ASEAN Libraries, April 2024

FACTS & FIGURES



10,129

Full-Time Undergraduates*



426

Full-time faculty



3,201

Full-Time and
Part-Time Postgraduates*



62% international
postgraduate students from
51 countries**

9%** international
undergraduate students from
35 countries**

38% international faculty
Representing
33 nationalities



40,230

Alumni*



SMU SCHOOLS & COLLEGES

MULTI- AND INTER-DISCIPLINARY OFFERINGS

With its 6 schools and 2 colleges, SMU offers a wide range of programmes in undergraduate, postgraduate and professional and continuing education in the disciplines of Accountancy, Business, Computing, Economics, Integrative Studies, Law and Social Sciences.



College of Graduate Research Studies



School of Computing and Information Systems



College of Integrative Studies



School of Economics



Lee Kong Chian School of Business



School of Social Sciences



School of Accountancy



Yong Pung How School of Law

SMU 2025: Growing Impact, Cultivating Change

Our Aspiration
("where to aim")

V I S I O N 2 0 2 5

Our Priorities
("where to play")



Our Strategies
("how to play")

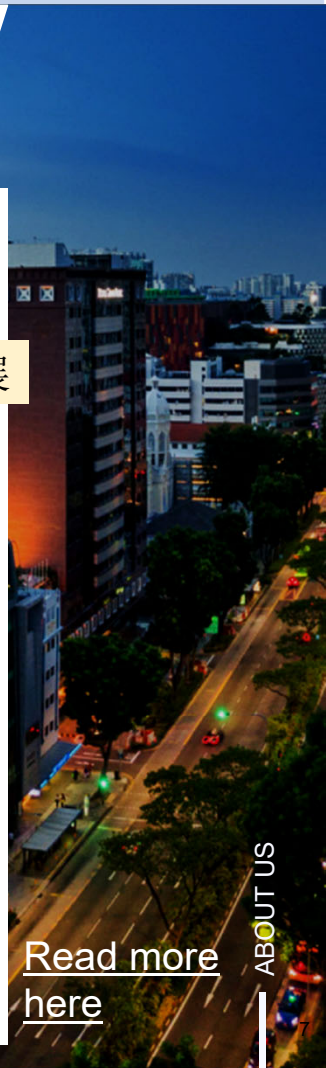


Our Enablers
("how to win")



F O C U S | F R A M E W O R K | F R E E D O M

[Read more here](#)



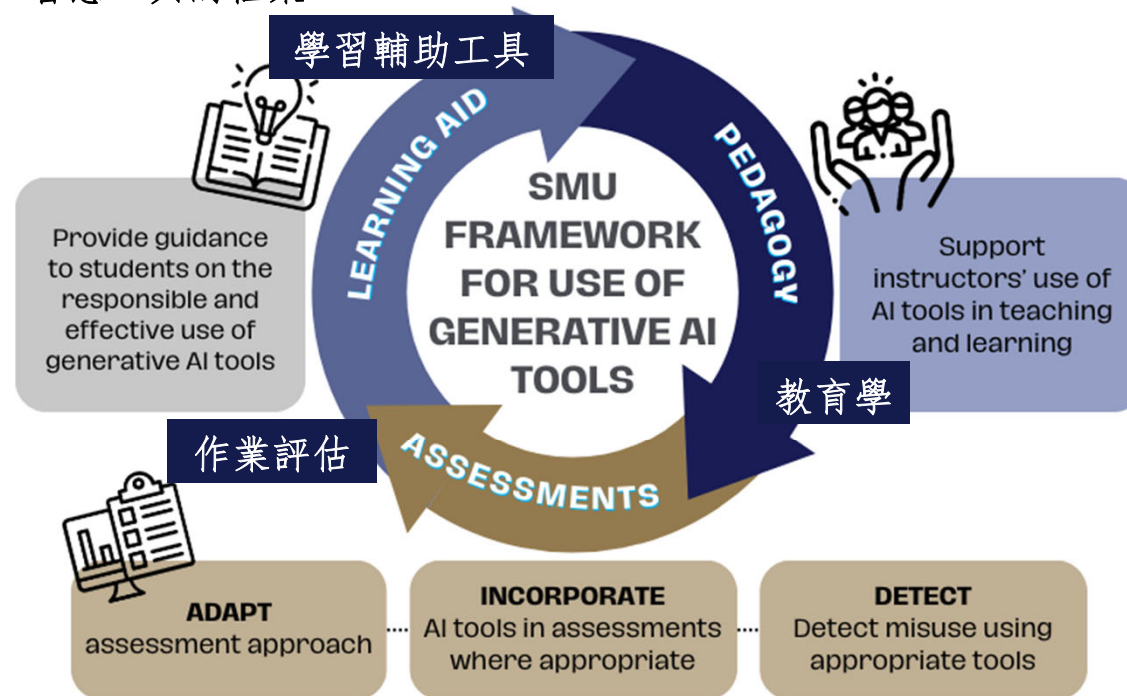
SMU Holistic Student Development Framework 7 Dimensions



[Read more here](#)

SMU Framework for Use of Generative AI Tools

SMU對於使用生成式人工智慧工具的框架

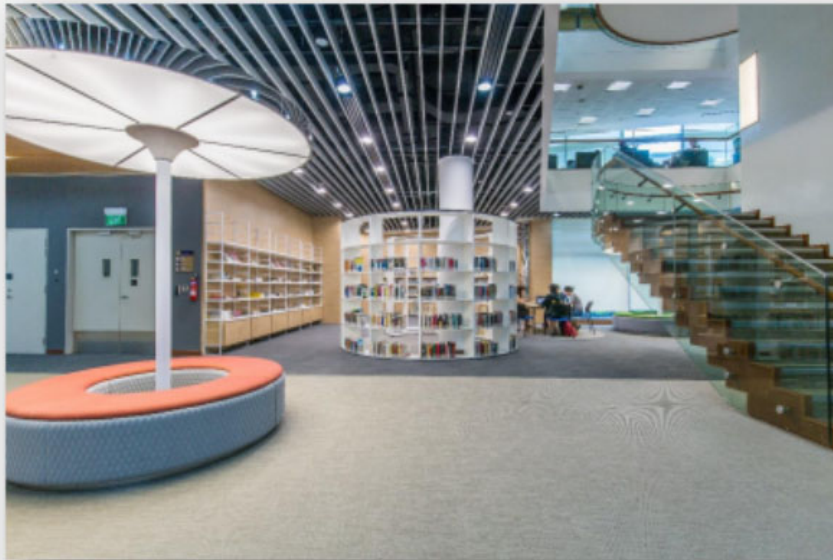


SMU's position

The University recognises the benefits of generative AI tools and is committed to integrating generative AI tools into education, while safeguarding academic integrity and rigour. At the same time, the University aims to teach students to use these tools responsibly and effectively.

[Read more here](#)

About SMU Libraries



Li Ka Shing Library (LKSL)



Kwa Geok Choo Law Library (KGCLL)

SMU has two libraries serving the community. They are the:
Li Ka Shing Library (李嘉誠圖書館), with 1800 seats, and the Kwa Geok Choo Law Library (柯玉芝法律圖書館), with 500 seats.

SMU Libraries' AI Literacy efforts

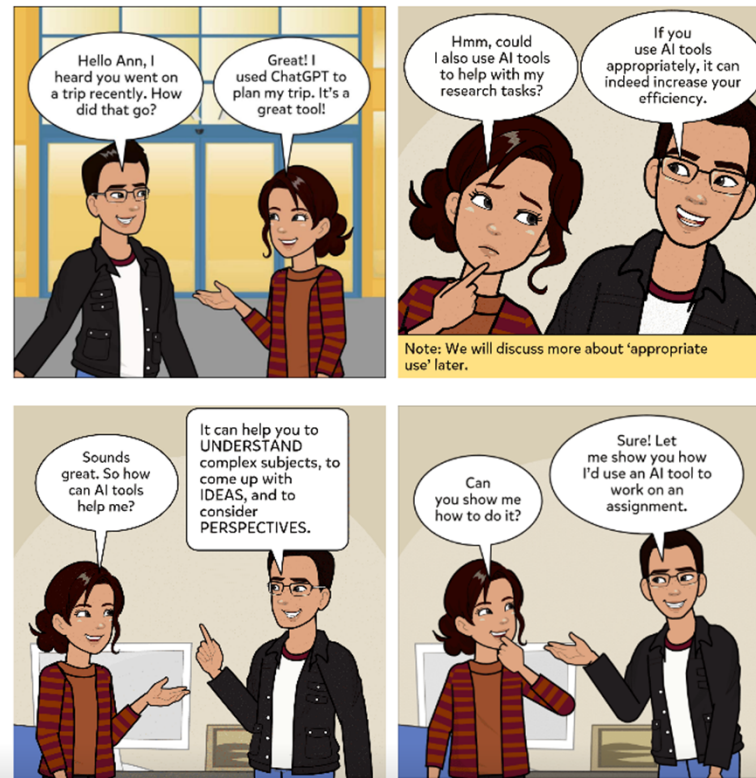
新大學圖書館開設AI素養課程

AI Literacy Initiatives by SMU Libraries

Initiative	Description	Audience
SMU adoption of Microsoft 365 Copilot	SMU is exploring the use of Microsoft Copilot for staff and faculty, the Library was invited to contribute a segment on Ethics and Responsible Use	Staff & Faculty
Guide to Learning with AI online module	A digital learning object on the effective and responsible use of AI tools in research was jointly developed by SMU Libraries and Temasek Polytechnic Library	Students
AI for Research Week 2024	A 3-day event as part of advocacy, promotion, and outreach. Brought together experts, researchers, and enthusiasts to explore and discuss how they can use Artificial Intelligence in different parts of the research process	Researchers & Faculty
Hackathon 2023	24 hours of collaboration and exploration to leverage the power of technology to craft creative applications that enhances library and research experience	Students
Workshop: When AI Goes Wrong	Out-of-classroom learning on AI literacy, understanding, awareness, and critical evaluation	SMU Community

Guide to Learning with AI online module

Introduction



[Link to beta of online module](#)

AI for Research Week 2024

Academic search and discovery tools in the age of AI and large language models: An overview of the space

Aaron TAY, *Singapore Management University*

Singapore

9:15 AM - 10:45 AM

[Visit Site](#)

Try it together - AI-powered search tools: Elicit, SciSpace, Connected Papers, Researchrabbit, and Undermind.ai

Aaron TAY, *Singapore Management University*

Bella RATMELIA, *Singapore Management University*

Kooi Ching OOI, *Singapore Management University*

Singapore

11:00 AM - 12:30 PM

[Visit Site](#)

Try it together: Transcribing your audio with Whisper API

Bella RATMELIA, *Singapore Management University*

Singapore

9:30 AM - 11:00 AM

[Visit Site](#)

Try it Together - Qualitative coding with Atlas.ti

Danping DONG, *Singapore Management University*

Bryan LEOW, *Singapore Management University*

Singapore

11:00 AM - 12:30 PM

[Visit Site](#)

Access the slides and recordings here:
https://ink.library.smu.edu.sg/ai_research_week/Programme/

AI for Research Week 2024

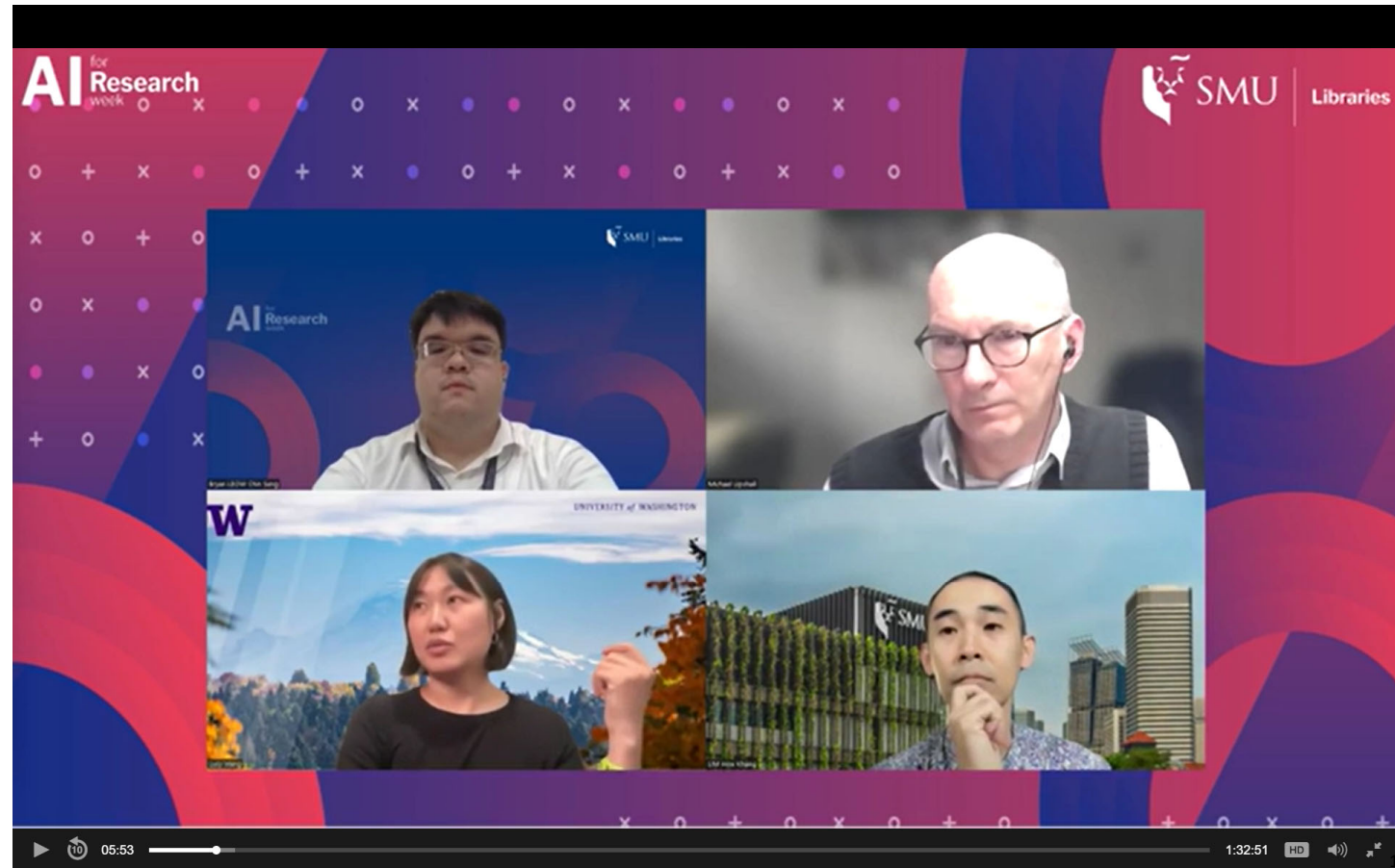
Roundtable discussion:
The impact of the increasing use of AI on the research workflow - In particular, its effect on research quality, research evaluation and our skills

Bryan LEOW, *Singapore Management University*

Michael UPSHALL,
ConsultMU Ltd

Lucy Lu WANG, *University of Washington*

How Khang LIM, *Singapore Management University*



Information Literacy and AI Literacy

資訊素養与AI素養

ACRL Information Literacy Framework 高等教育資訊素養框架

“Information resources reflect their **creator’s expertise and credibility**, and are evaluated based on the information need and the **context in which the information will be used.**”

信息资源反映了**创建者的专业水平和可信度**，人们基于**信息需求和使用情境**对其进行评估。

- Authority is Constructed and Contextual (權威的建構性與情境性)

“The iterative processes of researching, creating, revising, and disseminating information vary, and the **resulting product reflects these differences.**”

研究、創造、修改和傳播訊息的迭代過程不同，**最終的資訊產品也會有差異。**

- Information Creation as a Process (資訊創建的過程性)

“**Legal and socioeconomic interests** influence information production and dissemination.”

法律和社會經濟利益影響訊息的產生和傳播。

- Information has Value (資訊的價值屬性)

ACRL Information Literacy Framework 高等教育資訊素養框架

Communities of scholars, researchers, or professionals engage in sustained discourse with new insights and discoveries occurring over time **as a result of varied perspectives and interpretations.**

由于视角和理解各异，不同的学者、研究人员或专业人士团体会不断地带着新见解和新发现参与到持续的学术对话中。


- Scholarship as Conversation (對話式學術研究)

Searching for information is often nonlinear and iterative, requiring the evaluation of a **range of information sources and the mental flexibility to pursue alternate avenues** as new understanding develops.

資訊檢索往往是非線性且迭代重複的，需要對廣泛的資訊來源進行評估，並隨著新認識的形成，靈活尋求其他途徑。

- Searching as Strategic Exploration (戰略探索式檢索)


Ways to think about AI Literacy 透過資訊素養了解人工智慧素養

- Consider the way we teach Information Literacy 資訊素養教學的各個層面:
 - Choosing the right resource to look for 資源選擇
 - Crafting effective search strategies 檢索策略
 - Navigating different databases 使用不同的資料庫
 - Using AI in the research process, ethically 在研究過程中合乎道德地使用人工智慧
 - Understanding what tools are available to integrate into which part of the research process
 - Discovery 探索
 - Synthesis 論點綜合
 - Writing 寫作過程
- 

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Ways to think about AI Literacy 透過資訊素養了解人工智慧素養

- Consider the way we teach Information Literacy:
 - Understanding different types of information resources
瞭解不同類型的信息資源
 - Research cycle
研究過程
 - Peer review process
同行評審程序
 - Understanding the development of AI and generative AI and the ethics behind it
 - Mechanics 機制
 - Training data 訓練資料
 - Guardrails 護欄
- 

I'm a librarian, not a computer scientist!

Unlike traditional media production, AI is different and is worth delving a little deeper into the underlying technology

What level of understanding though?

- Unless you have an interest in computer science, it's good enough to understand how things work

Majority of people will be end-users of AI, hence it is important they know how to be critical in their evaluation and be conscious what they are doing when they choose to interact with AI

Goal: to equip users with a set of questions they can ask

New competencies 新知能

1. Understanding and implementing Privacy and Data Protection
 - Understanding legal and **ethical implications of data handling, implementing strong data protection measures**, and educating users of their privacy rights
 - 了解並實施隱私和資料保護
 - 了解資料處理的法律和**道德影響、實施強而有力的資料保護措施**、並教育使用者了解其隱私權

2. Digital Literacy and Technology Integration
 - Ability to evaluate and **adopt new technologies** that enhance user engagement, library operations, and service delivery
 - 數位素養和科技整合
 - 能夠評估和採用增強用戶參與度、圖書館運營和服務交付的**新技術**

Ghoush, V., & McCoy, D. (2024). Looking ahead: Incorporating AI in MLIS competencies. *School of Information Student Research Journal*, 14(1).

New competencies 新知能

3. Responsible Data Science and Analytics

- Using data visualization tools to effectively communicate data to stakeholders
- **Compare and contrast different AI models and critically evaluate them for ethical implications and suitability** in addressing library challenges

• 負責任的數據科學和分析

- 使用資料視覺化工具向利害關係人有效地傳達數據
- 比較和對比不同的人工智慧模型，並批判性地評估它們在應對圖書館挑戰方面的道德影響和適用性

4. Sustainability Practices

- Minimizing energy consumption characteristic of deep learning to **minimize environmental impact** by choosing to utilize greener models

• 永續發展實踐

- 透過選擇利用更環保的模型，最大限度地減少深度學習的能耗特性，從而最大限度地減少對環境的影響

Ghoush, V., & McCoy, D. (2024). Looking ahead: Incorporating AI in MLIS competencies. *School of Information Student Research Journal*, 14(1).

Mechanics of AI and the issues surrounding AI的機制及相關問題

About *When AI Goes Wrong*

Why I developed this 1-hour workshop:

- Collaboration with SMU Centre for AI and Data Governance
- To help users understand how it works, the various issues surrounding it, and what to take note of when using it

As a librarian, what should I know to teach AI literacy?

- Since modern AI has changed the information landscape, it is important to know the mechanics of it
- Opportunity to highlight issues surrounding the intellectual and physical landscape

A framework to help

- ROBOT framework and using it

Definitions of AI

Thought processes/reasoning
推理能力

Behaviour
行為

<p>Thinking Humanly “The exciting new effort to make computers think . . . <i>machines with minds</i>, in the full and literal sense.” (Haugeland, 1985) “[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning . . .” (Bellman, 1978)</p>	<p>Thinking Rationally “The study of mental faculties through the use of computational models.” (Charniak and McDermott, 1985) “The study of the computations that make it possible to perceive, reason, and act.” (Winston, 1992)</p>
<p>Acting Humanly “The art of creating machines that perform functions that require intelligence when performed by people.” (Kurzweil, 1990) “The study of how to make computers do things at which, at the moment, people are better.” (Rich and Knight, 1991)</p>	<p>Acting Rationally “Computational Intelligence is the study of the design of intelligent agents.” (Poole <i>et al.</i>, 1998) “AI . . . is concerned with intelligent behavior in artifacts.” (Nilsson, 1998)</p>
<p>Figure 1.1 Some definitions of artificial intelligence, organized into four categories.</p>	

Russell & Norvig (2021)

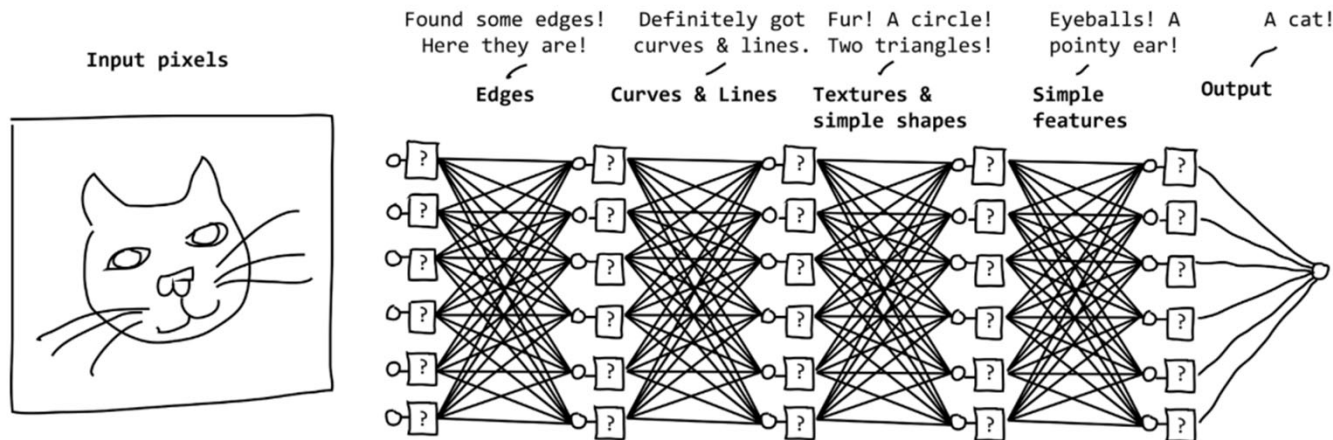
Comparing to humans
與人類技能相比

Comparing against an ideal concept of intelligence
與理想狀態相比

Branches of modern artificial intelligence

- Expert systems 專家系統
- Predictive analytics 預測分析
- Natural language processing (NLP) 自然語言處理
- Text generation 文字生成
- Machine translation 機器翻譯
- Computer vision 電腦視覺
- Robotics 機器人技術
- Speech recognition 語音辨識
- ...and more 等等

Deep Learning 深度學習



Shane (2019)

“The idea is that instead of having teams of researchers trying to find out how to find edges, you instead throw a ton of data at the algorithm and you let the data speak and have the software automatically learn from the data.”

- Andrew Ng (2012),
Computer Scientist, Stanford University

A question of scale 規模问题

- Large-scale Artificial Intelligence Open Network (LAION)
- LAION-5B is made up of >5,000,000,000 links to images scraped from the open web, including user-generated social media platforms
- Used to train the most popular AI generation models currently on the market e.g. Stable Diffusion

“Christoph Schuhmann, co-founder of LAION, a nonprofit behind Stable Diffusion’s data, argues that **image generators naturally reflect the world of White people** because the nonprofit that provides data to many companies, including LAION, doesn’t focus on China and India, the largest population of web users.” (Tiku et al, 2023)

Common Crawl

- Founded in 2007. Non-profit based in California, USA.
- Has crawled billions of web pages since 2008 and makes data freely available via Amazon Web Services
- Currently has > 9.5 petabytes of data = 9.5×10^6 GB
- Most likely used to train the original model behind OpenAI's ChatGPT but has no affiliation with OpenAI or Microsoft

Primary goal:

- Freely make high quality web crawl data available to researchers and smaller businesses and make the playing field more equal for technology development against tech giants like Google

Read more:

Baack, S. & Mozilla Insights. (2024). Training Data for the Price of Sandwich. Mozilla.

<https://foundation.mozilla.org/en/research/library/generative-ai-training-data/common-crawl/>

The era of Big Data

Assumptions:

- The data exists and is available for analysis
- The data is removed from any bias
- The data gives a good representation of what you're trying to analyse

Illusion of objectivity: Data is neutral? 數據是否真的中立?

- Audits of computer vision (電腦視覺) datasets (Scheuerman, 2021) have also highlighted:
 - Darker-skinned women tend to be underrepresented for facial analysis (臉部分析) datasets
 - Object recognition (物體辨識) datasets have documented bias towards Western countries
 - Stereotypical images of activities and gender overrepresented in datasets
 - Inclusion of non-consensual pornographic material of predominantly women
- Labelling (數據標籤) within the datasets also critiqued
 - Inclusion of misogynistic (厭惡女性的) terms, racial slurs (種族歧視), and other offensive labels

AI-GENERATED IMAGES

prompt:
A portrait photo of ...

Taken from the Washington
Post, 1 Nov 2023)

a person at social services



a productive person



Common Crawl and Generative AI

Common Crawl provided “82% of raw tokens used to train GPT-3”

LLM users of Common Crawl overshadow all others since the publication of OpenAI’s paper on GPT-3

Yet, Common Crawl does not represent the entire web:

- 50% of each crawl is likely to pick up URLs of previously retrieved top domains
- Crawls are not continuous, does not reflect changes between crawls
- Common Crawl respects robots.txt
- Because the infrastructure is based in the US, it skews the crawls towards English content

(Baack, S. & Mozilla Insights, 2024)

Using filters with Common Crawl

Four typical approaches to filtering, all automated in different ways:

1. Language filtering 語言篩選
2. Keywords and simple heuristics 關鍵字和啟發式
3. AI classifiers 使用人工智慧進行分類
4. Deduplication 重複資料刪除

Examples of criticism of handling of data sets:

- If your AI classifier relies on upvotes on user-generated content (like Reddit), they cannot be representative of any population and are prone to bias
- Popular keyword lists used to filter AI risk underrepresenting vulnerable groups because it will also remove non-toxic content from LGBTQIA+ communities

(Baack, S. & Mozilla Insights, 2024)

Ethical issues 道德問題

'Impossible' to create AI tools like ChatGPT without copyrighted material, OpenAI says

Pressure grows on artificial intelligence firms over the content used to train their products

AI start-up Anthropic accused of 'egregious' data scraping

Web publishers say developer is swarming their sites, collecting content to train models and ignoring orders to stop

THE STRAITS TIMES

New York Times sues OpenAI, Microsoft in copyright clash

The New York Times

Sarah Silverman Sues OpenAI and Meta Over Copyright Infringement

The comedian has joined two lawsuits accusing the companies of training their A.I. models using her writing without permission.

NVIDIA

Nvidia Sued for Scraping YouTube After 404 Media Investigation

SAMANTHA COLE · AUG 16, 2024 AT 6:19 PM

Sustainability Issues 永續性問題

ARTIFICIAL INTELLIGENCE

Making an image with generative AI uses as much energy as charging your phone

This is the first time the carbon emissions caused by using an AI model for different tasks have been calculated.

By Melissa Heikkilä

December 1, 2023

POWER GRAB

AI is exhausting the power grid. Tech firms are seeking a miracle solution.

As power needs of AI push emissions up and put big tech in a bind, companies put their faith in elusive — some say improbable — technologies.

By [Evan Halper](#) and [Caroline O'Donovan](#)

June 21, 2024 at 5:00 a.m. EDT

Google's emissions climb nearly 50% in five years due to AI energy demand

Tech giant's goal of reducing climate footprint at risk as it grows increasingly reliant on energy-hungry data centres

As librarians, how can we teach Information Literacy for AI?

<p>Reliability 可 信 度</p>	<p>How reliable is the information about the AI technology? If it's not produced by the party responsible for the AI, what are the author's credentials? Is there author bias? If it is produced by the party responsible for the AI, how much information are they making available? Is information only partially available due to trade secrets? How biased is the information they produce?</p>
<p>Objective 目 標</p>	<p>What is the goal or objective of the use of AI? What is the goal of sharing information about it? To inform? To convince? To find financial support?</p>
<p>Bias 偏 見</p>	<p>What could create bias in the AI technology? Are there ethical issues associated with this? Are biases or ethical issues acknowledged? By the source of information? By the party responsible for the AI? By its users?</p>
<p>Ownership 所 有 權</p>	<p>Who is the owner or developer of the AI technology? Who is responsible for it? Is it a private company? The government? A think tank or research group? Who has access to it? Who can use it?</p>
<p>Type 範 疇</p>	<p>Which subtype of AI is it? Is the technology theoretical or applied? What kind of information system does it rely on? Does it rely on human intervention?</p>

[Hervieux & Wheatley \(2023\)](#)

ROBOT in practice

Let's look at a use case of AI in education
Using the ROBOT evaluation tool, what is your analysis of this technology?

• May 15, 2023

Admissions Offices, Cautiously, Start Using AI

They are divided about what to do about ChatGPT, but that doesn't prevent some of them from embracing AI.

By [Scott Jaschik](#)

Taken from
[Inside Higher Education](#)

Experimenting

Other colleges are experimenting with AI in admissions.

Ownership 所有權

Stephen W. Harmon, executive director of the Center for 21st Century Universities at the Georgia Institute of Technology, said Georgia Tech is “not yet using AI in admissions, but we are experimenting with it.”

Objective 目標

Type 範疇

One project is to try to replicate admissions decisions using machine learning techniques. “We are using one of our large online master of science programs as a test case, and we are currently at about a 93 percent match with our admissions advisers' decisions,” Harmon said.

Reliability 可信度

Bias 偏見

What is the appeal? “The volume of applicants continues to increase at Georgia Tech, so anything we can do to improve their workflow is helpful. I don't see us relying solely on AI for admissions maybe ever, but it could become a useful tool in the process,” he said. Objective 目標

“Tech is not neutral. It can't be. It is always the sum total of human decisions, priorities, and tradeoffs, deployed to meet certain ends and desires, and particularly capitalistic interests. AI is far from being an exception to the rule.”

- *Ben Myers,*
web developer and software engineer at Microsoft

Starting the conversation

How do people in your communities feel about Generative AI and the issues surrounding it?

Speaking to a professor from SMU School of Computing and Information Systems, I asked him how he felt about these AI developers using his research publications to train their AI.

He said it's different for him compared to artists and creators whose work are being scrapped and then made to compete in the same market as generative AI. He gets a regular income from the university and he may not be the sole owner of the copyright. His livelihood isn't being threatened by Generative AI.

Other academics may not be as unconcerned: “[Academic authors ‘shocked’ after Taylor & Francis sells access to their research to Microsoft AI](#)”

Informa (parent company of Taylor & Francis) signed an £8 million (TW\$333,441,200) deal with Microsoft allowing access to their data to train AI models without telling their authors or giving them the option to opt-out or compensate them.

What can you do about it?

Academic institutions are in a unique position to be able to shape conversations in the industry since we not only nurture future minds entering the industry but also because our work and research also directly impact the innovations via collaborations with companies/funders.

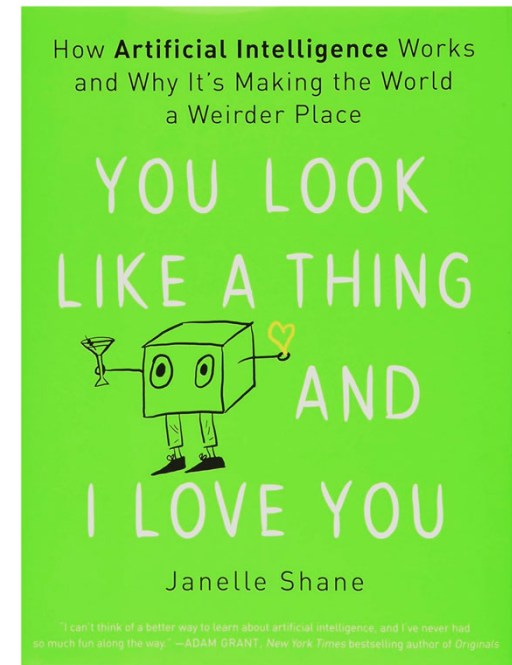
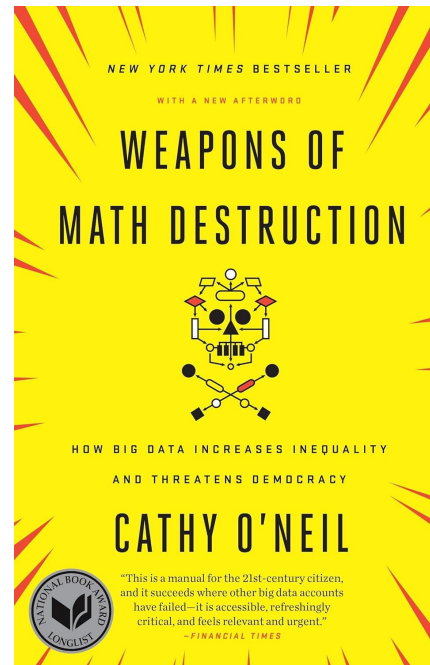
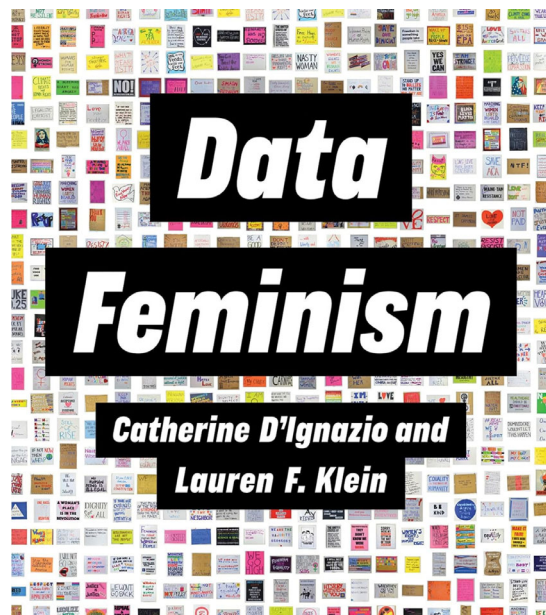
It is a responsibility to educate and highlight these issues.

We can also work with impacted communities to bring awareness and influence the conversation

Possible topics of discussion:

- Citing AI tools
- Tackling sustainability issues
- Privacy concerns
- Research Data Management

Read more



More resources

- Online free course in Practical Data Ethics: <https://ethics.fast.ai/>
- Models All The Way Down: A Knowing Machines Project which takes a deep dive into the LAION-5B dataset to understand its contents and dependencies <https://knowingmachines.org/models-all-the-way>
- [AI Weirdness](#), a blog by Janelle Shane on her experiments with AI
- Trustworthy AI Project, aiming to provide a framework and resources for teaching responsible AI in Higher Education: <https://www.trustworthyaiproject.eu/>
- Chatbot Arena, play with LLM chatbots and compare their output: <https://lmarena.ai/>
- Chinese LLMs: [文心一言](#) developed by Baidu & [a list of LLMs developed in China](#)

Librarians discuss AI and citing

- [Chatbots: To Cite Or Not To Cite? \(Part I\)](#),
- [The Case For Not Citing Chatbots As Information Sources \(Part II\)](#)

Thank you 謝謝

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