The AI/Data Science Professional

Amazon AWS Culture of Innovation & Working Backwards

Acknowledgement of Country

The AI/Data Science Professional

Course Coordinator: Flora Salim

What's next...

RMIT UNIVERSITY

RMIT University acknowledges the people of the Woi wurrung and Boon wurrung language groups of the eastern Kulin Nation on whose unceded lands we conduct the business of the University.

RMIT University respectfully acknowledges their Ancestors and Elders, past and present. RMIT also acknowledges the Traditional Custodians and their Ancestors of the lands and waters across Australia where we conduct our business.

Ngarara Place

The AI/Data Science Professional – Week 3: Culture of Innovation & Working Backwards

Catherine Eibner, Head of Cloud Innovation Programs from AWS

Week 3 Guest talk: Culture of Innovation (The talk won’t be recorded)

"Amazon’s approach to innovation has remained consistent since the company first launched - start with the customer and work backwards. Culture of Innovation provides valuable insights, lessons learned, and best practices from Amazon's cultural mechanisms by helping identify the next steps with the right AWS teams to solve problems and realize the opportunity for the end customers."

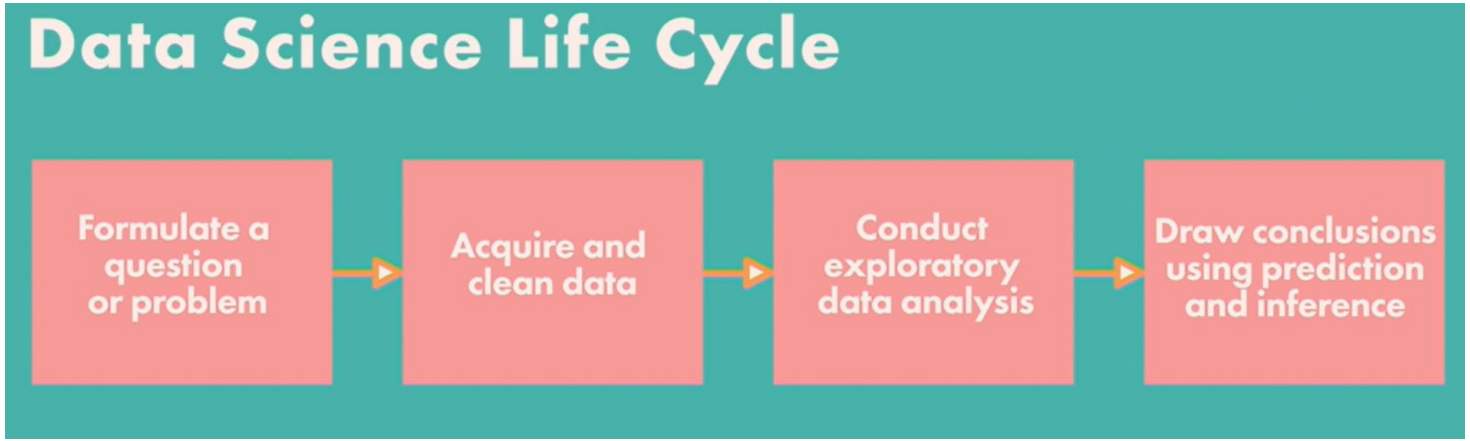
Catherine Eibner, Head of Cloud Innovation Programs, AWS.

Catherine's Bio: Catherine is a serial entrepreneur and a leader of innovation and growth in Australia's start-up economy. She built scalable programs and communities to support Entrepreneurs and Women in Technology while at Microsoft, then going on to become the GM of Start-ups at Incubator Blue Chilli. She joined AWS in late 2017, initially working in a start-up team in supporting and developing early stages of start-up companies and then recently joining the ANZ Public Sector business where she is the Digital Innovation lead, focused on improving the digital experiences for students and citizens by enabling digital transformation in the government, non-profit and education sectors through the innovative application of cloud technologies.
Catherine has been named one of the Top Australian Women in Tech and is recognised as one of the country's leading Start-up Mentors, actively advising start-ups, while also supporting entrepreneurs through her volunteer work and angel investments across the ecosystem.

The AI/Data Science Professional – Week 3: Research Planning & Working with Users

Flora Salim

Data Science Life Cycle



From: LinkedIn Learning (https://www.linkedin.com/learning/introduction-to-data-science-2/what-is-the-data-science-life-cycle

This looks **very similar** to a basic quantitative research process

Planning research that matters

Planning research that matters: from idea to execution

...

Thanks to: Associate Professor Inger Mewburn
Director of Research Training
Australian National University
Some of the following slides (10-11, 13-15, 18-20) are adapted from her slide deck

Finding ‘fundable’ ideas

(for now, let’s focus on government funding priorities)

Pick one of the following government priorities:

Population level health issues (diabetes, heart disease, cancer, etc)
Aged Care
Climate change ‘adaptation’ issues
Australia’s future economic prosperity
Growth and management of large cities
Agriculture (water, land-use, farming etc)
Cyber-security and defence

Or Pick an industry / societal challenge

https://www.weforum.org/great-reset/

Craft a set of research questions:

Start with a **TOPIC** you are interested in, ie:

Broader challenge: equitable transport

Specific challenge: “Access issues around transport in regional areas in Australia”

State your **RESEARCH OBJECTIVE**, ie:

“To help create an accessible, equitable, and safe ecosystem for people to share mobility in regional areas”

Write some provisional **RESEARCH QUESTIONS**, ie:

- To what extent has shared mobility (e.g. Uber / Lyft, Bus on demand) has been successful / not successfully deployed in regional areas?
- What are the benefits and risks from the data-driven prediction and optimisation system? How to incorporate them in the design?
- How to enable a multi-modal demand mobility system for regional areas? How to optimise against the high and low-demand in regional areas?

Think about possible research methods using your research questions as a starting point:

To what extent has shared mobility (e.g. Uber / Lyft, Bus on demand) has been successful / not successfully deployed in regional areas?

User research, maybe interviews with people who will benefit from this system, comparing the needs of residents vs. visitors/tourists, retrieve and analyse publicly available Uber data on regional areas

What are the benefits and risks from the data-driven prediction and optimisation system?

Extract and analyse data from interviews, surveys, literatures and public resources, in relation to FATE?

How to incorporate them in the design?

Model the benefits and risks as objective functions and constraints?

Run user testing?

“Good, fast, cheap: pick only two…”

(or better performance, faster/more efficient, or cheaper to run)

Research into a new generation task assistant in Microsoft-RMIT Cortana Intelligence Institute

https://www.microsoft.com/en-us/research/blog/new-institute-explores-future-cortana/

Broader challenge area: Future of Work

Specific challenge: helping working professionals to accomplish more in a day

Technology area: intelligent task assistant

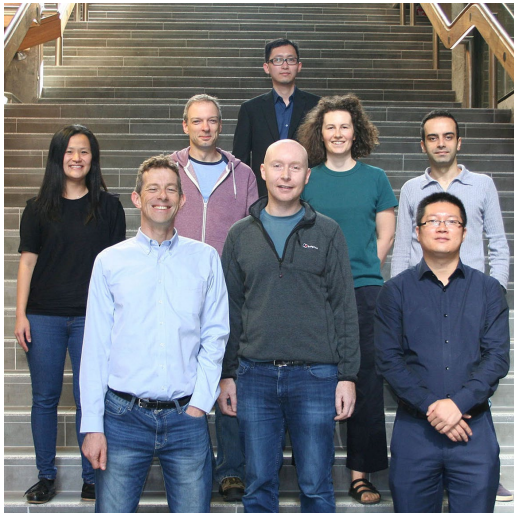
RMIT-Microsoft Cortana Intelligence Institute

Overview:

Cortana Intelligence Institute is driving the next-generation of capabilities for Microsoft's digital assistant, Cortana. Focused on researching work-related tasks and using sensors in mobile phones, the CII team builds a complex multidimensional data set, used to model and predict user's work-related tasks.

Impact:

- Task intelligence, to support complex tasks such as tracking a person's progress on a task, reminders, or assisting with completion of a task.
- Create a virtual assistant that can manage a calendar, understand the user, be aware of context, and support multi-turn dialogues.



RMIT UNIVERSITY

Microsoft

One of the many research outputs:

Intelligent Task Recognition: Towards Enabling Productivity Assistance in Daily Life

Jonathan Liono[1], Mohammad S. Rahaman[1], Flora D. Salim[1], Yongli Ren[1], Damiano Spina[1], Falk Scholer[1], Johanne R. Trippas[1], Mark Sanderson[1], Paul N. Bennett[2], and Ryen W. White[2]

1. Computer Science & IT, RMIT University, Melbourne, Australia
2. Microsoft, Redmond, USA

What could you do for cheap to demonstrate this project has potential and you have credibility?

Take your research questions.

What kind of research methodologies could you employ to answer one of them (at least in part)?

What kind of pilot study could you do for no $$ that could *show you can work together* before you apply for a grant/investment?

Draft a quick project outline: what, why and how will you do? How long will it take?

Remember, project tasks have different kinds of dependencies:

Parallel: where tasks can happen simultaneously because they are not logically connected (keeping up with the literature while you collect data)

Finish to start: the first task must be completed before the next one can start (ethics approval before data collection)

Start to start: Where the start of one task triggers the start of another (experiments trigger data analysis tasks)

Finish to Finish: Where a task is not complete until another is finished (data analysis can start, but not be completed until all data is gathered).

Knowledge audit:

What are our existing knowledge and interests around this topic?

Are we knowledge ‘adjacent’, what knowledge can we transfer across?

Do we know if any work is being done in this area already?

Who else might we need to work with to fill in the gaps in our expertise?

Write it up

1.What is the problem?

2.Why is it interesting and important?

3.Why is it hard? (E.g., why do naive approaches fail?)

4.Why hasn't it been solved before? (Or, what's wrong with previous proposed solutions? How does mine differ?)

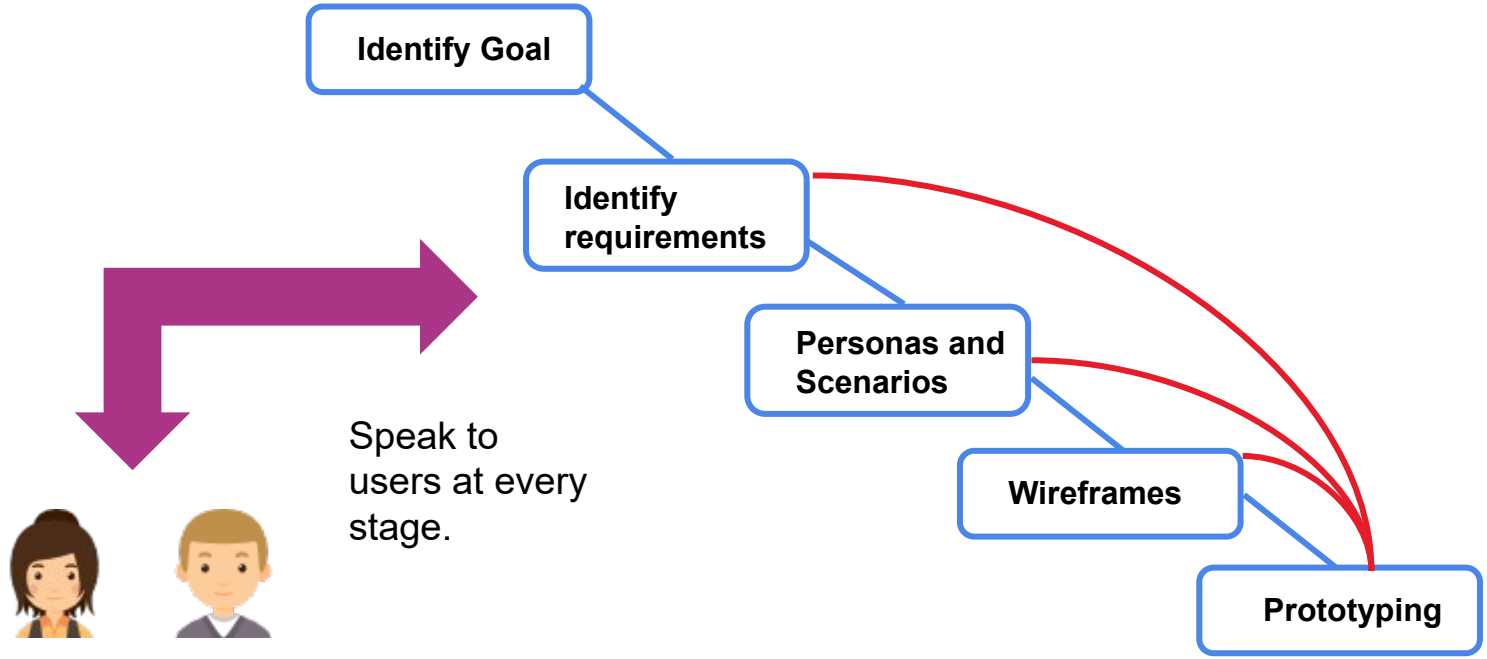
5.What are the key components of my approach and results? Also include any specific limitations.

Taken from: https://cs.stanford.edu/people/widom/paper-writing.html (Links to an external site.)

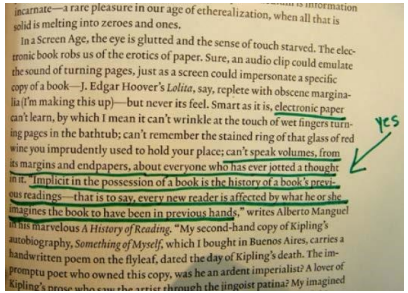
In week 9:
How to Pitch
(for Funding / Support / etc)

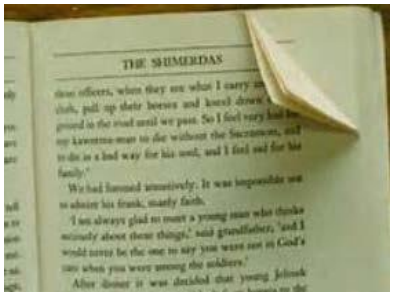
Working with Users
...

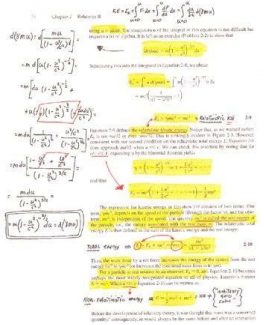
Overall Process

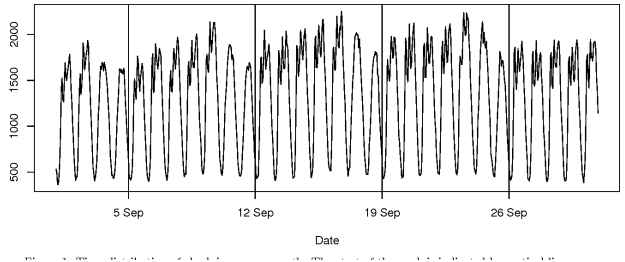


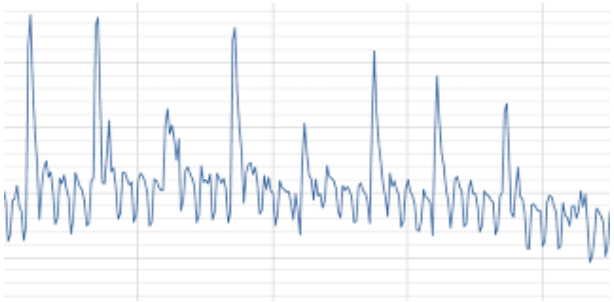
Analysing user behaviours

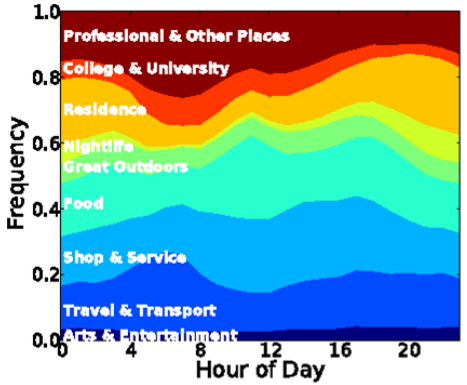








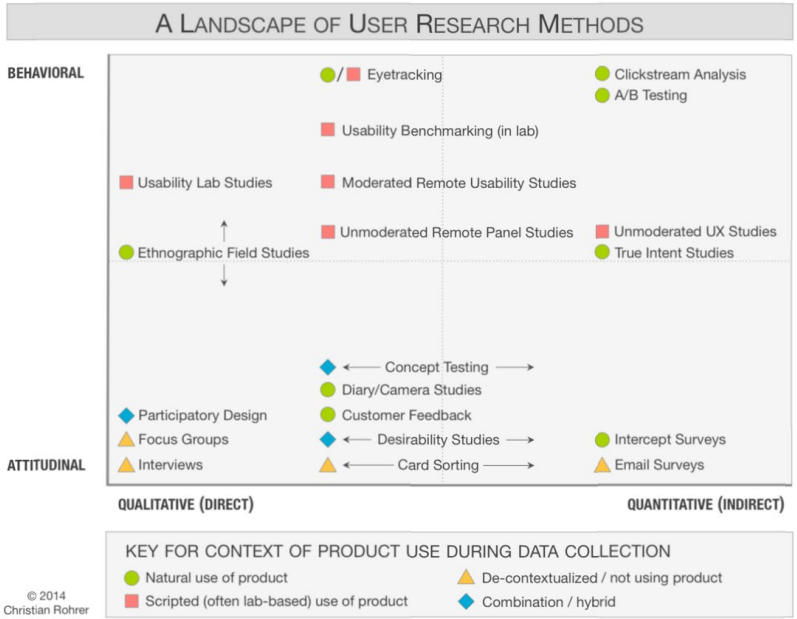




3-dimensional framework in User Research

- Attitudinal vs. Behavioral
- Qualitative (formative) vs. Quantitative (summative)
- Context of Use

https://www.nngroup.com/articles/which-ux-research-methods/



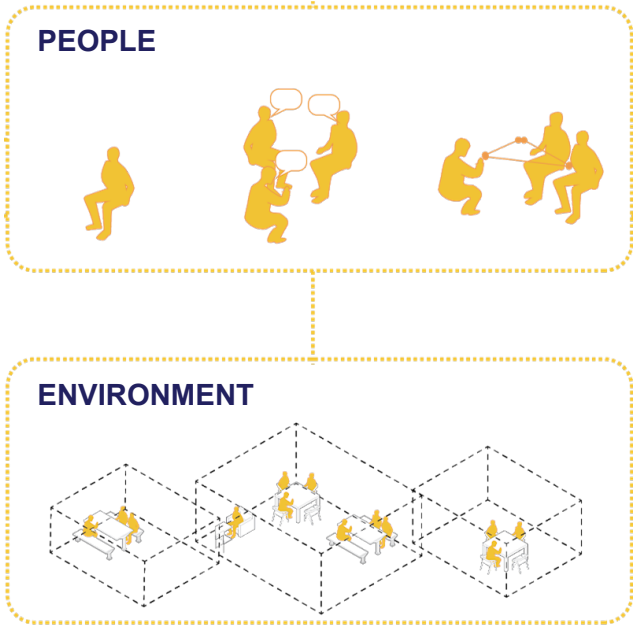
Example Case Study
Which user research method?
…

Challenge: Hot desking & activity-based working

- **Distrust**, **distractions**, **uncooperative behaviour** and **negative relationships**.
- **Decreased perception of support from supervisors**.
- Workplaces should be designed to support both **well-being** and **productivity**. This requires a more nuanced approach.

https://theconversation.com/the-research-on-hot-desking-and-activity-based-work-isnt-so-positive-75612

Initial Idea: Recommender System for Flexible Workspaces



Which user research method was employed?

Example Case Study
Which user research method was employed?

rmit.edu.au/news/all-news/2020/jun/office-comfort-and-concentration

Can't concentrate at work? This AI system knows why

Computer scientists have developed a way to measure staff comfort and concentration in flexible working spaces using artificial intelligence.

TECHNOLOGY

04 June 2020

Share

While hot desking and activity-based working allow cost savings and greater flexibility - and are said to increase staff collaboration and satisfaction - studies also show the noise and lack of privacy can be distracting for some people.

With coronavirus restrictions beginning to ease in some parts of the world and employers planning the return to office-based work, a new sensor-based system developed by RMIT and Arup can offer insights on how to get the best out of these flexible working spaces.

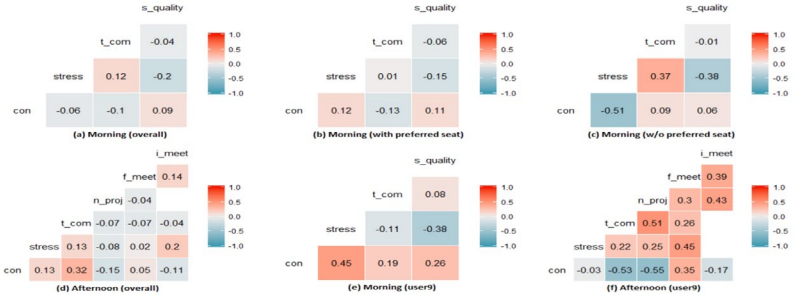
The RMIT team behind the study are experts in using AI to uncover patterns in human behaviour.

For this project they worked with psychologists to identify several key variables for concentration and comfort levels in work environments, then set about measuring these with sensors.

They worked with global design and engineering firm Arup to develop and test their new AI-driven system on 31 staff in two of the company's activity-based working offices over four weeks.

What we ended up with:
AI+sensor-system for Workplace Concentration & Stress

A project done in collaboration with Arup Melbourne



s_quality: sleep quality; *s_com:* thermal comfort; *con:* concentration level; *stress:* stress level; *n_proj:* active project; *i_meet:* informal meetings; *f_meet:* formal meetings

"AI-enabled sensor system for measuring staff comfort and workplace concentration could help employers get the best out of flexible office spaces"
https://www.theengineer.co.uk/ai-sensor-system-workplace-concentration/

"*A world-leading study by Arup and RMIT University harnesses artificial intelligence to uncover some surprising office productivity killers and offer clues to future workplace design.*" https://info.propertycouncil.com.au/property-australia-blog/ai-sheds-light-on-workplace-productivity-killers

Saiedur Rahaman, M. Liono, J. Ren, Y. Chan, J. Kudo, S. Rawling, T. and Salim, F. 2020, 'An Ambient-Physical System to Infer Concentration in Open-plan Workplace', in *IEEE Internet of Things Journal,* 2020. https://ieeexplore.ieee.org/document/9097829. Free access: https://arxiv.org/abs/2005.13535

What to do this week?

- Micro-cred deadline reminder:
  - Micro-cred: Presenting using story
- This week is the deadline for notifying groups
- Discuss the topic for the project, bring the ideation materials (eg using working backwards method or research question formulation)

Next week:

- Exploring case studies in FATE in AI/DS
- Problem formulation
- Get approval for tutors for Task 2 draft topic

Group formation

- Consultation available for those who haven't found a group yet or need more members. See Canvas announcement for specific consultation time based on the workshop allocation
- If you've formed the group:
  - Contact your workshop tutor who will create the group under "Project Groups" in Canvas. When submitting and peer-reviewing assignments, this group will be used
  - Create a private team channel under Microsoft Teams for your workshop, which you're supposed to be added into based on myTimetable allocation. Otherwise, please contact Hao Xue
  - Prepare the topic ideas for discussion with your tutor next week during the workshop

Next: Climate action challenge
A guest talk by Victor Lee, Communiteer

Communiteer's CEO, Victor Lee, is a graduate of the Australian Institute of Company Director. He began his career as a management consultant specialising in HR, Change Management and Corporate Volunteering. In 2009, he became Chief Operating Officer of Australia's first online mental health community at Reachout, before making his mark as the General Manager of Australia's largest Community Legal Centre. Since then, he has served on different Board of Directors and has managed national projects worth over $120 million that involves all levels of government, and multiple community and corporate stakeholders.