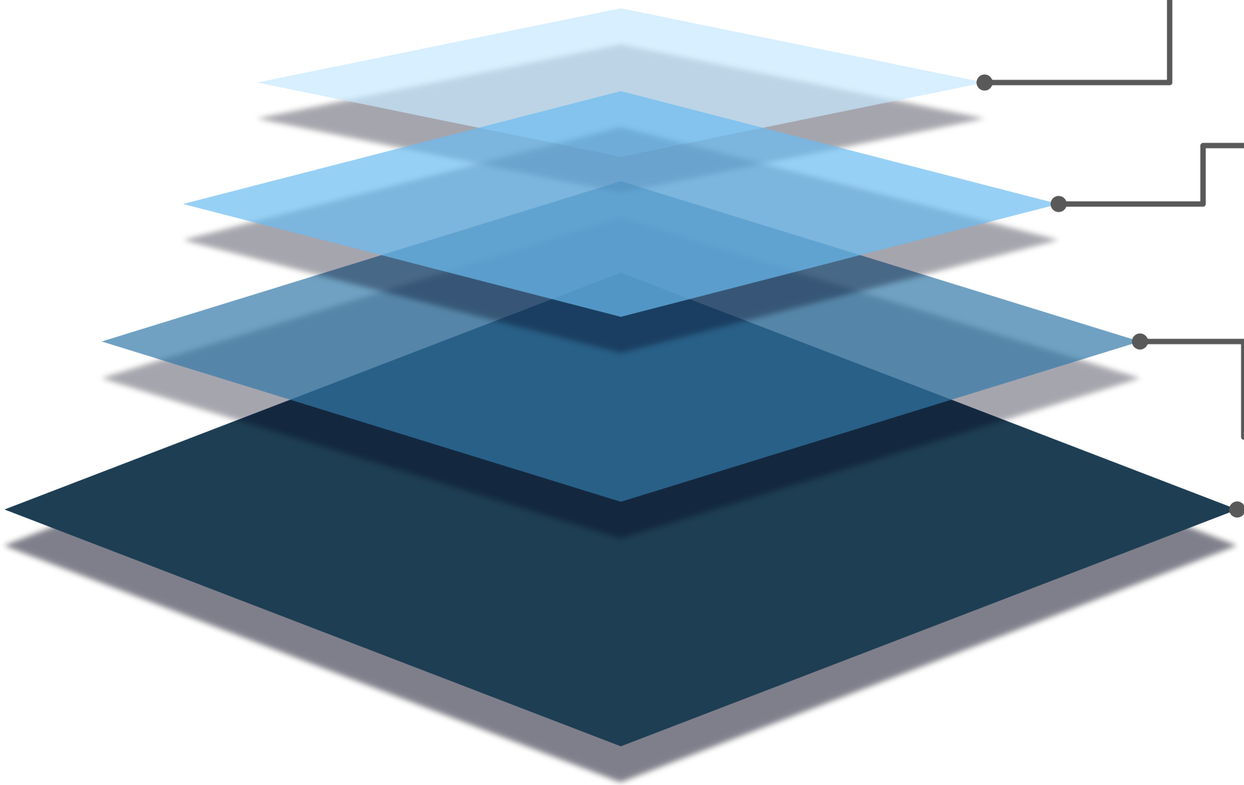
INTERSECT
EMPOWERING RESEARCH

AI Training Bootcamps

Glen Charlton Lead Data Scientist

The purpose

:: Layers of Research Support



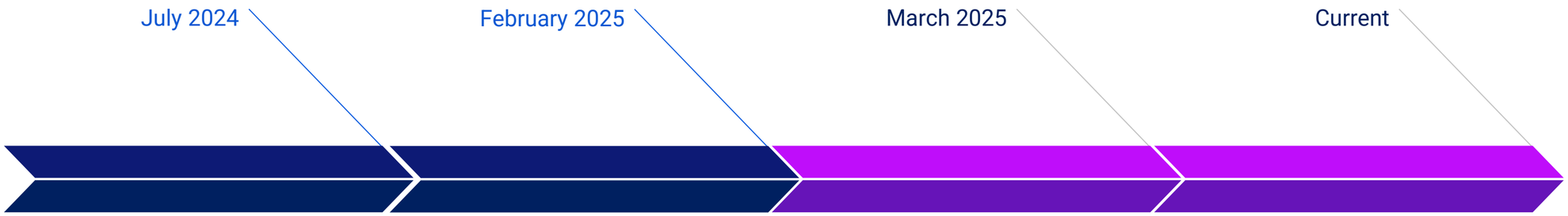
Data Science as a Service: Dedicated team of data scientists, analysts, statisticians, etc. designed to provide full end-to-end support for data intensive research across key areas of the research workflow

3AI Bootcamps: Researched oriented AI Training bootcamps in topics such as Generative Learning, LLMs, Computer Vision, Machine Learning Operations and reinforcement learning.

DRA SUPPORT: Second core component of membership. Remains as a first line of support, building workforce capability by helping researchers. The nature and extent of this support is limited by providing generalised support.

TRAINING: As a core component of membership, remains the primary avenue for building research workforce capability.

:: Project Timeline



Ideation

3AI and wider Intersect team identified the gap for researchers and begun to develop training content.

Developed

The idea and concept was developed and the development of the application was started.

Launched

The first delivery of the AI Training Bootcamps at NSW Department of Climate Change, Energy, the Environment and Water

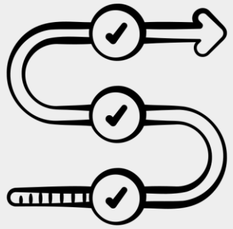
Continued delivery and development

Currently delivering an AI bootcamp with participants from WSU, SCU, LTU and UoA.

:: The team

3AI is a team of research-oriented data scientists and AI experts from diverse research backgrounds.

We aim to advance research by leveraging data science and AI methods combined with digital tools, technologies, and infrastructure.



We provide full end-to-end hands-on support for data-intensive research.

:: For researchers by researchers

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Advanced Analytics & AI Platform

:: 3AI Training Bootcamp

Upskill your research workforce with our specialised AI Training Bootcamps led by Research Data Scientists

A.
Research-Oriented

Designed and led by individuals with a background in research

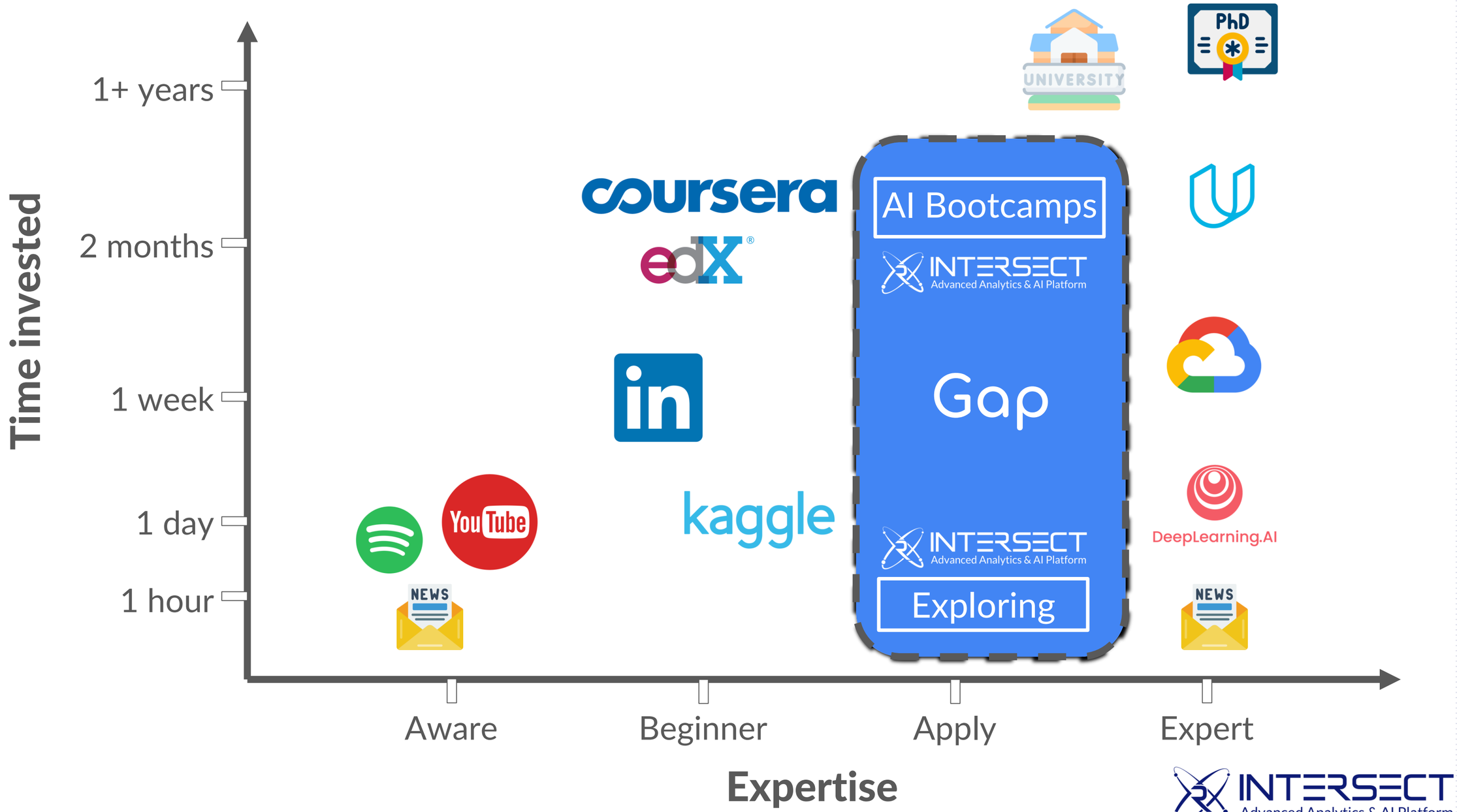
B.
Research-Relevant

The topics covered are directly applicable to research contexts

C.
Research-Focused

Strong emphasis on research applications and methodologies

:: 3AI Training Bootcamp



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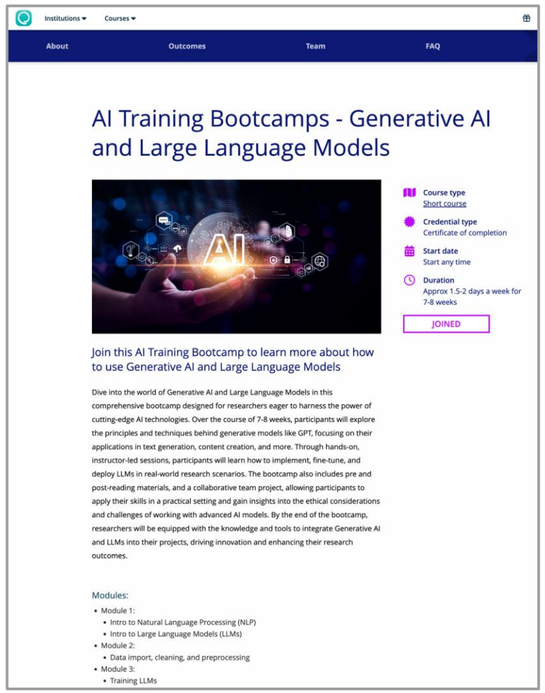
What are the bootcamps?

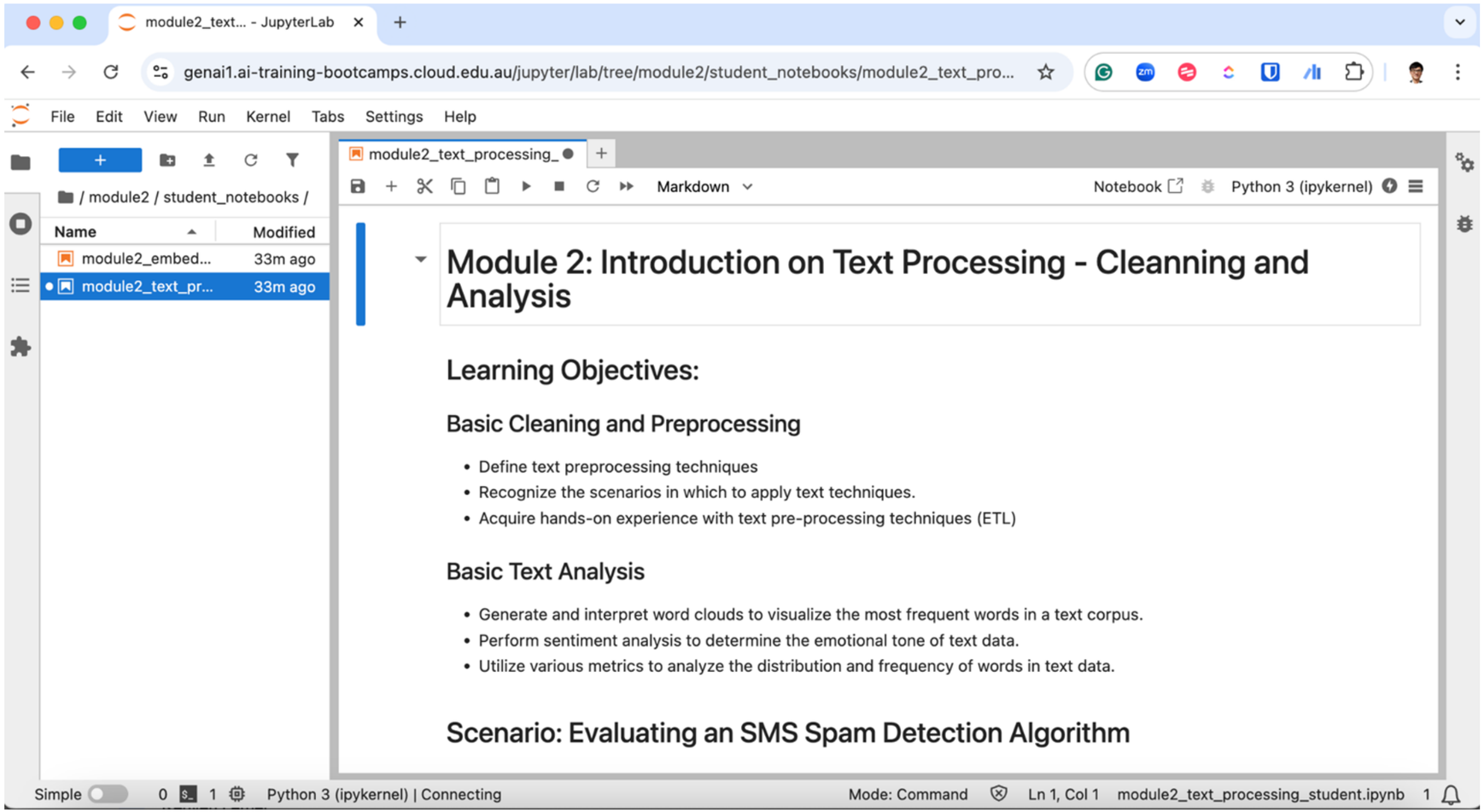
:: 3AI Training Bootcamp

Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Getting started - Course Guide	Pre-reading Hands-on live instructor-led delivery Project work Exercises / Quizzes	Pre-reading Hands-on live instructor-led delivery Project work Exercises / Quizzes	Pre-reading Hands-on live instructor-led delivery Project work Exercises / Quizzes	Pre-reading Hands-on live instructor-led delivery Project work Exercises / Quizzes	Pre-reading Hands-on live instructor-led delivery Project work Exercises / Quizzes	Pre-reading Hands-on live instructor-led delivery Project work Exercises / Quizzes	Pre-reading Hands-on live instructor-led delivery Project work

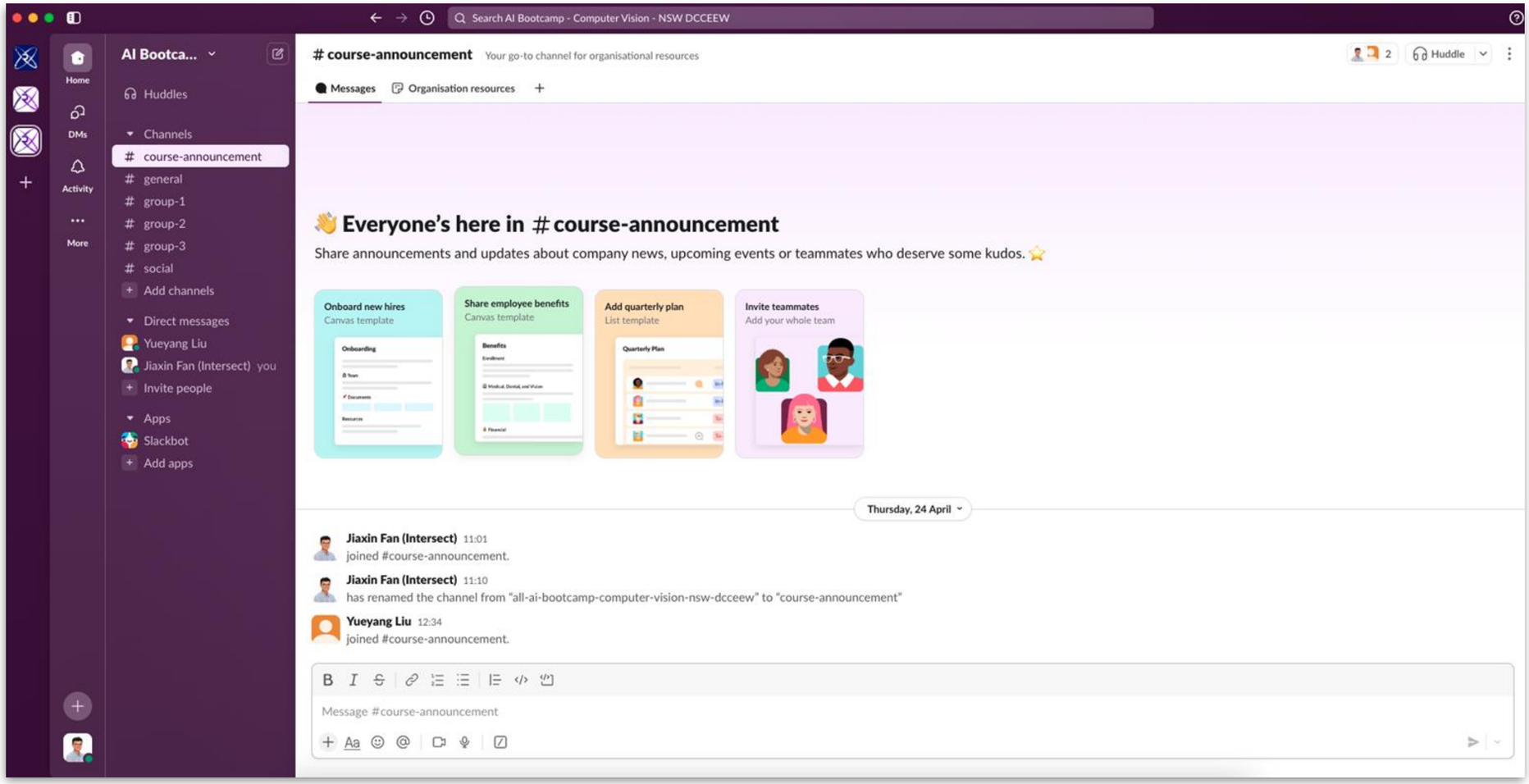
:: Learning Management System



:: Web-based Coding Environment



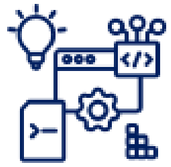
:: Collaborative Communication



:: Generative AI and Large Language Models

In this course, we challenge you to think critically about how these cutting-edge technologies can be applied to advance your work. How will you harness their potential to solve complex problems, unlock new insights, and drive the next wave of breakthroughs?

Through hands-on instructor-led workshops, exercises and quizzes, real-world case studies, and discussions, you'll dive into the practical applications of Generative AI and LLMs.



Learning Outcomes

- **Concepts of Natural Language Processing (NLP):** Gain a basic understanding of NLP and its applications, and comprehend the fundamentals of Generative AI and LLMs.
- **Text Processing:** Acquire hands-on experience with text data, understand text preprocessing techniques, and prepare data for modelling, including a prompt use case.
- **Training Language Models:** Train a simple NLP model for various tasks, discuss computational challenges during pre-training, and improve performance through fine-tuning with prompt datasets.
- **Model Evaluation and Interpretation:** Evaluate and interpret model results, and learn to deploy models in other applications via APIs.
- **Limitations of GenAI and LLMs:** Understand the limitations of generative AI and learn responsible AI practices.

Explore the transformative power of GenAI and LLMs in reshaping research and innovation

:: Computer Vision

This course offers an immersive learning experience that blends hands-on practice with essential theories, providing a solid foundation in Computer Vision.

You'll explore machine learning, deep learning, object detection, image segmentation, and generative AI. Along the way, you'll develop strong problem-solving skills and gain deep expertise, preparing you to understand and address complex research questions.

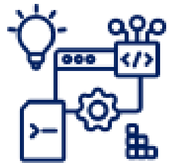
Learning Outcomes

- **Fundamentals of Computer Vision:** Understand the scope and current development of computer vision.
- **Image Processing:** Apply knowledge of computer vision to process imagery data and extract features.
- **Building Convolutional Neural Networks (CNNs):** Understand the basic concepts and code your own CNNs.
- **Object Detection and Image Segmentation:** Acquire hands-on experience with Object Detection and Image Segmentation, and successfully apply models to a realistic problem.
- **Generative Models:** Communicate an understanding of Generative Model and how it can be applied to Computer Vision.
- **Model Evaluation and Interpretation:** Critically evaluate and interpret Computer Vision approaches to apply to their applications.

Equipping researchers with knowledge and hands-on practice in Computer Vision

:: Machine Learning Operations (MLOps)

Managing machine learning experiments is complex and time-consuming. The MLOps course streamlines workflows and optimizes the ML lifecycle. Hands-on MLflow experience enables efficient experiment tracking and automation. The course enhances reproducibility, scalability, and collaboration in ML development.



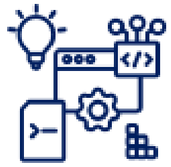
Learning Outcomes

- **Benefits of MLOps:** Communicate a clear understanding of the benefits of applying ML operations.
- **Applying Experiment Tracking:** Apply knowledge of ML experiment tracking using MLflow to perform model evaluation and hyper parameter tuning.
- **Managing MLflow Project:** Acquire hands-on experience with modular ML scripts to successfully execute an MLflow project
- **Designing End-to-end Pipeline:** Apply the concepts of ML operations to develop an End-to-End ML pipeline.
- **Managing through the ML Lifecycle:** Critically evaluate and interpret the ML model life cycle via iterating the model building and tracking.

Helping researchers to apply the concepts of MLOps in managing and tracking machine learning experiments

:: Reinforcement Learning

The bootcamp explores reinforcement learning for solving complex problems. Participants enhance skills to optimize decisions and develop intelligent systems. Workshops, case studies, and discussions provide practical real-world implementation skills.



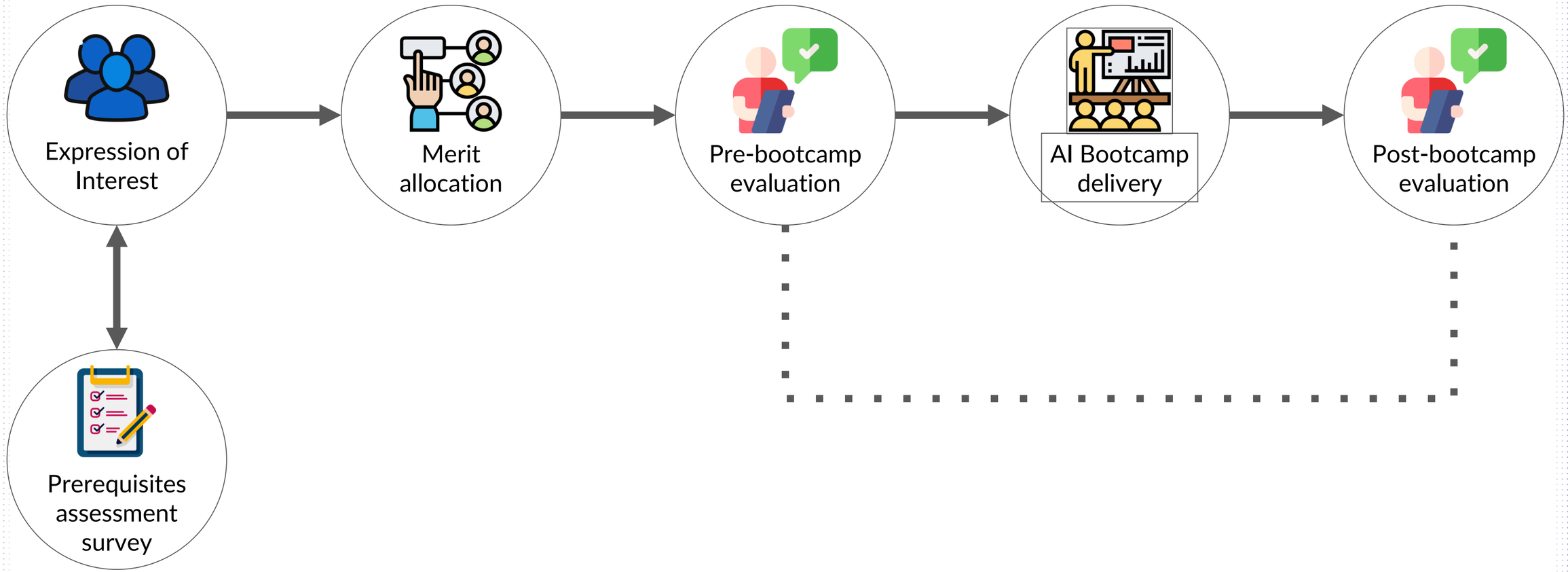
Learning Outcomes

- **Reinforcement Learning (RL) Fundamentals:** Communicate an understanding of the fundamental concepts and principles in Reinforcement Learning
- **Applying RL algorithms:** Apply various value-based Reinforcement Learning algorithms, and develop an understanding of their applicability, strengths and weaknesses.
- **Use of Neural Network in RL:** Understand and apply Deep Reinforcement Learning techniques, including the use of neural network function approximators.
- **Policy-based Methods:** Develop an understanding of policy gradients and apply key policy-based methods in Reinforcement Learning.
- **Performance Optimisation:** Apply state-of-the-art techniques to optimize the performance of Reinforcement Learning.
- **Case Studies:** Apply state-of-the-art techniques to optimize the performance of Reinforcement Learning.

Helping researchers unlock the potential of reinforcement learning within a research context

The results to date

:: Data Collection Process



:: 3AI Training Bootcamp: Results

Attendance Rate:	Net Promoter Score:	Understanding of AI topic:
90%	+52	~50%

Attendees' feedback:

"I really appreciated the holistic approach of the bootcamp — it covered a wide range of topics, striking a great balance between theory and hands-on practice."

"The quality of the resources provided was excellent and will be incredibly helpful for continuing the learning journey independently."

"[The bootcamp] felt well-structured and empowering, all delivered in a genuinely supportive and friendly environment."

Results as of September 2025

:: 3AI Training Bootcamp: What is next?

Actively updating the content while listening to community feedback

Engagement

More activities to keep attendees engaged with the instructors and among themselves.

Improvement

Observe while delivering and iteratively improve the content for both theory and practice.

Update

Update the content to keep up with the latest trend and knowledge.

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A special thank you to those who contributed to this work:

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