



Module 6

Workshop 1: Designing and Optimising ML Training Pipelines



What slows you down?

Before we design efficient training pipelines, think about your own ML projects.

Which part of your model training process causes the biggest bottleneck — data prep, training, or tuning?

Type your answer in the chat!





Module 6

Workshop 1: Designing and Optimising ML Training Pipelines



Agenda

- **Review:** Recap key concepts.
- **Practical exercise:** The efficiency challenge.
- **Closing:** Wrap up and reflection.



Learning objectives

- Design an efficient end-to-end ML training workflow.
- Balance performance, efficiency, and sustainability trade-offs.
- Apply optimisation techniques for tuning and resource management.
- Link performance outcomes to business and operational goals.



Async review: Units 1 and 2

Go to My Multiverse, Module 6
Workshop 1

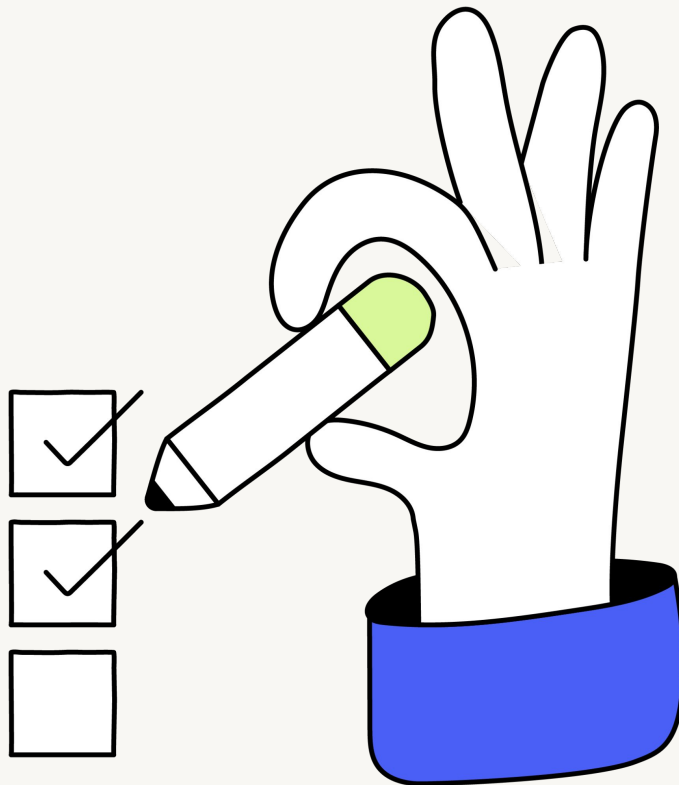


Navigate to the **"Async review"** page



Review the summaries of Units 1 and 2,
then complete the following Poll:

How smart is your pipeline?





Poll debrief

- Optimisation looks different for every team, some focus on data, others on tuning or scaling.

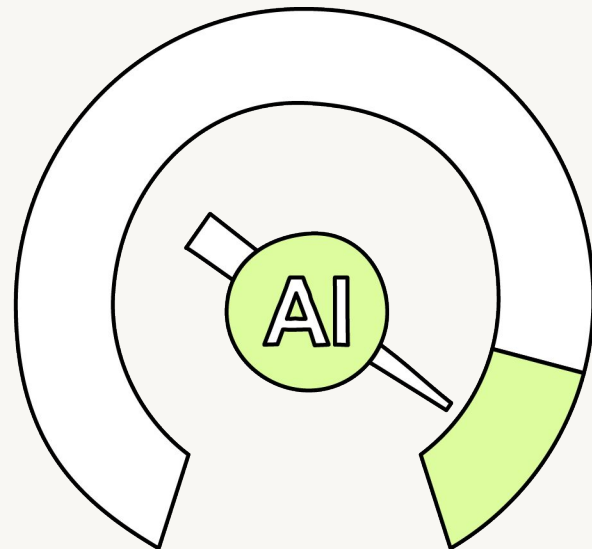


Where do you see the biggest opportunity to improve your pipeline: streamlining data prep, refining training efficiency, or reducing compute waste?



Building efficient ML workflows

- A strong ML workflow connects data ingestion, preprocessing, training, validation, and deployment into one efficient system.
- Each design choice — from data handling to retraining — affects scalability and speed.
- Efficiency comes from balancing compute use, data flow, and model performance.



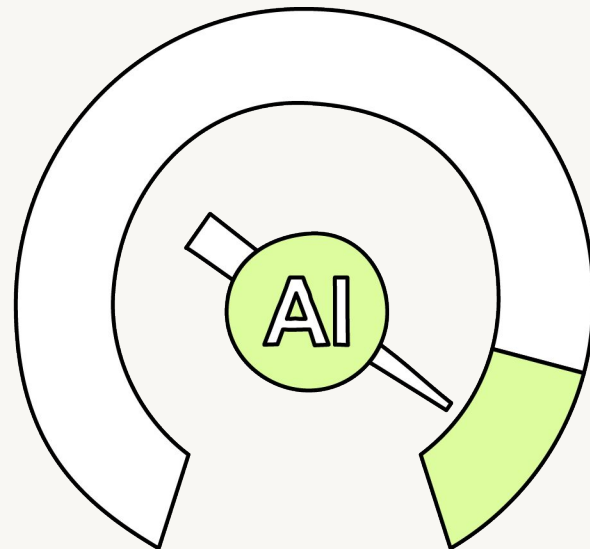


Measuring what matters

Accuracy isn't enough — the right metric reflects real-world impact.

- **Precision:** Fewer false positives.
- **Recall:** Fewer false negatives.
- **F1-score:** Balance between the two.

Choosing metrics tied to business outcomes ensures models optimise what truly matters.

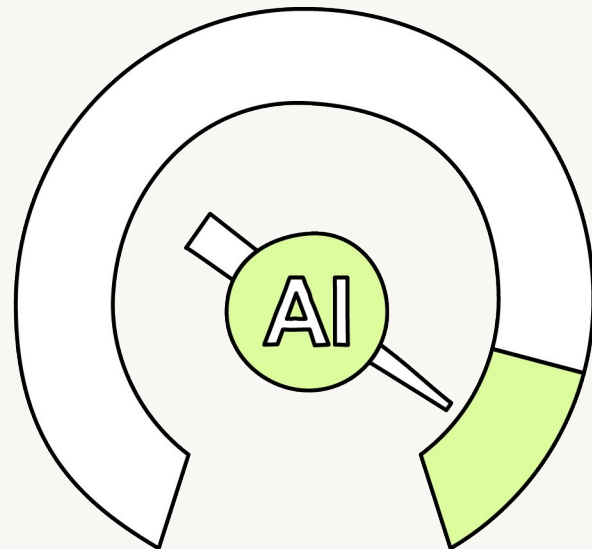


Training for efficiency and sustainability

Optimisation means better results with fewer resources.

- Tune hyperparameters to speed up convergence.
- Manage model size and complexity to reduce cost.
- Track energy use or CO₂ impact for responsible AI.

Efficiency and sustainability go hand in hand — less waste, more value.



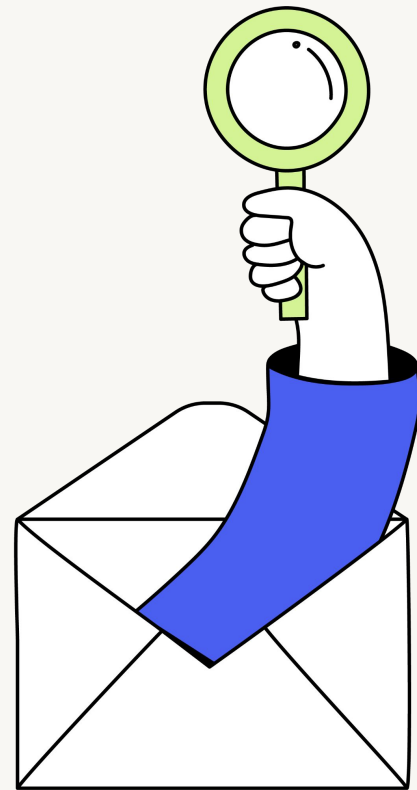


Practical exercise: The efficiency challenge



Practical exercise: Context

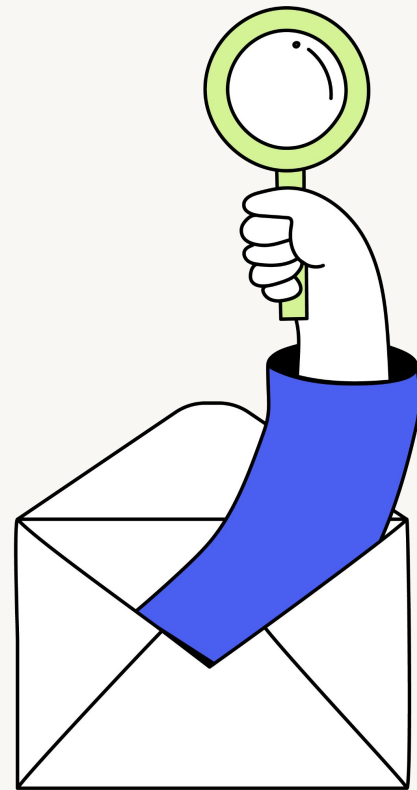
- **Company:** RetailMax, a global retail company using AI to optimise inventory and reduce waste across regional warehouses.
- **Project goal:** Maintain high model accuracy while improving efficiency and sustainability in the company's demand forecasting pipeline.
- **Challenge:** Daily retraining has raised cloud costs and energy use. Stakeholders have competing priorities around speed, cost, and sustainability, requiring a balanced, efficient workflow redesign.





Practical exercise instructions

- Work in breakout rooms in small groups.
- Step into the role of RetailMax's ML project team.
- Find all instructions and resources on Ariel.





Access the skills application

Go to My Multiverse, Module 6
Workshop 1



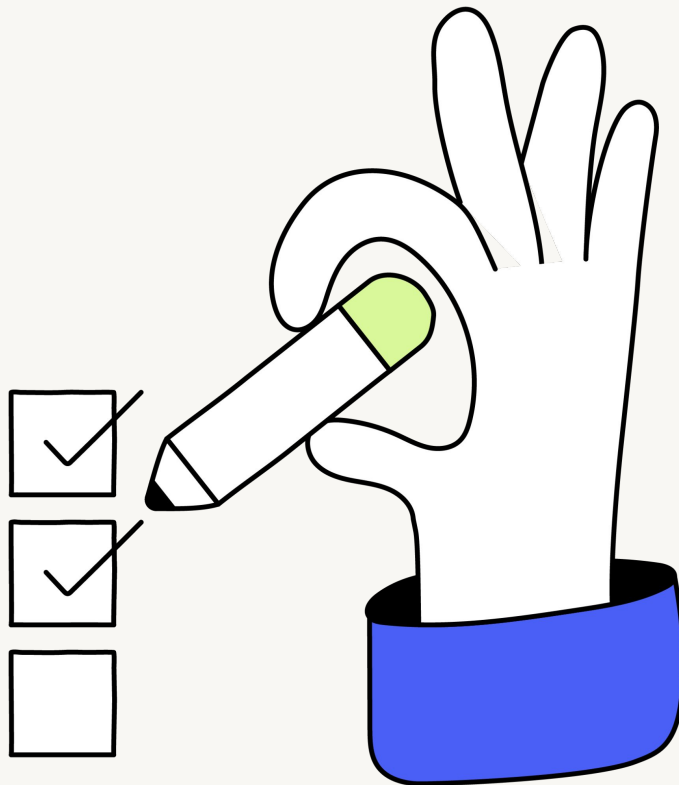
Navigate to the **"Practical exercise"**
page



Start working on the activity tasks



Be prepared to share in 20 minutes
when we come back together





Group discussion debrief



Practical exercise debrief

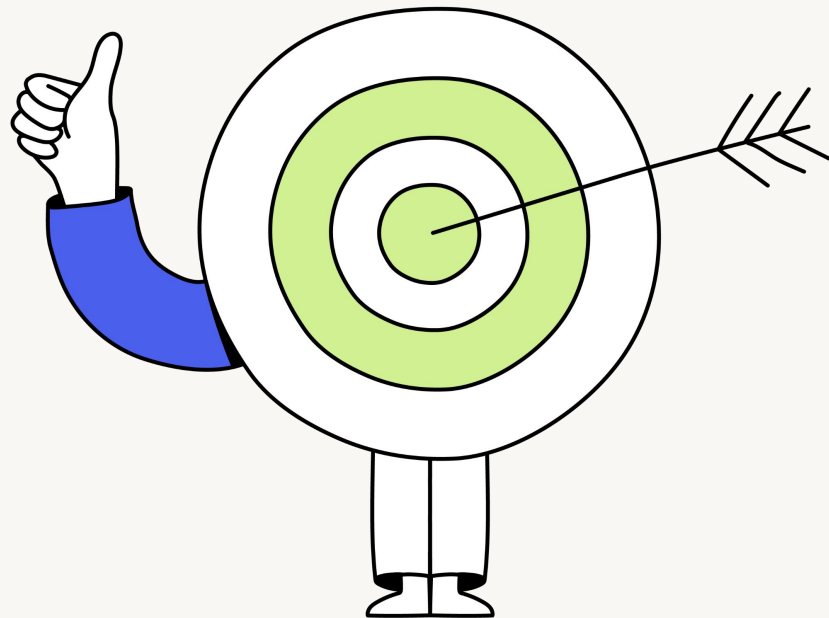
- 1 Which stakeholder's priority did your solution favor most (operations, data science, finance, sustainability)?
- 2 What was your team's most impactful efficiency decision?
- 3 What would you adjust in future iterations of this pipeline?





Key takeaways

- 1 Design ML workflows for efficiency, scalability, and sustainability.
- 2 Choose metrics that reflect business goals, not just accuracy.
- 3 Balance cost, performance, and environmental impact.
- 4 Build sustainability into your model from the start.





Applying **key** **takeaways** to your organisation



Applying key takeaways

- 1 How does your organisation balance performance, efficiency, and sustainability in ML projects?
- 2 Where do you see the biggest inefficiencies or trade-off challenges in your current workflows?
- 3 What steps could your team take to design ML systems that are more scalable, cost-effective, and environmentally responsible?



Share your plan to apply new skills

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Workshop 1



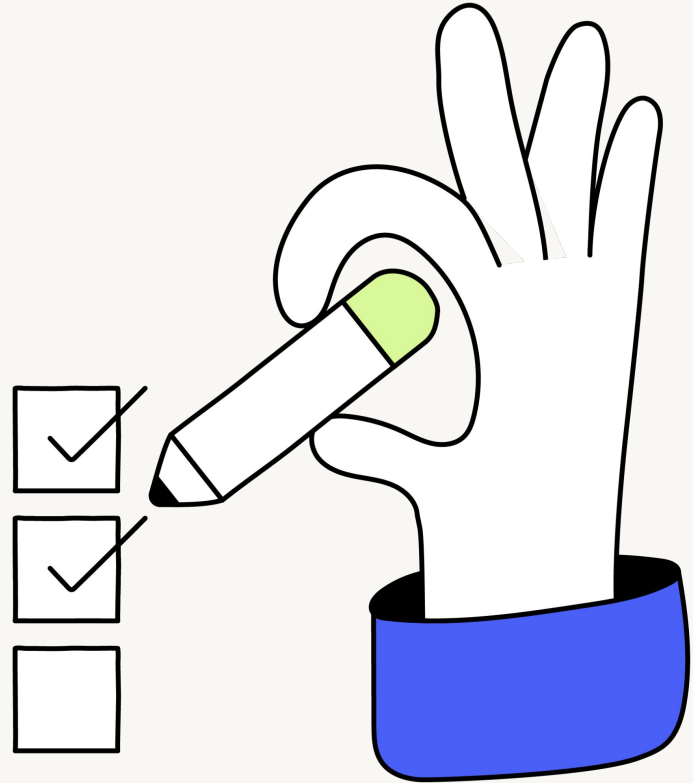
Navigate to the discussion activity
page **"Apply new skills to your role"**



Take 5 minutes to share how you will
apply this skill in your role



Take time this week to read what
others have written and get new ideas!





Closing out

- **Next workshop:** Auditing Fairness and Bias in ML Models
- **Have questions?**
 - Chat with Atlas
 - Reach out to your Cohort Coach
 - Sign up for Tutoring
- **Log your OTJ hours**
- **Take the Workshop Survey** on My Multiverse

multiverse