



Module 7

Workshop 2: Handling Imbalanced Datasets

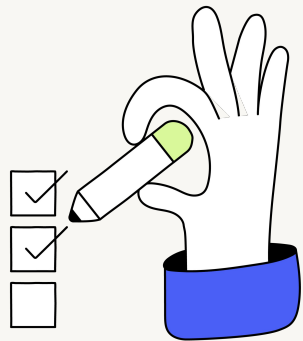
Icebreaker

Go to My Multiverse, Module X
Workshop x



Complete the following poll:

**What connects the three images
on the right?**





Module 7

Workshop 2: Handling Imbalanced Datasets



Agenda

- **Review:** Recap key concepts from async unit 3.
- **Practice:** Hands-on with handling imbalanced datasets.
- **Closing:** Key takeaways and next steps.



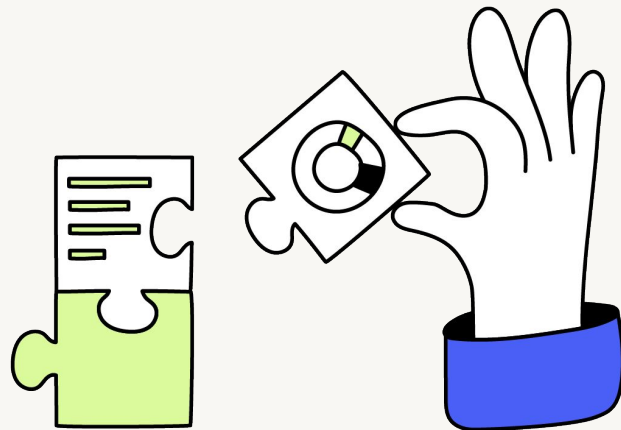
Learning objectives

- **Identify the business value** of using techniques for managing imbalanced class.
- **Define how the key concepts** of imbalanced class, oversampling/undersampling, SMOTE, Kappa, and AUC support managing bias.
- **Apply techniques** to address class imbalance and manage bias.



Bias, Variance & the Tradeoff

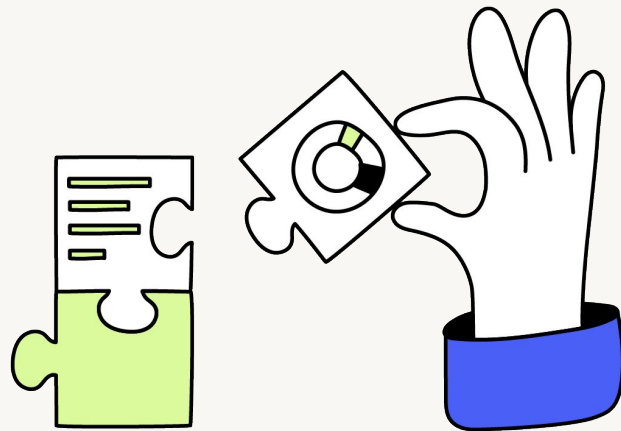
- Bias is error from overly simple models that miss key patterns.
- Variance is error from overly complex models that react too much to noise.
- The bias-variance tradeoff helps us find the sweet spot between underfitting and overfitting.
- Regularisation, more data, and ensembles help control bias and variance.





Fairness & ethical bias

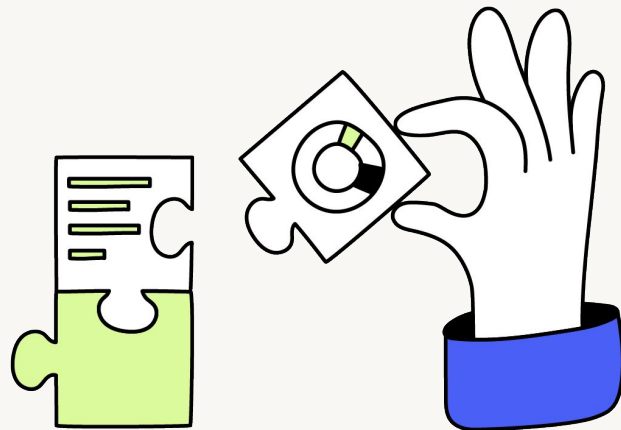
- Fairness bias happens when models treat groups unequally.
- It's different from statistical bias—this is about justice and equity.
- Causes include imbalanced data, missing values, and skewed features.
- Unfair models can harm people, break laws, and damage reputations.





Detecting & Fixing Fairness Bias

- Use tools like Fairlearn, Aequitas, and AI Fairness 360 to detect bias.
- Mitigation strategies include pre-processing, in-processing, and post-processing.
- Explainable AI (XAI) helps spot and correct bias in model decisions.
- Ongoing fairness needs governance, audits, and accountability.



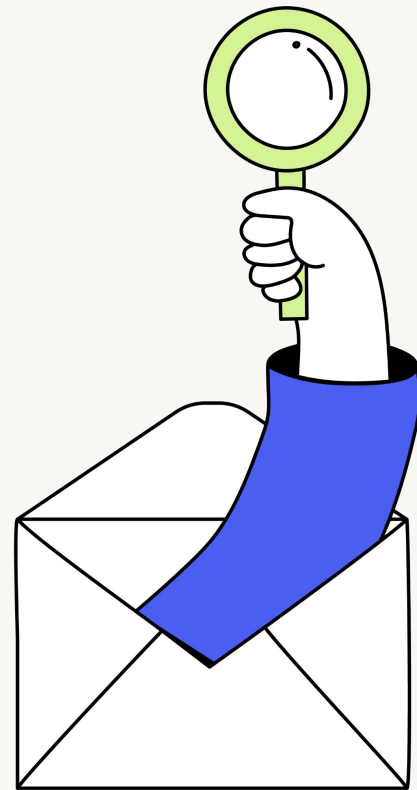


Skills application: Handling imbalanced datasets



Skills application introduction

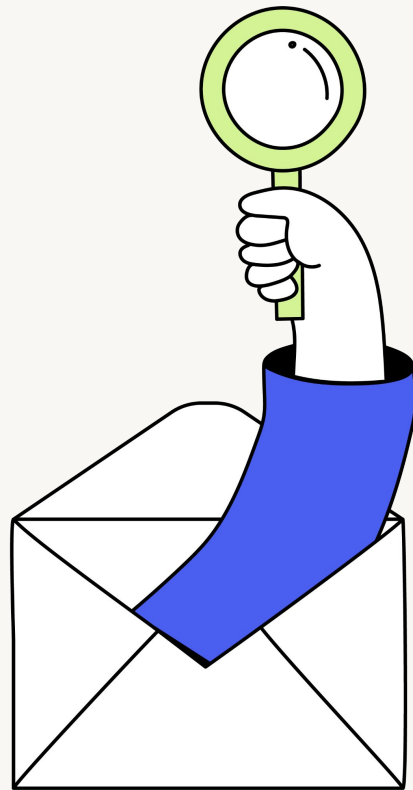
- **Objective:** Apply techniques to address class imbalance in a classification model, helping improve fairness and predictive power in real-world scenarios like churn prediction, fraud detection, and healthcare risk scoring.
- **What you'll do:**
 - Explore the RingNet Telecom churn challenge using their customer dataset.
 - Work in teams to apply sampling and evaluation techniques that tackle class imbalance in a classification model.
 - Use your insights to build a more balanced, reliable churn prediction model.





Skills application instructions

- Work in breakout rooms in small groups.
- Use the Jupyter Notebook to apply techniques to address class imbalance in RingNet Telecoms classification model
- The challenge is designed to be solved individually, but collaboration is encouraged.
- Find all instructions and resources on Ariel.





Access the skills application

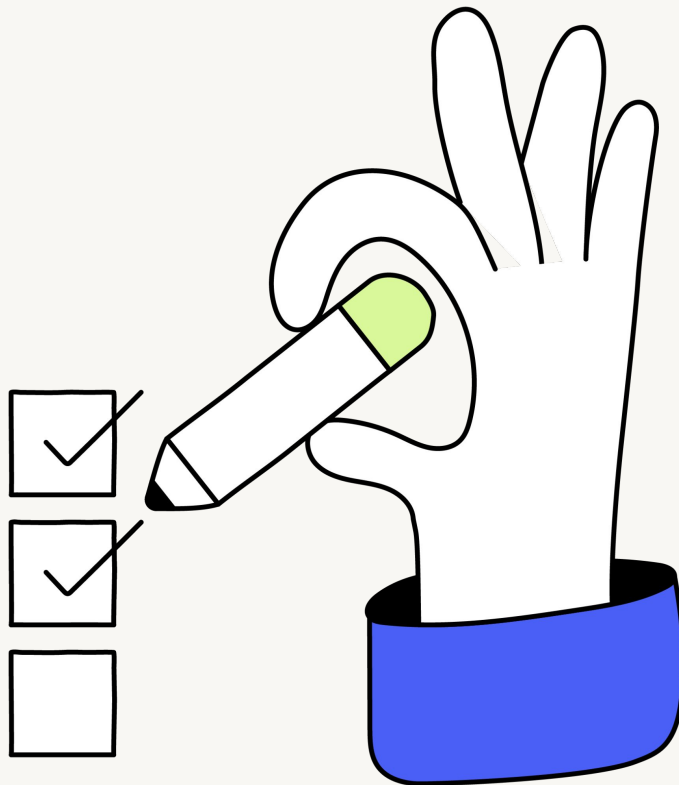
Go to My Multiverse, Module 6
Workshop 2



Go to the Skills application demo page
or Skills application page and follow
the instructions provided



Be prepared to discuss your learnings
when we come back together





Skills application debrief



Skills application debrief

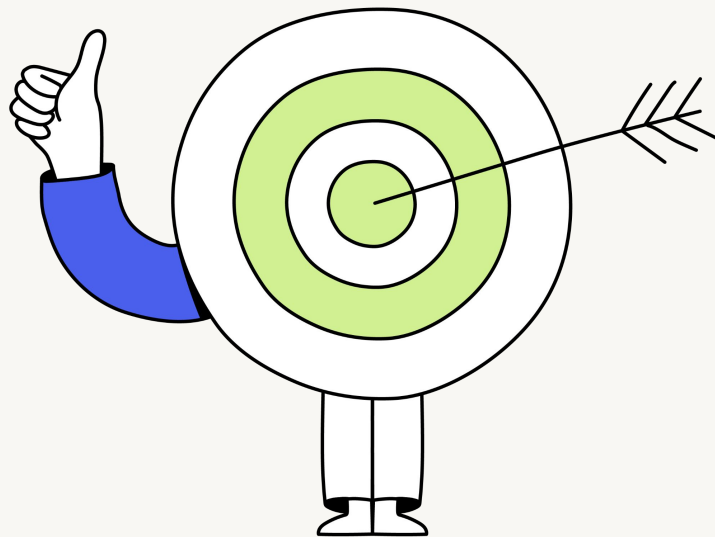
What techniques did you apply, and how did they impact the model's performance?





Key takeaways

- 1 Balance matters. Even small changes can make big improvements.
- 2 Fairer models lead to smarter decisions. When models see everyone in data, you get more accurate results.
- 3 Interpretable patterns drive action. Data becomes more than just insights, it becomes a strategy.





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



Applying key takeaways

- 1 Where does imbalanced data show up in your organisation? How are you currently handling it?
- 2 How would techniques like oversampling, undersampling, or SMOTE shift that balance and help your models perform more reliably across the board?
- 3 How would better predictions or fairer results improve the decision making process in your business?



Share your plan to apply new skills

Go to My Multiverse, Module 7
Workshop 2



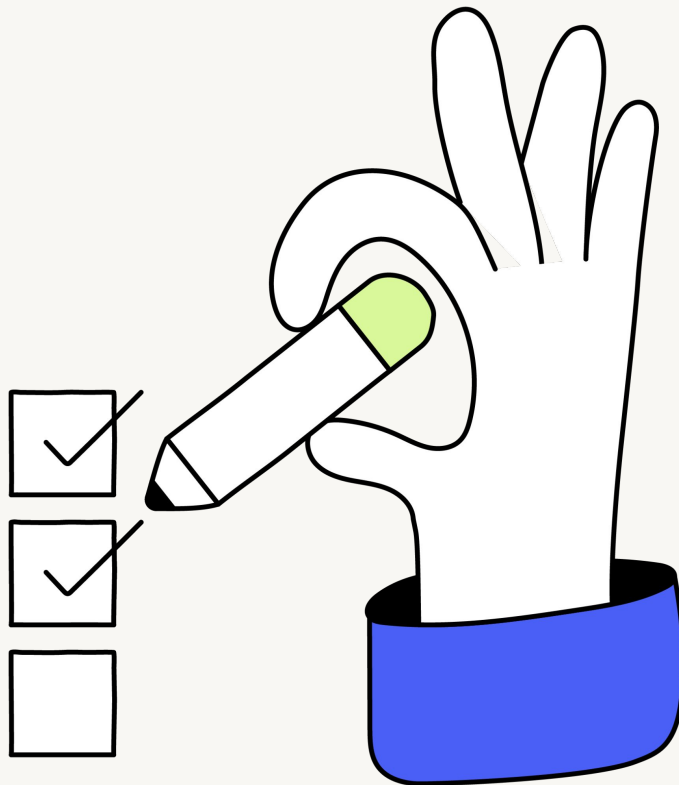
On the Apply new skills to your role
page, find the discussion activity



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:** Module 7 wrap up
- **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

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