



Module 7

Workshop 1: Hyperparameter Tuning



Icebreaker

Try to decipher the anagrams below to find words that could relate to today's workshop.

Put your answers into the chat.

B E A N C L A D M I

E A R T H Y R E A P E R M

E N G R O S S S I R E



Module 7

Workshop 1: Hyperparameter Tuning



Agenda

- **Review:** Recap key concepts from async units 1 and 2.
- **Practice:** Hands-on with hyperparameter tuning.
- **Closing:** Key takeaways and next steps.



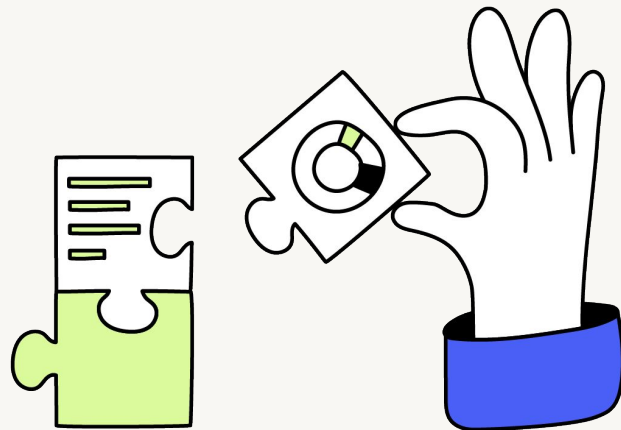
Learning objectives

- **Identify the business value** of utilising hyperparameter tuning techniques.
- **Define how the key concepts** of grid search, support vector machine, AIC, and BIC enable hyperparameter tuning.
- **Apply hyperparameter tuning** techniques to enhance a regression model.



How ML models and systems work together

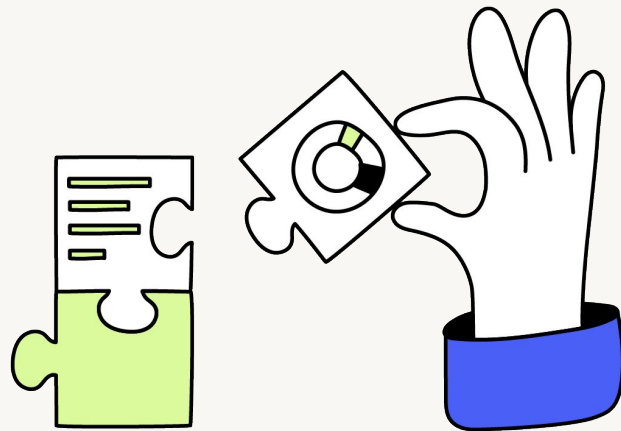
- Models turn raw data into predictions using layers, weights, and activations.
- Loss functions and optimisers help models learn from mistakes.
- System architecture handles everything around the model—from data in to results out.
- Tools like MLOps and APIs help keep things fast, stable, and scalable.





Training smart, not just hard

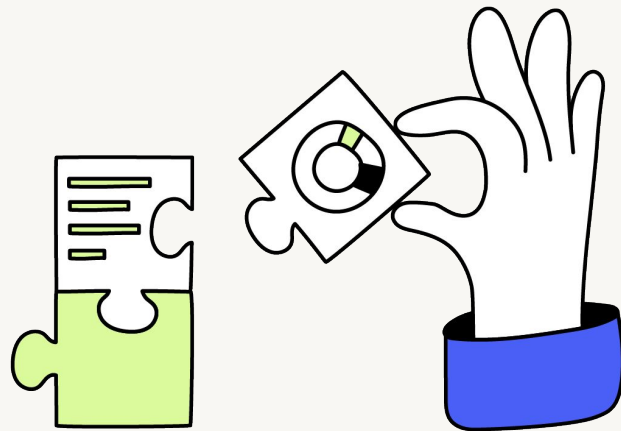
- Training is a loop: tune, test, learn, repeat.
- Use cross-validation, early stopping, and ensembles to boost performance.
- Try advanced tools like transfer learning and federated training to save time and scale up.
- Choose your method based on data, compute power, and how flexible your model needs to be.





Making it work in the real world

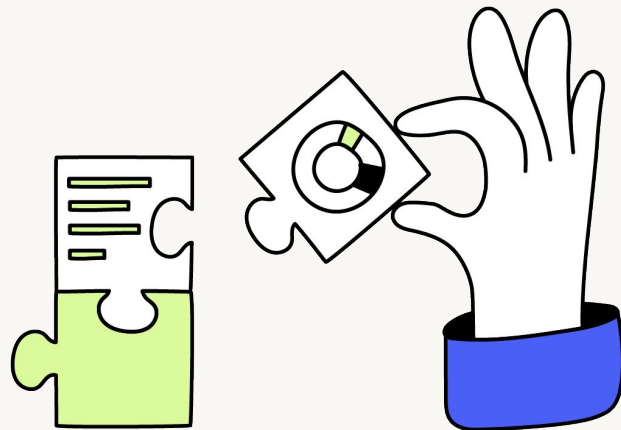
- Pick the right hardware—GPU, TPU, or CPU—to match your model's needs.
- Spread training across machines with the right setup and tools.
- Speed things up with smart tricks like mixed precision and dynamic batch sizes.
- Think green—track your energy use and build models that are powerful and sustainable.





Make metrics work for you

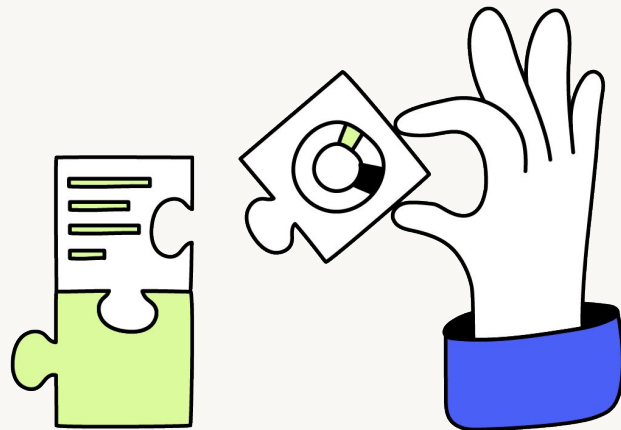
- Pick the right metric for the task—accuracy isn't always enough.
- Use precision, recall, and F1-score to catch what accuracy might miss.
- For regression? Track errors with MSE, RMSE, MAE, and R^2 .
- Connect model performance to real-world outcomes like cost, risk, and satisfaction.





Tune smarter, train better

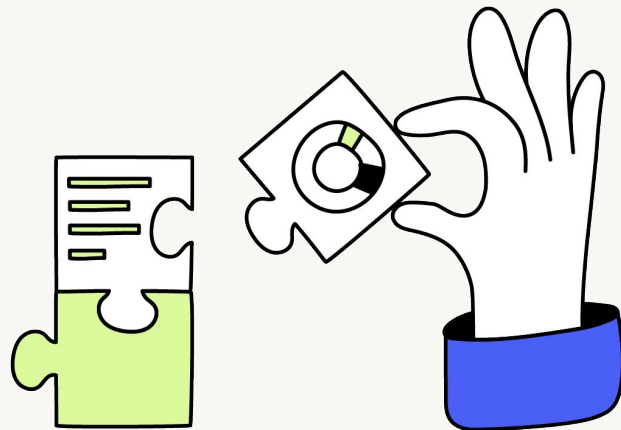
- Use regularisation (L1, L2, dropout) to keep your model focused and avoid overfitting.
- Try grid search, random search, or AutoML to find the best settings fast.
- Speed up learning with optimisers like Adam and RMSprop.
- Compress your model to make it faster and lighter without losing power.





Test like a pro

- Split and test your data the right way—K-fold and stratified CV help you trust the results.
- Dig into your model's errors with confusion matrices and ROC curves.
- Calibrate your outputs so the probabilities actually mean something.
- Keep tuning until your model works where it really matters—out in the wild.



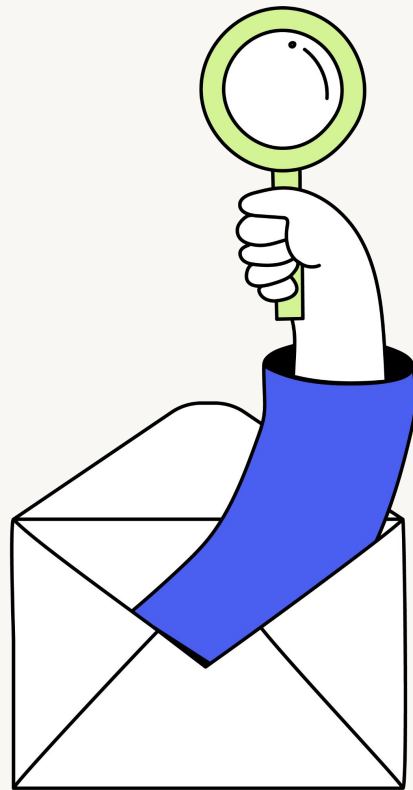


Skills application: Hyperparameter Tuning



Skills application introduction

- **Objective:** Enhance your hyperparameter tuning techniques skills to manage bias in imbalanced datasets, improving model accuracy and fairness in scenarios such as fraud detection, disease diagnosis, and anomaly detection.
- **What you'll do:**
 - Get familiar with the RingNet Telecom case study and dataset.
 - Apply hyperparameter tuning techniques to enhance a regression model.





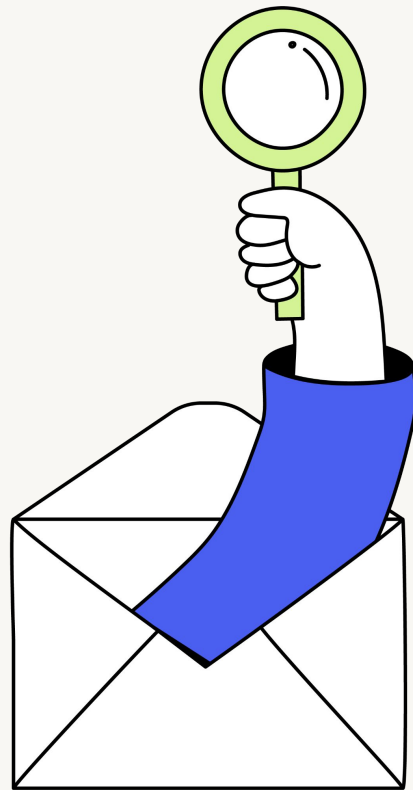
Skills application options

Option 1: Coach demo

- Watch and follow along as the coach completes the task

Option 2: Group collaboration

- Work in breakout rooms in small groups.
- Use the Jupyter Notebook to apply hyperparameter tuning techniques to the RingNet Telecom dataset.
- The challenge is designed to be solved individually, but collaboration is encouraged.
- Find all instructions and resources on Ariel.





Access the skills application

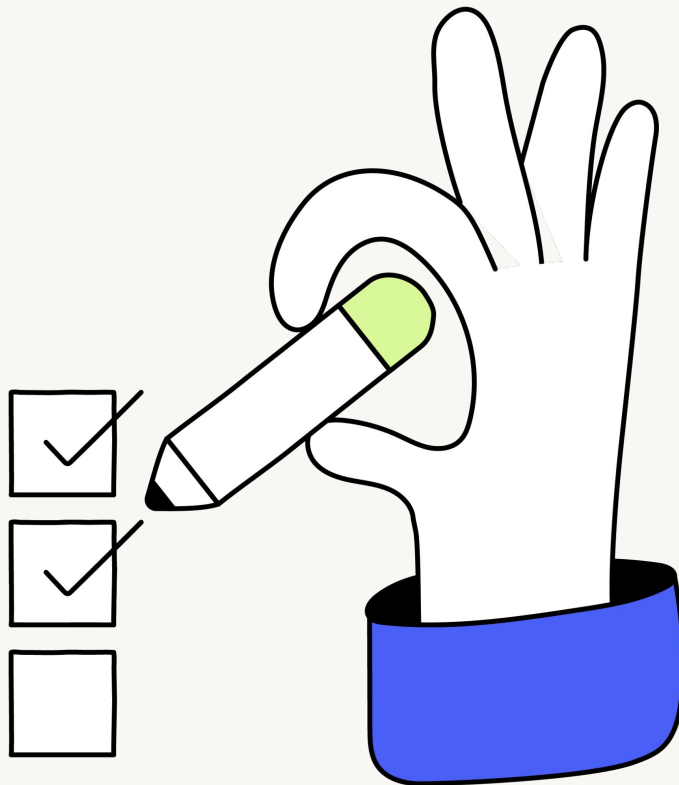
Go to My Multiverse, Module 6
Workshop 1



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

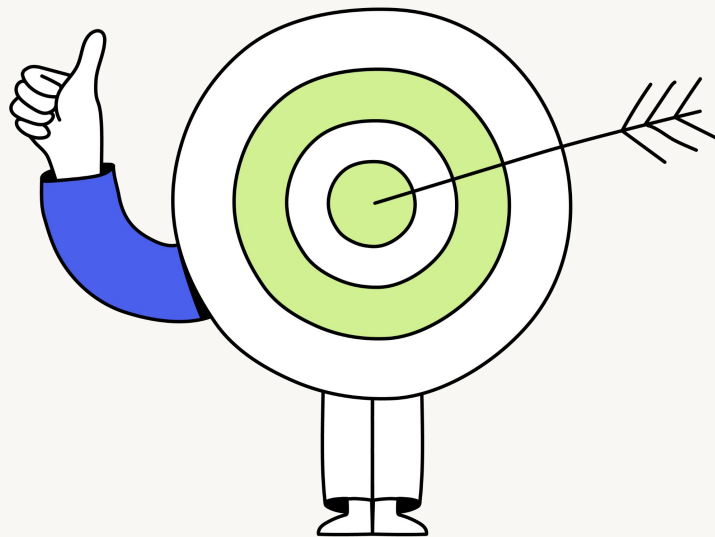
What techniques did you apply, and how did they impact the model's performance?





Key takeaways

- 1 Put hyperparameter tuning into practice and see how small tweaks can lead to big performance wins.
- 2 Solve real business problems with machine learning, turning data into smarter decisions.
- 3 Build confidence collaborating and thinking like a data pro, whether you're flying solo or teaming up.





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



Applying key takeaways

- 1 What kinds of regression models you use—or could use—in your organisation to predict outcomes like sales, revenue, or demand?
- 2 What hyperparameters do you currently tune, if any? And how do you determine the best values?
- 3 How might tuning hyperparameters like regularisation strength, tree depth, or learning rate improve prediction accuracy and generalisability?



Share your plan to apply new skills

Go to My Multiverse, Module 7
Workshop 1



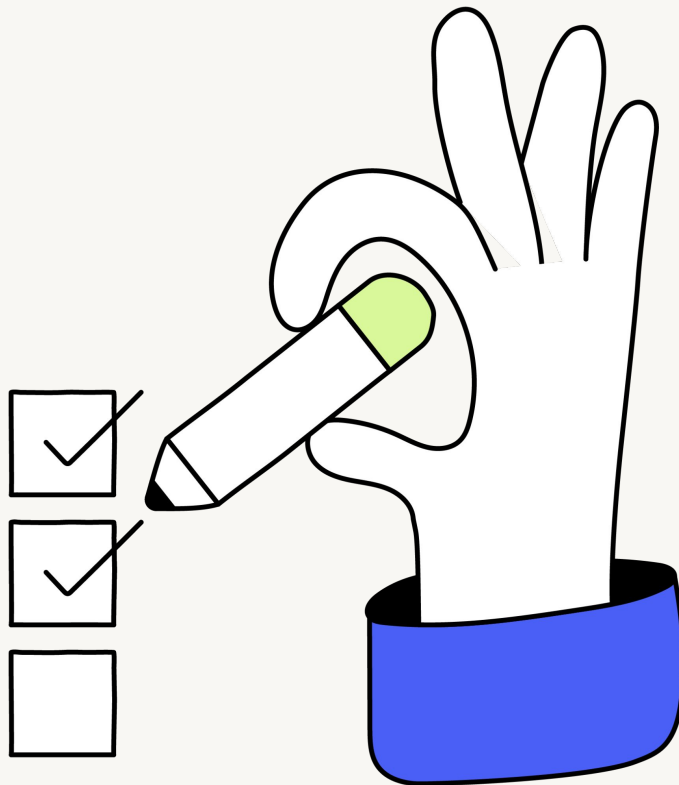
Find the discussion activity



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:** Handling Imbalanced Datasets
- **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