



Module 1

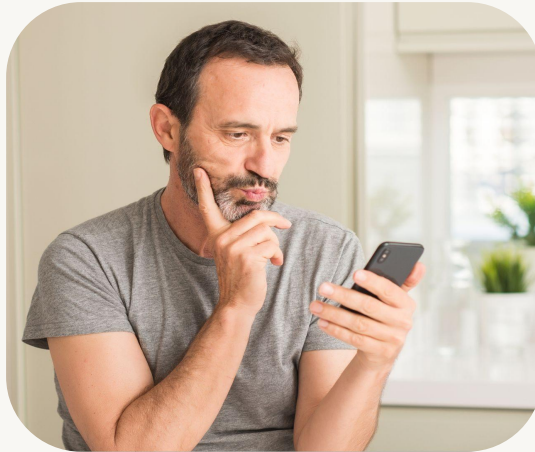
Workshop 1: ML and Computer Vision

Face Detection and Hierarchical Approaches



Find the link!

What links these three images? Share your thoughts in the chat!





Module 1

Workshop 1: ML and Computer Vision

Face Detection and Hierarchical Approaches



Agenda

- **Review:** Recap key concepts and applications.
- **Demo:** Face and eye detection with OpenCV.
- **Practice:** Apply and optimize detection.
- **Closing:** Key takeaways and next steps.



Learning objectives

- **Understand face detection** by exploring Haar Cascades in OpenCV to detect faces in images.
- **Develop real-time detection pipelines** by preprocessing images, applying models, and visualizing results.
- **Explore modern detection methods** with Mediapipe, including handling profile faces.
- **Learn to build comprehensive detection pipelines** by integrating face and eye detection and refining accuracy.
- **Apply problem-solving techniques** by adjusting parameters and implementing complete detection solutions.

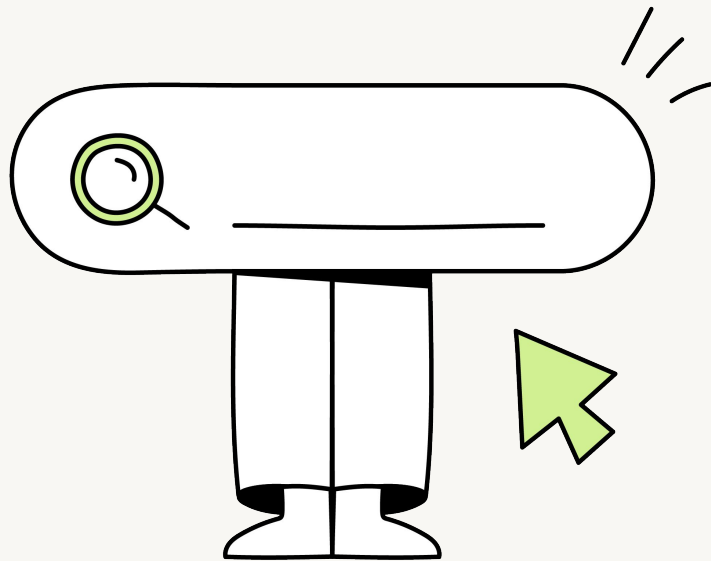


Async review: Unit 1

What is AI and ML?

In one sentence, how would you explain the difference between AI and ML to someone with no technical background?

Drop your answer in the chat!



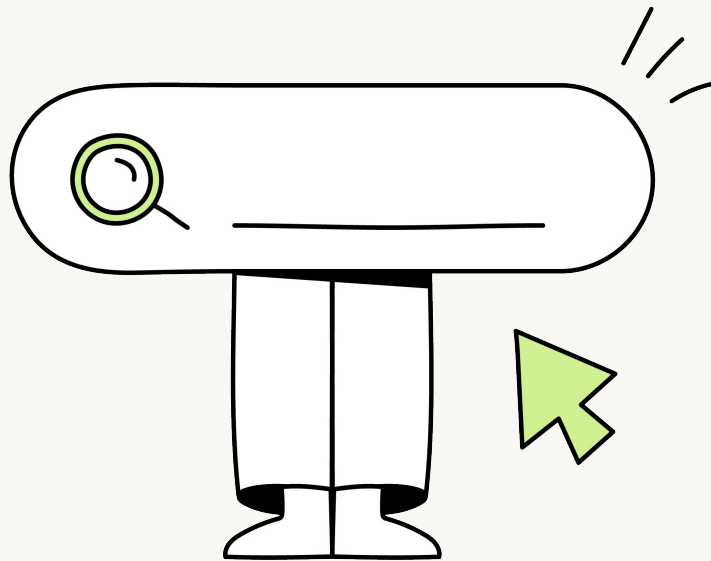


Async review: Unit 1

Where have you seen it?

Think of a product or service you use daily that relies on ML. What is it, and how does ML enhance its functionality?

Share your thoughts in the chat!





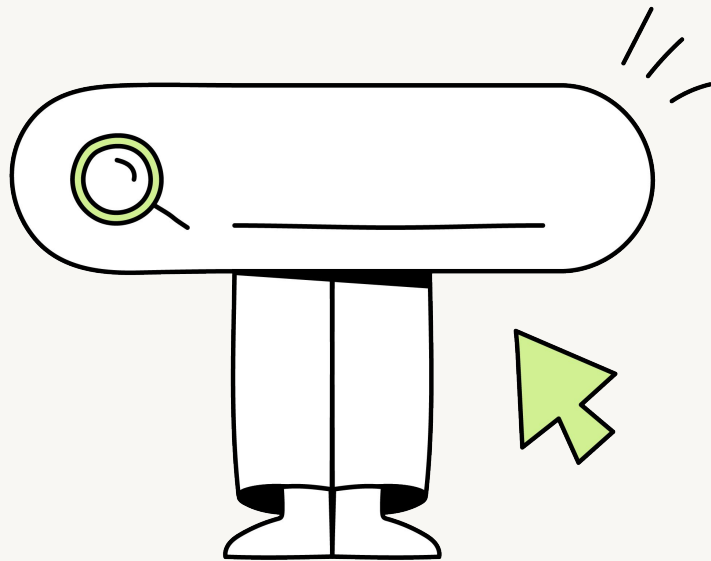
Async review: Unit 2

Which ML method works best?

Imagine you're designing an ML system to detect fraudulent transactions. You have past transaction data labeled. Which learning approach would be most effective?

- A) Supervised learning
- B) Unsupervised learning
- C) Reinforcement learning

Drop your answer in the chat!



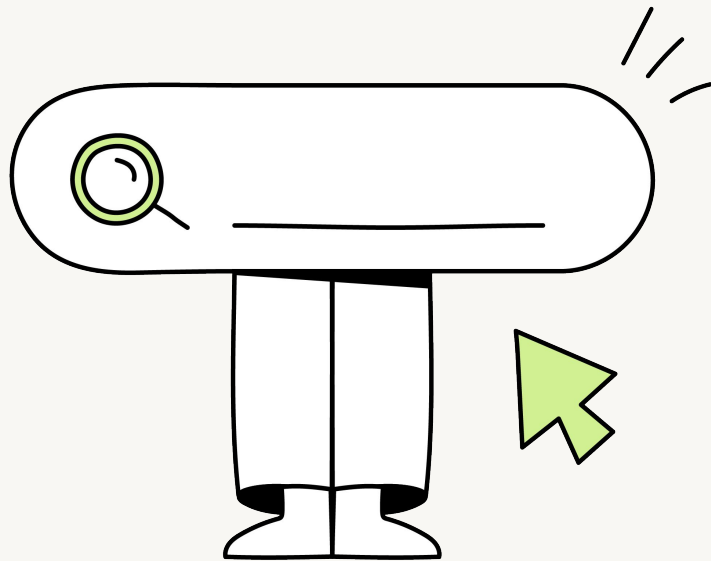


Async review: Unit 2

A classification or a regression problem?

A bank wants to predict whether a loan applicant will default (Yes/No). Would this be a classification or a regression problem?

Type your answer in the chat!





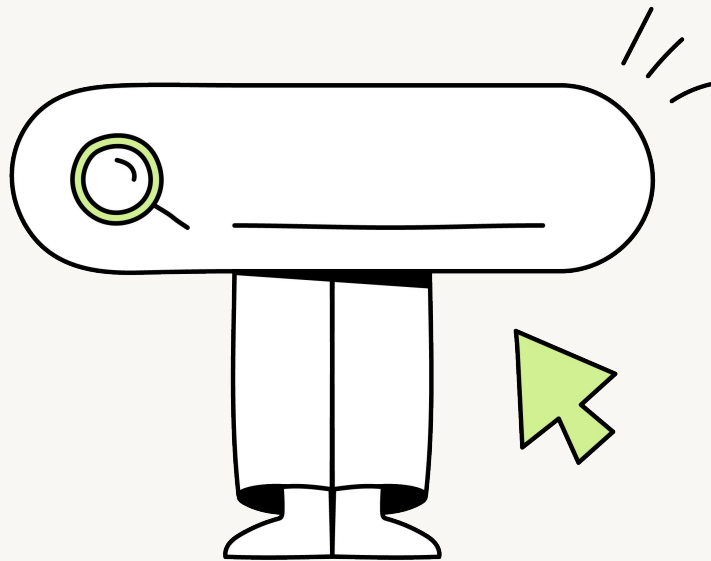
Async review: Unit 2

Where is clustering more useful?

Which of the following tasks is best suited for clustering?

- A) Identifying customers likely to leave.
- B) Detecting fraudulent transactions.
- C) Grouping customers based on similar shopping behavior.
- D) Identifying spam emails.

Drop your answer in the chat!





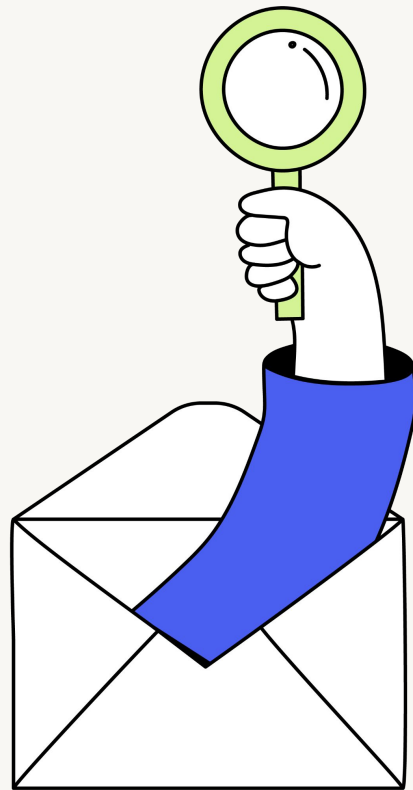
Skills demonstration: Eye detection with openCV

From face detection to eye detection

Building on face detection – Expanding from face detection to detecting eyes.

Why this matters:

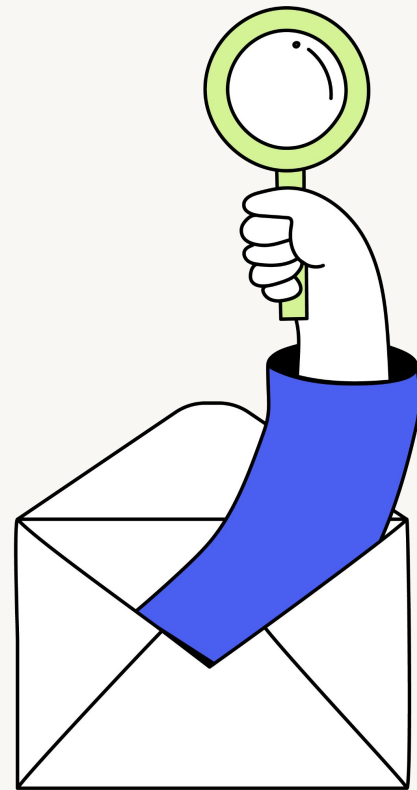
-  Gaze tracking
-  Emotion analysis
-  Biometric authentication





Demonstrating key steps in eye detection

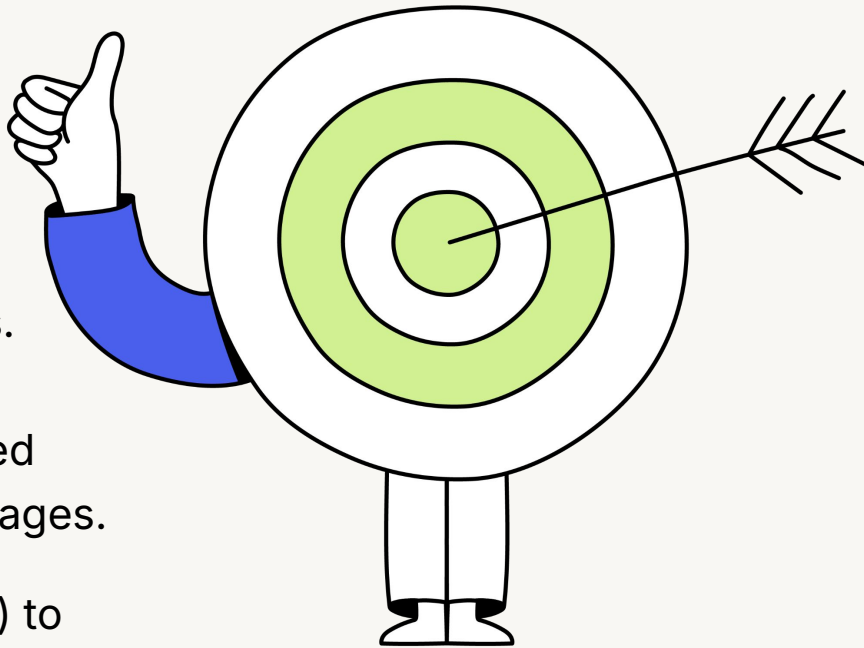
1. Load Haar Cascades
2. Preprocess image
3. Detect faces
4. Detect eyes within detected faces.





Demo key takeaways

- 1 Grayscale simplifies processing.
- 2 Gaussian blur reduces noise.
- 3 Edge detection finds intensity changes.
- 4 Haar Cascade classifiers are pre-trained models that work best on grayscale images.
- 5 Zoom in on the Region Of Interest (ROI) to apply eye detection within the detected face.



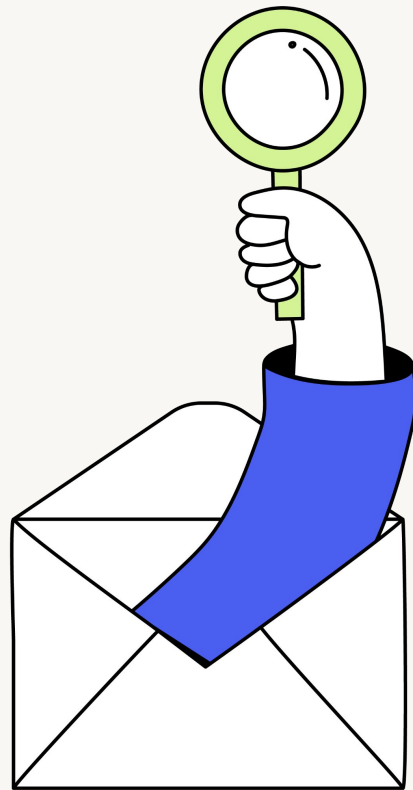


Skills application: Eye detection with openCV



Skills application instructions

- Apply what you've learned in a hands-on challenge.
- Work in breakout rooms in small groups.
- Use the Jupyter Notebook to work on exploring and refining face and eye detection.
- 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 1
Workshop 1



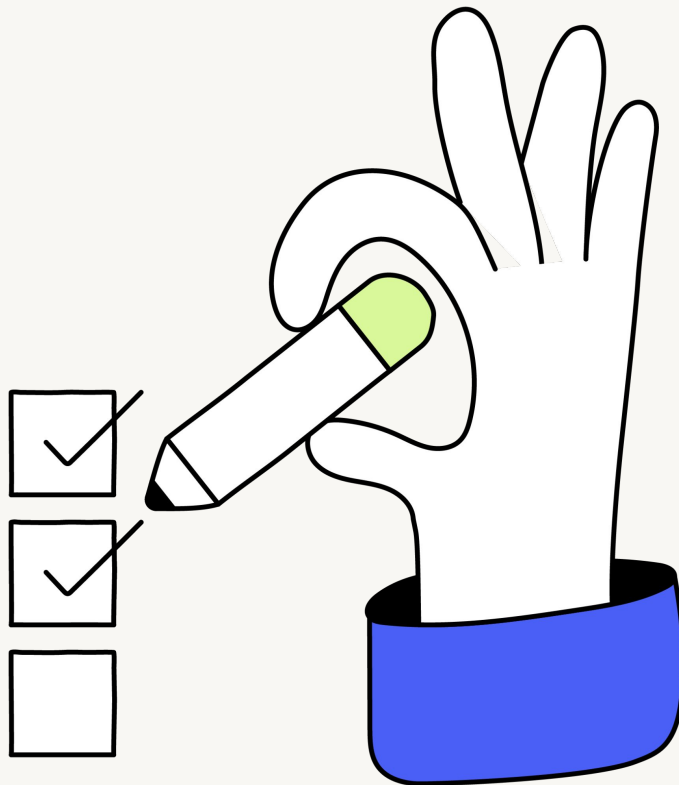
Navigate to the
"Skills application" page



Start working on the activity challenges



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





Skills application debrief



Skills application debrief

What was the biggest challenge you faced during the activity, and how did you approach solving it?





Applying key takeaways to your organization



Applying key takeaways

1 How could face and eye detection be useful in your company or industry?

2 What challenges might arise when implementing these techniques in real-world applications?



Share your plan to apply new skills

Go to My Multiverse, Module 1
Workshop 1



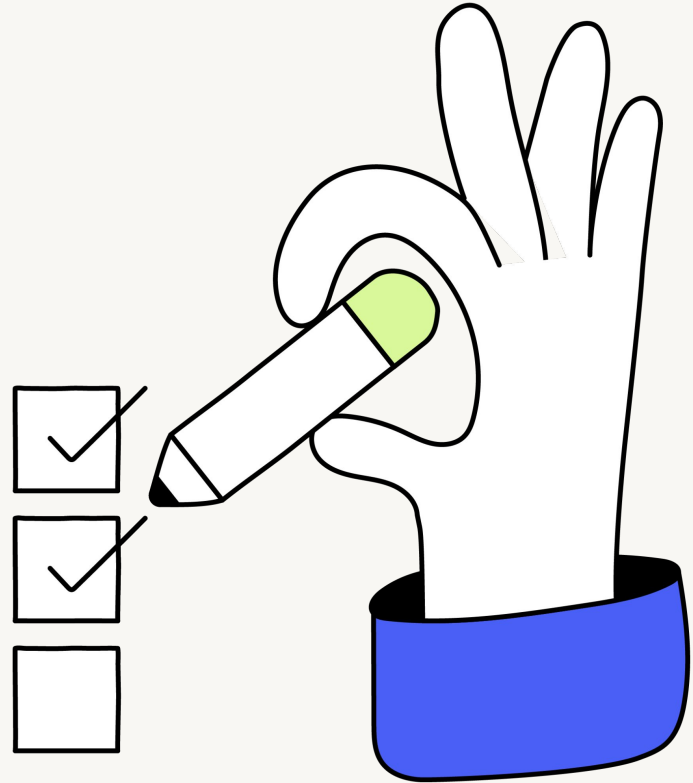
Navigate to the discussion activity
page **"Apply new skills to your role"**



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:** ML and NLP: Named Entity Recognition & Sentiment Analysis
- **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