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Welcome to this session

Skills Bootcamp:

Tutorial

The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators answering questions.

Skills Bootcamp Data Science Housekeeping

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. We will be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

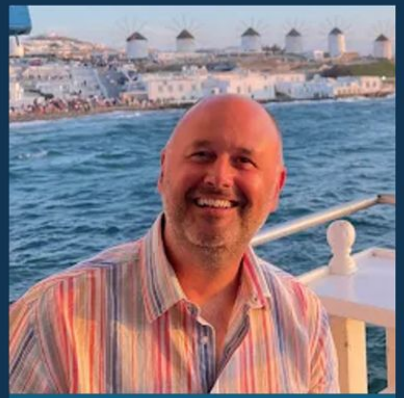
Skills Bootcamp Data Science Housekeeping

- For all **non-academic questions**, please submit a query: ***www.hyperiondev.com/support***
- **Report a safeguarding incident: *www.hyperiondev.com/safeguardreporting***
- We would love your feedback on lectures: ***Feedback on Lectures.***
- Find all the lecture **content** in your **Lecture Backpack** on GitHub.
- If you are hearing impaired, kindly use your computer's function through Google chrome to enable captions.

Safeguarding & Welfare

We are committed to all our students and staff feeling safe and happy; we want to make sure there is always someone you can turn to if you are worried about anything.

If you are feeling upset or unsafe, are worried about a friend, student or family member, or you feel like something isn't right, speak to our safeguarding team:



Ian Wyles
Designated Safeguarding Lead

Simone Botes

Nurhaan Snyman

Rafiq Manan

Ronald Munodawafa

Tevin Pitts

Scan to report a safeguarding concern

or email the Designated Safeguarding Lead:
Ian Wyles
safeguarding@hyperiondev.com

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Skills Bootcamp Progression Overview

✅ Criterion 1 - Initial Requirements

Specific achievements within the first two weeks of the program.

To meet this criterion, students need to, by no later than **01 December 2024 (C11)** or **22 December 2024 (C12):**

- **Guided Learning Hours** (GLH)**:** Attend a minimum of 7-8 GLH per week (lectures, workshops, or mentor calls) for a total minimum of **15 GLH**.
- **Task Completion:** Successfully complete the **first 4 of the assigned tasks**.

✅ Criterion 2 - Mid-Course Progress

Progress through the successful completion of tasks within the first half of the program.

To meet this criterion, students should, by no later than **12 January 2025 (C11)** or **02 February 2025 (C12):**

- **Guided Learning Hours** (GLH)**:** Complete at least **60 GLH**.
- **Task Completion :** Successfully complete the **first 13 of the assigned tasks**.

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Skills Bootcamp Progression Overview

✅ Criterion 3 – End-Course Progress

Showcasing students' progress nearing the completion of the course.

To meet this criterion, students should:

- **Guided Learning Hours** (GLH)**:** Complete the **total minimum required GLH,** by the **support end date.**
- **Task Completion : Complete all mandatory tasks**, including any necessary resubmissions, by the end of the bootcamp, **09 March 2025 (C11)** or **30 March 2025 (C12).**

✅ Criterion 4 - Employability

Demonstrating progress to find employment.

To meet this criterion, students should:

- **Record an Interview Invite:** Students are required to record proof of invitation to an interview by **30 March 2025 (C11)** or **04 May 2025 (C12)**.
  - **South Holland Students** are required to proof and interview by **17 March 2025.**
- **Record a Final Job Outcome :** Within 12 weeks post-graduation, students are required to record a job outcome.

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Initial Assessment

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What is the primary difference between correlation and causation?

- Correlation implies causation.
- Causation means that one variable directly affects another, while correlation only shows an association.
- Correlation and causation mean the same thing.
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What is a counterfactual question?

- A question that predicts a future outcome based on data trends.
- A question that explores what would have happened under a different scenario.
- A question that determines whether two variables are correlated.
- A question that estimates how much missing data affects results.

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Which of the following best describes a Directed Acyclic Graph (DAG) in causal inference?

- A graph with cycles representing feedback loops.
- A method for clustering data points based on relationships.
- A representation of causal relationships where edges indicate direction without cycles.
- A neural network used for time series forecasting.

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Learning Outcomes

- Implement Causal Inference
- Use tools like Alibi and DICE-ML to generate counterfactual explanations.
- Use counterfactuals to assess fairness in machine learning models.
- Apply causal inference and counterfactual analysis to real-world datasets.

Lecture Overview

- ➔ This lecture introduces causal inference and counterfactual analysis.
- ➔ You'll learn to estimate causal effects using synthetic controls, generate counterfactual explanations with Alibi and DICE-ML, and apply these techniques to real-world datasets like the California Tobacco Control Program and Adult Income Dataset.
- ➔ Q&A

Let’s code

Let's take a break

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Polls Assessment

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What is the purpose of Propensity Score Matching (PSM) in causal inference?

A. To predict future trends based on historical data.
B. To balance treatment and control groups based on observed characteristics.
C. To assign random treatments to individuals.
D. To identify direct and indirect causal pathways.

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Which method is used to estimate causal effects when a randomized controlled trial is not possible?

A. Synthetic Control Method
B. Linear Regression
C. Principal Component Analysis (PCA)
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In counterfactual analysis, what is a "potential outcome"?

A. The average outcome of an entire dataset.
B. The outcome that would have happened under a different treatment scenario.
C. The predicted value from a linear regression model.
D. The difference between the observed and expected values.

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How does the DoWhy library help with causal inference?

A. It automatically builds predictive models for time series forecasting.
B. It provides a framework for defining, estimating, and validating causal effects.
C. It generates counterfactual explanations without needing any assumptions.
D. It is mainly used for clustering and classification.

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Which of the following is a challenge in causal inference?

A. Omitted Variable Bias
B. Sample Selection Bias
C. Confounding Variables
D. All of the above

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Questions and Answers

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Thank you for attending

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SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education