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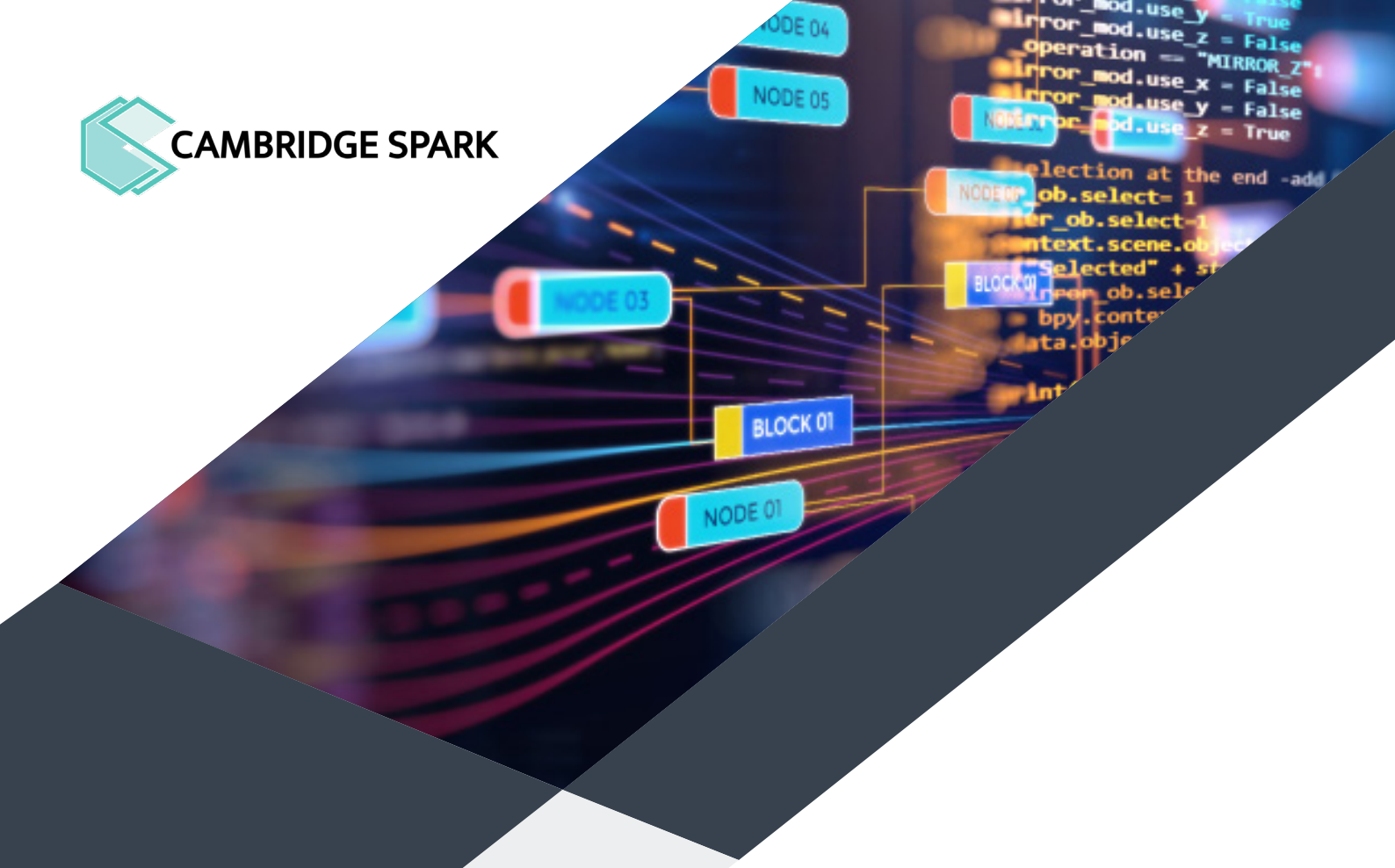


AI Apprenticeships (L7) Academy

Government Funded Data Science, Machine Learning and AI Apprenticeship

15 months | Virtual Learning | Online Project Submissions

cambridgespark.com

CYBER ESSENTIALS

bcs Accredited Training Partner

RIT Tech

Crown Commercial Service Supplier

Contents

AI Apprenticeships (L7) Academy

Introduction

Our AI Apprenticeships (L7) Academy equips learners with an advanced skill set to discover and devise new data-driven AI solutions, to automate and optimise business processes, and to support, augment and enhance human decision-making.

The 'Machine Learning' and 'Data Science' pathways along with a new 'Data Ops pathway' have been made optional for those who wish to specialise - this is to ensure learners aren't overstretched during the programme and can continue to advance their skills should they wish to in the most relevant topics.

The academy offers three specialist apprenticeships:

Advanced Data Scientist

Ideal for domain experts who want to utilise data to improve performance and efficiencies.

MLOps

Suited to software engineers looking to implement Machine Learning solutions.

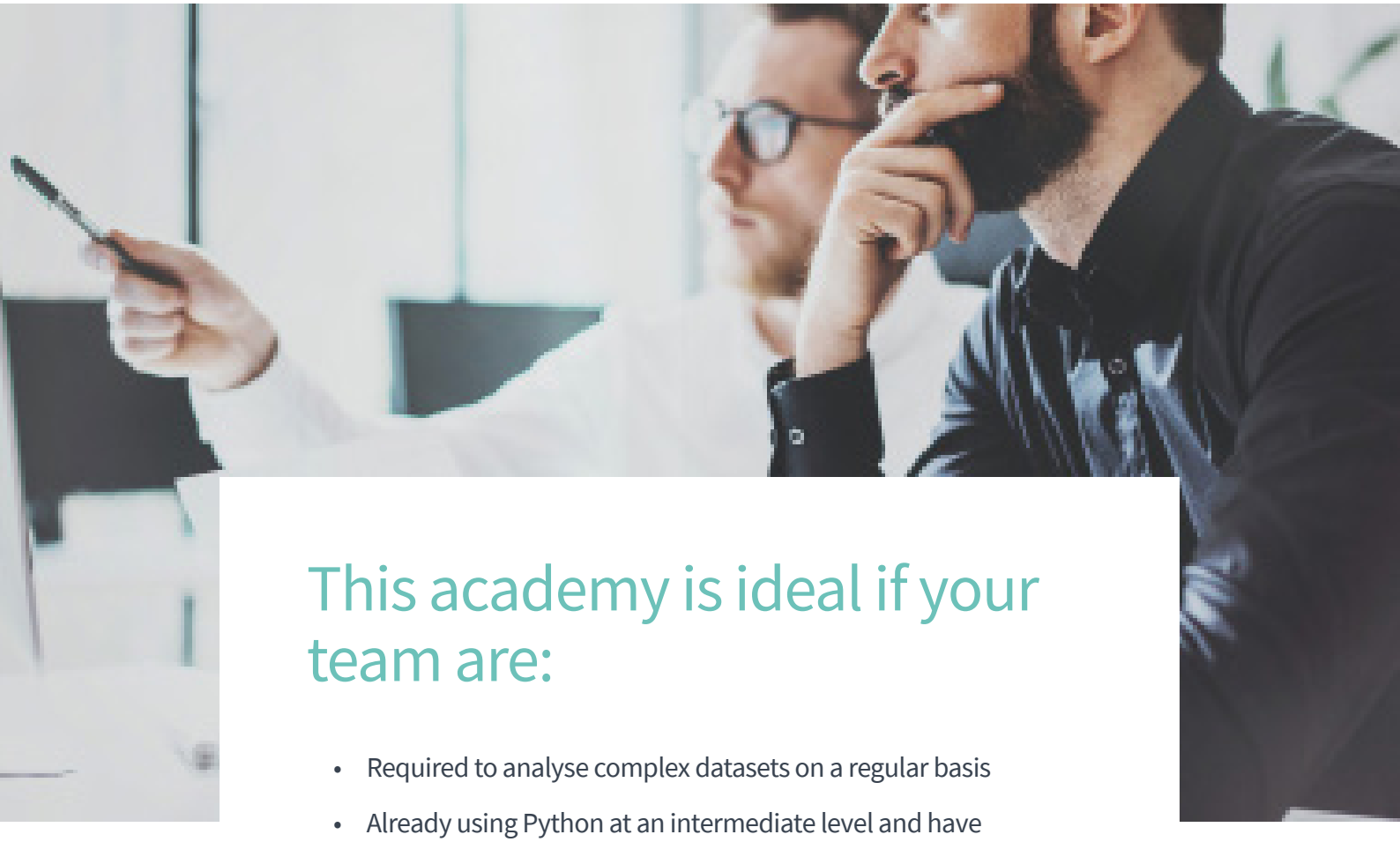
DataOps

Ideal for engineers looking to develop skills to make raw data more useful to their organisation.

Across 15 months, all apprentices will undertake expert-designed modules delivered remotely, whilst receiving coaching, attending check-ins and submitting assignments via EDUKATE.AI®, our proprietary AI-powered learning and assessment platform that provides instant, personalised feedback.

The curriculum covers the modules outlined in the Artificial Intelligence (AI) Data Specialist (Level 7) apprenticeship standard, which was developed in collaboration with a variety of tech-focused companies including the BBC, Bank of England, Barclays, GlaxoSmithKline and the Office of National Statistics (ONS). The curriculum and training is regulated, and only available from accredited providers to ensure high quality and effective transfer of skills into the workplace.

Apprenticeships have moved on from what they used to be and are an exciting option for employers wanting to nurture, upskill and retain thevir talent. The Data Science and Machine Learning Engineer Apprenticeships are funded by the UK government through the Apprenticeship Levy. For levy-paying employers, there is no cost for training apprentices, while non-levy-paying employers only pay 5% of the cost.



This academy is ideal if your team are:

- Required to analyse complex datasets on a regular basis
- Already using Python at an intermediate level and have fundamental statistics experience
- Looking to upskill into Data Scientist or Machine Learning Engineer roles
- Wanting to champion AI and its applications within your organisation

This academy will ensure that your employees are able to harness the power of data and AI to enhance decision making, optimise business performance and identify new opportunities.

How are the apprenticeships funded?

The Data Science Apprenticeship and the Machine Learning Engineer Apprenticeship are funded by the government's Apprenticeship Levy scheme.

The scheme came into effect in April 2017 as a way to drive investment in strengthening the country's skills base.

All organisations with staff costs of over £3m pay 0.5% of their salary bill into a ring-fenced Apprenticeship Levy pot. The money is collected monthly via PAYE, but can be clawed back within 24 months and used for training on approved apprenticeship schemes (such as the Data Science and Machine Learning Apprenticeship).

The government fully funds apprenticeships for businesses paying into the Apprenticeship Levy.

Q: "What if my company doesn't pay into the Apprenticeship Levy?"

A: The government will cover 95% of the cost for SMEs that don't have a salary bill of over £3m and pay the levy. As an employer, you will only need to cover the last 5% (max. £850).

Skills that benefit your organisation

The breadth of skills required to deliver end-to-end data science projects are complex and constantly evolving. Data science roles are now becoming more specialist, as are the tool kits used. It can take organisations a long time to find talent with the very specific skills they need.

Organisations are also finding that while data science candidates have excellent technical knowledge, they sometimes lack the ability to really see the business problem and to communicate insights to stakeholders in a clear and concise way. Data scientists today need to develop the right balance of technical versus soft skills - but finding this balance is tricky.

Our AI Apprenticeships (L7) Academy enables you to build the specialist talent you need from within your organisation, by upskilling your existing employees. It can be much easier to find and nurture talent within your organisation than source it externally.

Here are a few examples of what individuals will be capable of doing:

- Identify areas where AI solutions can create new business opportunities and efficiencies
- Initiate and design new projects and develop innovative, scalable, data-driven AI solutions focussed on addressing business or customer needs and problems
- Deliver value-creating products and processes for the business by advancing the use of data, machine learning and artificial intelligence
- Provide technical authority, direction and strategic guidance for the business on emerging opportunities and insights for AI that are relevant to business goals
- Simplify models and deliver insights that everyone in the business can understand
- Be informed and up to speed on current data governance frameworks and ethical best practices
- Maintain technical standards within AI solutions applied across the organisation
- Communicate and adapt to different audiences both internally and externally with technology leaders and third parties
- Enhance awareness of the wider application of AI tools and technologies across the business so that opportunities for its use can be identified and realised

What can the AI Apprenticeships (L7) Academy do for your company?

Our AI Apprenticeships (L7) Academy allows you to grow - and retain - talent within your organisation.

Work-based projects

Apprentices build a portfolio of innovative projects in their own work, delivering a return on your investment for your business from the very start of the programme. Apprentices are supported by expert coaches and mentors who deliver project briefs and offer feedback as they apply their new skills and knowledge in the workplace.

Efficiency

Apprentices learn how to drive greater efficiency across your business through the automation and streamlining of data processing.

Revenue

Apprentices learn how to increase revenue and identify new opportunities for value creation within your business.

Innovation

The programme will inspire innovative thinking across your organisation, improve thought leadership and enable digital transformation.

Customer value

Apprentices will learn how to initiate, design and deliver new data-driven products and services to provide better value and experience for your customers.

Communication

Apprentices will learn how to demonstrate value by communicating complex concepts simply through data and insights, in a way that everyone in your business understands.

Talent retention

Investing in your employees improves engagement and talent retention.

> “80% of companies who invest in apprenticeships for their existing talent report a significant increase in employee retention.”
>
> **Centre for Economics and Business Research (CEBR)**

Programme delivery offer

- 4 start dates per year; February, June, September and November
- Remaining modules taught through our learning management system (flexible, remote delivery)
- Paid for by the UK government for levy-paying employers using the Apprenticeship Levy
- A minimum 20% off-the-job training
- Online project submissions via EDUKATE.AI®
- End point assessment and certification preparation

Entry requirements: Apprentices must be able to use Python at an intermediate level and have experience of statistics and linear algebra.

MLOps requirements: In addition to the requirements for the Data Science pathway, apprentices must have two years of software engineering experience or a Computer Science BSc/MSc.

Our practical industry-relevant curriculum

Tools for Data Science

Learn how to perform data analysis using Pandas and Numpy including filtering, aggregation, cleaning and applying imputation techniques.

Data Science for business (eLearning)

Understand how data analysis fits into the wider data context for businesses, including key terms and connected workstreams.

Maths for Data Science

Understand the basics of maths for data science, including linear algebra, calculus and optimisation.

Introduction to Machine Learning

Learn the foundations of machine learning and how to prepare data for training models.

Supervised Learning

Learn about model selection and evaluation, including algorithms such as Decision Trees.

Unsupervised Learning

Understand a wide range of unsupervised learning models and techniques to reveal latent structure within your data and covers topics including KMeans, hierarchical clustering, DBSCAN, PCA and t-SNE.

Time Series Analysis

Build a more advanced understanding of tools and testing techniques for working with time series data with Python, Pandas, Numpy, the Prophet library as well as autoregressive models.

Data, Privacy, Ethics & Regulations

Learn how to interpret policies, ethics and regulations in relation to AI and data.

Ensemble Methods

Learn the fundamental principles behind ensemble techniques including random forests, lightgbm and xgboost and how these models can be evaluated. Understand the theory behind Support Vector Machines (SVMs), and develop the skills needed to build and evaluate them.

Hackathon

Reinforce and develop the technical knowledge, practical skills and data science behaviours with a halfway hackathon.

Pragmatic techniques for Model Evaluation

Learn how to optimise models for dealing with bias/variance as well as additional evaluation metrics, regularisation techniques and practical tips.

Neural Networks and Deep Learning

Understand how neural networks are designed and how they operate, including different neural network architectures including CNNs and RNNs.

Model Explainability & Interpretability

Become familiar with techniques for interpreting and explaining a range of machine learning models and deep neural networks.

Preparation for End Point Assessment

Plan and review the project to be completed and presented as part of EPA, including presentation skills, report writing and mock technical test. END POINT ASSESSMENT: Apprentices will carry out a final project and prepare a presentation which will be assessed. They will also take part in a professional discussion and complete a technical test.

Elective Specialist Pathways

DataOps

Databases, SQL & NoSQL
Introduction to SQL and JSON uses and functionality, as well as other tools and features of databases.

Big Data Systems
Introduction to Big Data, including aspects such as volume, velocity and variety and the Hadoop ecosystem. Learn about Spark features, functionality and best practice.

Principles of Cloud Computing
Understand services offered by cloud providers and how to integrate them into everyday tasks.

Advanced Data Scientist

Natural Language Processing
Hands-on training in text processing, semantic analysis and sophisticated Machine Learning approaches.

Recommender Systems
Learn about the applications of recommender systems, the different kinds and how to use them in practice.

Bayesian ML & Gaussian Processes
Look at different probability distributions, probabilistic modeling, Monte Carlo methods and the fundamental concepts behind Bayesian machine learning.

MLOps

Software Testing for Data Science
Learn how to test processing functions with unittest, pytest and hypothesis.

Software Engineering Practices for DS
Understand code quality, design patterns and infrastructure.

Machine Learning in Production
Gain experience in advanced testing, Scikitlearn best practices and how to carry out continuous integration, continuous deployment and monitoring models in production.

Format

- Intensity: 4-5 days learning per month; ~2 days of lectures and 2-3 days of hands-on practice
- Remote e-learning: ensures maximum flexibility for key staff
- Virtual live instructor-led training: live teaching for 3 modules plus hackathon (8 days in total, 2 days each for modules 1, 2 and 15 plus 2 days for the hackathon)
- Hackathon: 2 day real-world simulated team project
- Academic Reading Club: apprentices come together in five sessions throughout the programme to review and discuss the latest ideas and insights in data science and AI
- Continuous hands-on project work
- Assessment and certification

> The introduction of this new standard will help to build the next generation of talent in AI, who are so integral to the future of our society and the UK's industrial ambitions. The AI Data Specialist Apprenticeship curriculum directly addresses the skills gap and harnesses the expertise of world-class training providers to deliver advanced computing and statistics training."
>
> **Matthew Forshaw, Lecturer in Data Science at Newcastle University and Data Skills Policy Leader at The Alan Turing Institute**

What does the learner experience look like?

Our academy programme follows the proven learn by doing methodology, emphasising hands-on practical learning following expert-led virtual training.

Flexible, self-paced e-learning

Our online learning approach ensures maximum flexibility and minimal disruption to your business. Apprentices can complete projects at their own pace, supported by a team of tutors and technical experts who can brief them on projects and answer questions. Apprentices can also practice their code in EDUKATE.AI® and receive instant feedback on projects to accelerate learning.

Live, instructor-led training

Three modules will be taught virtually by our expert instructors. Our live training sessions have been specifically designed for group remote learning. Training takes place over high-quality video and audio, creating a virtual classroom. Learners also have access to break out rooms, supported by Slack, where they can come together to chat, socialise and discuss the training.

Live-coded video lectures are provided to help learners recap and revise after each live training session. Each topic is broken down into bite-sized modules, providing step-by-step guidance to reinforce learning.

> Having a chat function running alongside the delivery is excellent because you are doubling your resources. And it means people can ask questions without it disrupting the flow of the session. I think there's always going to be some degree of difficulty in being able to interact effectively remotely and the tutor time is so precious. The chat support helps solve that problem and allows apprentices to get the most out of the virtual learning sessions."
>
> **Tim Buchanan,**
> **Apprenticeship Vendor Manager, GSK**

> Great content and great set of assignments in each module to get your hands dirty with code and real-world data sets"
>
> **Ravi Singh,**
> **Data Scientist at HBO**

Instant feedback 24/7 with EDUKATE.AI®

Learning is supported by our proprietary assessment and development platform, EDUKATE.AI®, to help apprentices learn at a quicker rate. Learners are given instant feedback that's aligned with standards such as PEP8, Pylint, Cyclomatic Complexity and Unit Tests, as well as machine learning metrics such as accuracy, F1 score, MSE and the confusion matrix.

Work-based projects and portfolios

Learners will gain applied practical experience through completing real world data problems. The programme is focused on enabling learners to apply new skills into their work right away, driving value for the business and ensuring ROI.

Teaching & coaching from professionals

The very fabric of Cambridge Spark is deeply-rooted in academia, with our teaching and coaching team consisting of PhD's from the UK's best universities, and professionals with backgrounds in world-renowned Machine Learning organisations, such as Google, Microsoft, Goldman Sachs, Amazon, and Morgan Stanley.

Join a specialist network and community

Apprentices enjoy the informal, friendly team that helps them build confidence to communicate and share findings. Apprentices will come together regularly to review and discuss the latest ideas and insights in data science and AI.
The hackathon half-way through the programme is a great opportunity for apprentices to come together to reinforce and develop the technical knowledge, practical skills and data science behaviours they have learned so far. And on completing the apprenticeship, learners will become part of the Cambridge Spark alumni network.

Certification preparation

Towards the end of their apprenticeship journey, apprentices will be prepared by Cambridge Spark for the end point assessment certification exams.

Personalised learning with EDUKATE.AI®

Apprentices will submit assignments to K.A.T.E.®, the smart code engine behind EDUKATE.AI®, Cambridge Spark's AI-powered learning and development platform.

How EDUKATE.AI® accelerates learning:

Real-life applications

Projects apply skills to real-world situations, simulating a data science environment in a range of sectors from finance to media

Instant feedback - no waiting on tutors

Learners submit code and K.A.T.E.® provides feedback instantly, helping them understand how to develop their skills and improve the quality of their code

Fully personalised

K.A.T.E.® offers personalised exercises and reading recommendations based on the code students submit, allowing them to learn more effectively

Adaptive learning

As apprentices submit their work K.A.T.E.® gets to know their learning needs and can identify key skills for them to practice and develop

Sample of EDUKATE.AI® projects

Python

- Data Analysis of restaurants' tips (vanilla python, data analysis)
- HR application (vanilla Python + Object oriented programming)
- Set of smaller Python projects (multiple micro-project to practice diverse Python skills)

Maths

- Fundamentals of maths and statistics

Data Analyst

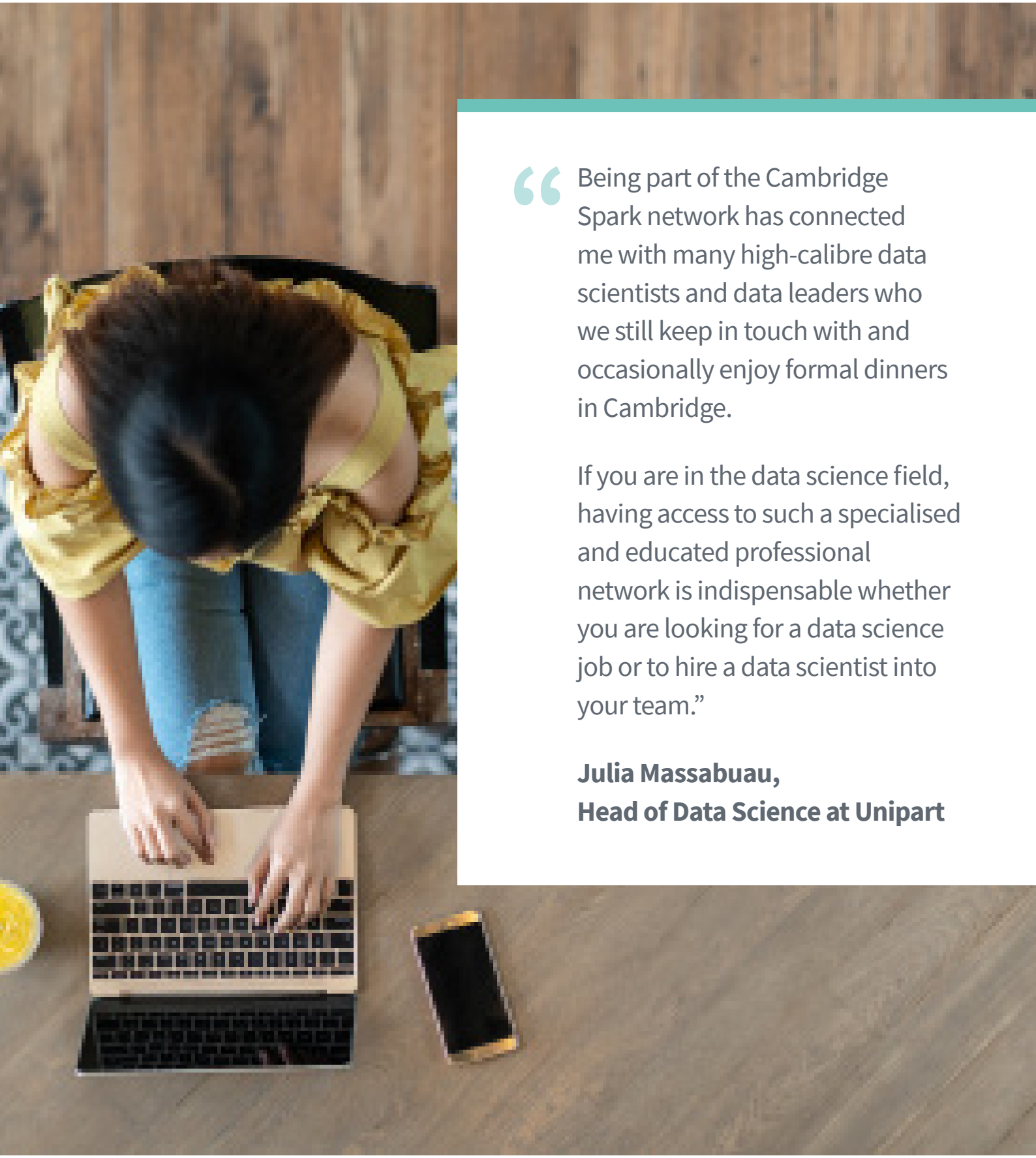
- FTSE Market Summary Report
- Exploratory Data Analysis of Customer Banking Complaints
- Time Series Analysis of Deutsche Boerse Exchange Data
- Business Intelligence on Investigation Reports
- World Development Indicators Report Automation

Data Science

- Fundamentals of pandas, numpy and matplotlib
- Advanced pandas, numpy + Principal Component Analysis
- Data Analysis of health investigations of restaurants in the Bay Area (SQL)
- Data Analysis of all Hackernews posts (big data/Spark)

Machine Learning

- Predictions of the success of Kickstarter campaigns
- Time series forecasting of energy consumption in London using smart meter data
- Classification of risk profiles for an insurance company
- Classification of topics for newsgroup articles
- Classification of images of clothes for an online retailer (Deep Learning)



> “Being part of the Cambridge Spark network has connected me with many high-calibre data scientists and data leaders who we still keep in touch with and occasionally enjoy formal dinners in Cambridge.
>
> If you are in the data science field, having access to such a specialised and educated professional network is indispensable whether you are looking for a data science job or to hire a data scientist into your team.”

Julia Massabuau,
Head of Data Science at Unipart

Academy FAQs

What does 20% off-the-job training mean?

Apprentices will spend 20% of their working hours on off-the-job training. Off-the-job training is defined as learning which is undertaken outside of the day-to-day work duties and it must take place within the apprentice's normal working hours. The training can be delivered on a flexible basis, for example, as a part of each day, one day per week, one week of five or as block release. It can take place at many locations including the workplace, off-site (e.g. classroom) or from home via remote learning.

The 20% off-the-job training provides learners with the time to focus and develop the required skills, knowledge and behaviours to achieve the apprenticeship. Both apprentices and employers tend to find the off-the-job training invaluable for improving productivity and accelerating learning.

How much class time is involved?

There are eight days of class time in total. The three live, instructor-led modules will take place over six days (two days for each module) and the hackathon will also take place over two days. The rest of the programme is flexible, self-paced e-learning, offering maximum flexibility.

How much do managers need to be involved?

There is no official obligation for managers to get involved with the apprenticeship. However, they will need to ensure apprentices achieve the 20% off-the-job training hours and work on their project portfolios.

We also recommend that managers have regular one-to-one meetings with apprentices to catch up on how they are progressing and the plans for the coming weeks. In addition, managers are encouraged to join the apprentice and their coach for thirty minutes every 3-4 months for a general catch up in regards to the programme.

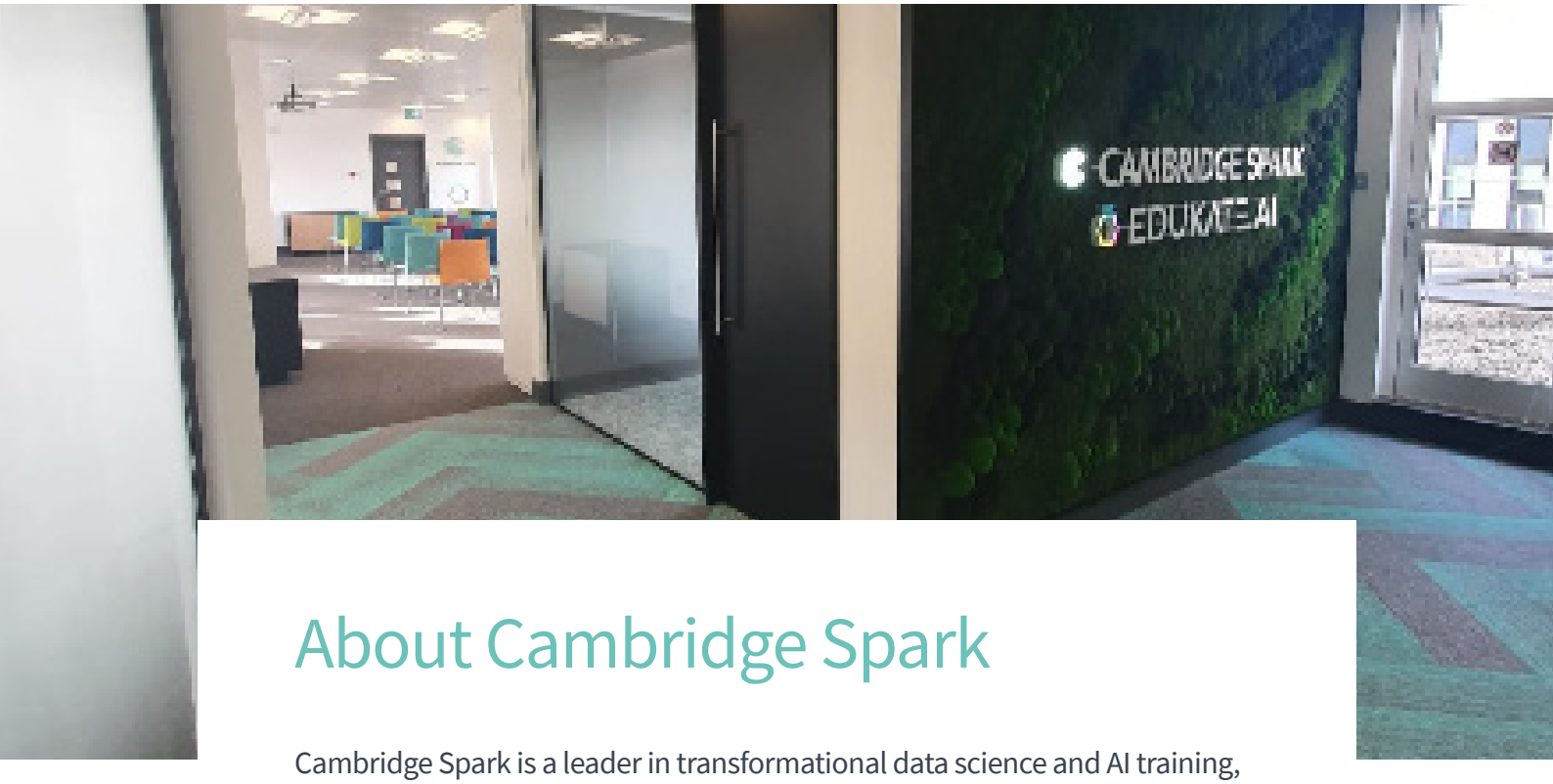
Who is eligible to join the academy?

Apprentices must meet the following criteria to be eligible for the programme:

- Full time, permanent contract of employment in a relevant role
- Ability to use the skills taught throughout the programme as a major part of their current role
- Not undertaking any other government funded qualifications
- Fulfils the prerequisites set out in the apprenticeship pathways
- Has the motivation and interest to learn these new skills
- Does not have a degree in Data Science or AI
- Does not have extensive work experience in Data Science or AI

What options are there for people with no data science experience?

Employees with no previous experience in data science or programming can join the levy-funded Data Analyst Apprenticeship (Level 4) or the BSc (Hons) in Data Science degree apprenticeship. They can then go on to complete the Data Science Apprenticeship or Machine Learning Engineering Apprenticeship.



About Cambridge Spark

Cambridge Spark is a leader in transformational data science and AI training, career development and progression.

Our pioneering, customer-focused, training programs are built on our proprietary AI-powered platform, EDUKATE.AI®, and accelerate the tech capability of both individuals and organisations.

Our goal is to empower the entire global workforce to reap the benefits of data science and AI. The company is headquartered in Cambridge, UK, with an office and an educational campus in Kings Cross, London.

Contact Us

Get in touch with us to learn about how we can help you increase your organisation's data science and AI capabilities

Email contact@cambridgespark.com
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cambridgespark.com/ai-apprenticeships-l7-academy