

Synthetic Data for AI

2024 - LONDON



Overview

This course provides a comprehensive overview of synthetic data generation, its applications in machine learning, and the tools and techniques needed to generate, validate, and deploy synthetic data. Key ethical considerations and best practices are covered, with a focus on using synthetic data for privacy-sensitive applications, data augmentation in computer vision, and overcoming challenges of data scarcity.

We do not assume any particular technological background — you'll focus on the organizational and managerial implications of these technologies and how they can be applied in your workplace, rather than on their technical dimensions.



British Computer Society (BCS London)

Quick Facts

Target Audience	This training is tailored for managers, executives, and industry leaders looking to apply synthetic data and AI to their business challenges. Whether you're a strategist, marketer, product developer, or analyst, this program will help you make data-informed decisions and lead synthetic data-based AI-driven growth.
Duration	Course Duration: 6 weeks, 6-8 hours per week Start Date: Flexible
Cost	Course Cost: £1,000 Flexible Payment Options (Credit Card, PayPal)
Delivery Format	Training delivery formats: entirely online, in-person, or as a hybrid blend of both, allowing you to choose the learning experience that best fits your schedule and preferences.

Why Choose This Program?

Develop a Synthetic Data-Driven Strategy

- Create a clear, actionable synthetic data-based AI roadmap to drive smarter decisions and growth for your business.

Master Key Synthetic Data Generation Approaches

- Explore Generative AI, GANs, VAEs, and Diffusion models and understand their implications for business.

Gain Practical Insights

- Real-world applications, case studies, and a business-focused synthetic data project to reinforce learning.

Learn from Leading Experts

- Researchers and lecturers from Lancaster, Surrey, and York Universities, along with industry professionals, will guide you through real-life applications.

Timeline

	Week 1	Week 2	Week 3	Week 4	Weeks 5 - 6
Synthetic Data and AI <ul style="list-style-type: none">● Introduction to synthetic data and AI-driven business strategies● Why synthetic data matters?● Synthetic data for your bussiness					
Synthetic Data Generation Techniques and Tools <ul style="list-style-type: none">● <i>Overview of synthetic data generation techniques</i>● <i>Commercial and open-source options (e.g., Synthia, Unity, DataGen).</i>					
Deep Dive into Generative AI Techniques <ul style="list-style-type: none">● <i>Generative Adversarial Networks (GANs)</i>● <i>Variational Autoencoders (VAEs)</i>● <i>Case studies on GANs and VAEs</i>					
Practical Applications and Industry Case Studies <ul style="list-style-type: none">● <i>Case studies in synthetic data applications across industrie</i>					
Capstone Project – Developing a Synthetic Data Strategy for Your Business <ul style="list-style-type: none">● <i>Applying learned techniques to a unique project tailored to your company</i>					

Six-Week Training Plan

Week 1: Introduction to Synthetic Data and AI-Driven Business Strategies

- **Goal:** Understand synthetic data and its role in business strategy.
- **Topics:**
 - Introduction to synthetic data: Concepts, types, and applications.
 - Why synthetic data matters: Data privacy, security, scalability, and flexibility.
 - Defining a synthetic data-driven AI strategy: Aligning synthetic data initiatives with business goals.
- **Activities:**
 - Workshop: Identifying key challenges in your organization that synthetic data can address.
 - Case study review on synthetic data-driven success stories in diverse industries.
- **Outcome:** Clarity on how synthetic data can support business goals and early strategy formulation.

Week 2: Synthetic Data Generation Techniques and Tools

- **Goal:** Gain foundational knowledge in synthetic data generation methods.
- **Topics:**
 - Overview of synthetic data generation techniques: Data augmentation, domain randomization, and anonymization.
 - Tools for generating synthetic data: Commercial and open-source options (e.g., Synthia, Unity, DataGen).
- **Activities:**
 - Hands-on session: Setting up a synthetic data generation pipeline using a basic tool.
 - Discussion with industry experts on choosing the right tools for specific business contexts.
- **Outcome:** Practical experience with a synthetic data tool and understanding of the tool landscape.

Week 3: Deep Dive into Generative AI Techniques – GANs and VAEs

- **Goal:** Master GANs and VAEs for data generation.
- **Topics:**
 - Generative Adversarial Networks (GANs): Architecture, applications, and limitations.
 - Variational Autoencoders (VAEs): Functionality and use cases.
 - Comparison and considerations for business applications.
- **Activities:**

- Hands-on lab: Building a basic GAN or VAE model for a specific data generation task.
- Case studies on GAN/VAE implementations in healthcare, finance, and retail.
- **Outcome:** Understanding of how GANs and VAEs can be applied in real-world scenarios and hands-on experience.

Week 4: Advanced Generative AI Techniques — Diffusion Models and Beyond

- **Goal:** Explore the latest advances in generative AI, focusing on diffusion models.
- **Topics:**
 - Introduction to diffusion models: Architecture and use cases.
 - Differences between GANs, VAEs, and diffusion models: When to use each.
 - Ethical and practical considerations.
- **Activities:**
 - Hands-on lab: Experimenting with a pre-trained diffusion model to generate synthetic data.
 - Panel discussion with researchers from Lancaster, Surrey, and York Universities on generative AI trends.
- **Outcome:** Advanced understanding of diffusion models and experience with a cutting-edge generative technique.

Week 5: Practical Applications and Industry Case Studies

- **Goal:** Learn from real-world applications and case studies.
- **Topics:**
 - Case studies in synthetic data applications across industries (automotive, manufacturing, finance, healthcare).
 - Benefits and challenges of using synthetic data in production environments.
 - Metrics and evaluation: Measuring synthetic data success.
- **Activities:**
 - Workshop: Analyze a case study and outline a synthetic data implementation plan.
 - Presentation from an industry professional on a successful synthetic data-driven transformation.
- **Outcome:** Practical insights into deploying synthetic data solutions and understanding of performance metrics.

Week 6: Capstone Project — Developing a Synthetic Data Strategy for Your Business

- **Goal:** Apply knowledge in a business-focused synthetic data project.
- **Topics:**
 - Synthesizing learnings: How to integrate synthetic data into an AI-driven business strategy.
 - Defining actionable steps and project roadmap.
- **Activities:**
 - Capstone project: Create a synthetic data-based roadmap tailored to your organization's needs.
 - Final presentations to receive feedback from instructors and industry experts.

- **Outcome:** A comprehensive synthetic data roadmap ready to be refined and implemented in your business.

Team

Our dedicated team of tutors is always on hand to provide support, a commitment we take seriously to enhance your learning experience. Upon successful completion, you'll receive a certificate from Imperial Academic, validating your expertise.



1 I'm a Senior Researcher with over 10 years of experience in computer vision, machine learning, and AI, specializing in innovative solutions for complex visual challenges.

With a PhD in Computer Vision and as a Fellow of the British Machine Vision Association (BMVA), I've led impactful research in semantic segmentation, visual tracking, and video stabilization.

Having managed projects with budgets over £300K, I bring a strong commitment to delivering high-quality results aligned with client needs and expectations.



Dr. Abdulrahman Kerim



2 I'm Associate Lecturer at the university of York. My research interests revolve around Computational Intelligence and Machine Learning particularly, empirical intelligent systems, Multi-Agent Systems.

Farid Lawan Bello

Resources

- "Synthetic Data for Machine Learning" by Abdulrahman Kerim – an essential resource for transforming and optimizing your machine learning strategies with synthetic data ([Order the book](#)) 
- "Deep Learning - Foundations and Concepts" by Chris Bishop and Hugh Bishop ([Book online](#)) 

Contact Details

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