samcommunity.in

✦ EMERGING TECHNOLOGIES · ADVANCED

Edge AI & TinyML

AI on the smallest devices.





48	7	SAM-EDGEAI
HOURS	MODULES	CERTIFICATION

✦ INSIDE THIS BROCHURE

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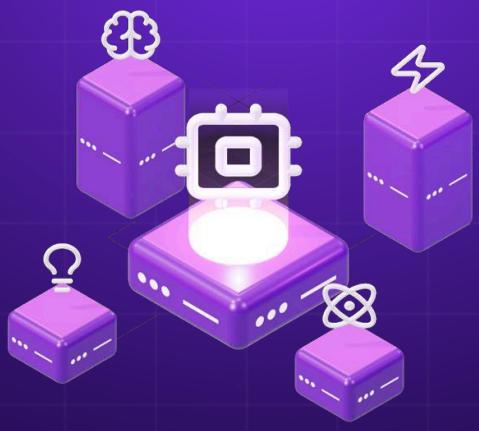


AT A GLANCE

Level	Advanced
Duration	48 Hours
Modules	7
Certificate	SAM-EDGEAI

✦ PROGRAM OVERVIEW

AI on the smallest devices.



Run machine learning on edge and embedded devices.

Running machine learning directly on devices reduces latency, bandwidth use and privacy risk, enabling smart sensors, wearables and industrial monitoring without constant cloud connectivity. This advanced program teaches how to collect sensor data, train compact models, optimise them through quantisation and pruning, and deploy them to microcontrollers and edge devices such as Arduino and Raspberry Pi.

LEVEL	DURATION	CERTIFICATION	DELIVERY
Advanced	48 Hours	SAM-EDGEAI	ILT · VILT · Lab-intensive



✦ WHAT YOU'LL PRACTISE

Optimise models for edge devices	01
Deploy TinyML on microcontrollers	02
Process sensor data with ML	03
Build edge AI prototypes	04

✦ WHO IT'S FOR

Built for people ready to grow.

01

Curious professionals

Quantum, blockchain, IoT and AR/VR fundamentals

02

Developers

Solidity, XR development, edge AI / TinyML

03

Security teams

Quantum-safe crypto, IoT and 5G security

04

Innovation teams

Digital twins and emerging-tech strategy

PREREQUISITES

Python programming and machine learning basics	01
Familiarity with neural networks and TensorFlow or PyTorch	02
Basic electronics or embedded experience helpful	03

ROLES YOU CAN TARGET

- Edge AI Engineer ↗
- TinyML Developer ↗
- Embedded ML Engineer ↗
- IoT Solutions Engineer ↗
- Applied ML Engineer (Edge) ↗

✦ LEARNING OUTCOMES

What you'll be able to do.

01 Explain edge AI architectures and microcontroller resource constraints

02 Collect and preprocess sensor, audio and image data for ML

03 Train compact models for classification and anomaly detection

04 Optimise models using quantisation, pruning and distillation

05 Deploy models with LiteRT for Microcontrollers on Arduino

06 Benchmark latency, memory and power on edge hardware

HOURS PER MODULE



✦ PROGRAM RUNWAY

Your journey, module by module.

7
MODULES · 48 HRS

01	**Edge AI and TinyML Foundations** Cloud vs edge vs TinyML, Microcontroller architecture and limits, Edge hardware landscape	6 hrs
02	**Sensor Data Collection and Processing** Accelerometer, audio and image data, Data collection pipelines, Signal processing and feature extraction	6 hrs
03	**Model Design for Constrained Devices** Compact CNN architectures, Keyword spotting models, Anomaly detection with autoencoders	8 hrs
04	**Model Optimisation Techniques** Post-training quantisation, Quantisation-aware training, Pruning and sparsity	8 hrs
05	**Deploying to Microcontrollers** LiteRT for Microcontrollers, Converting and embedding models, Arduino deployment workflow	8 hrs
06	**Edge AI on Linux Devices** Raspberry Pi inference with LiteRT, ONNX Runtime at the edge, Computer vision on edge devices	6 hrs
07	**Benchmarking and MLOps at the Edge** Latency, memory and power measurement, MLPerf Tiny benchmarks, Over-the-air model updates	6 hrs
★	**Capstone · Edge AI Product Prototype** Assessment, capstone review and certification	

✦ DETAILED CURRICULUM

The syllabus.

Modules 01–03

MODULE 01

Edge AI and TinyML Foundations

6 hours

Hands-on lab
Profile memory and compute limits of an Arduino Nano 33 BLE Sense.

TOPICS COVERED

- Cloud vs edge vs TinyML
- Microcontroller architecture and limits
- Edge hardware landscape
- Edge AI use cases
- Toolchain overview

Arduino

MODULE 02

Sensor Data Collection and Processing

6 hours

Hands-on lab
Collect and label accelerometer gesture data using Edge Impulse.

TOPICS COVERED

- Accelerometer, audio and image data
- Data collection pipelines
- Signal processing and feature extraction
- Spectrograms and MFCCs
- Dataset labelling and balancing

MODULE 03

Model Design for Constrained Devices

8 hours

Hands-on lab
Train a compact keyword spotting model in TensorFlow.

TOPICS COVERED

- Compact CNN architectures
- Keyword spotting models
- Anomaly detection with autoencoders
- MobileNet and efficient architectures
- Training with TensorFlow and Keras

TensorFlow

LEARN BY DOING

7 guided labs, one in every module.



✦ DETAILED CURRICULUM

Syllabus, continued.

Modules 04–05

MODULE 04

Model Optimisation Techniques

8 hours

Hands-on lab
Quantise a model to int8 and compare accuracy and size.

TOPICS COVERED

- Post-training quantisation
- Quantisation-aware training
- Pruning and sparsity
- Knowledge distillation
- Accuracy vs size trade-offs

MODULE 05

Deploying to Microcontrollers

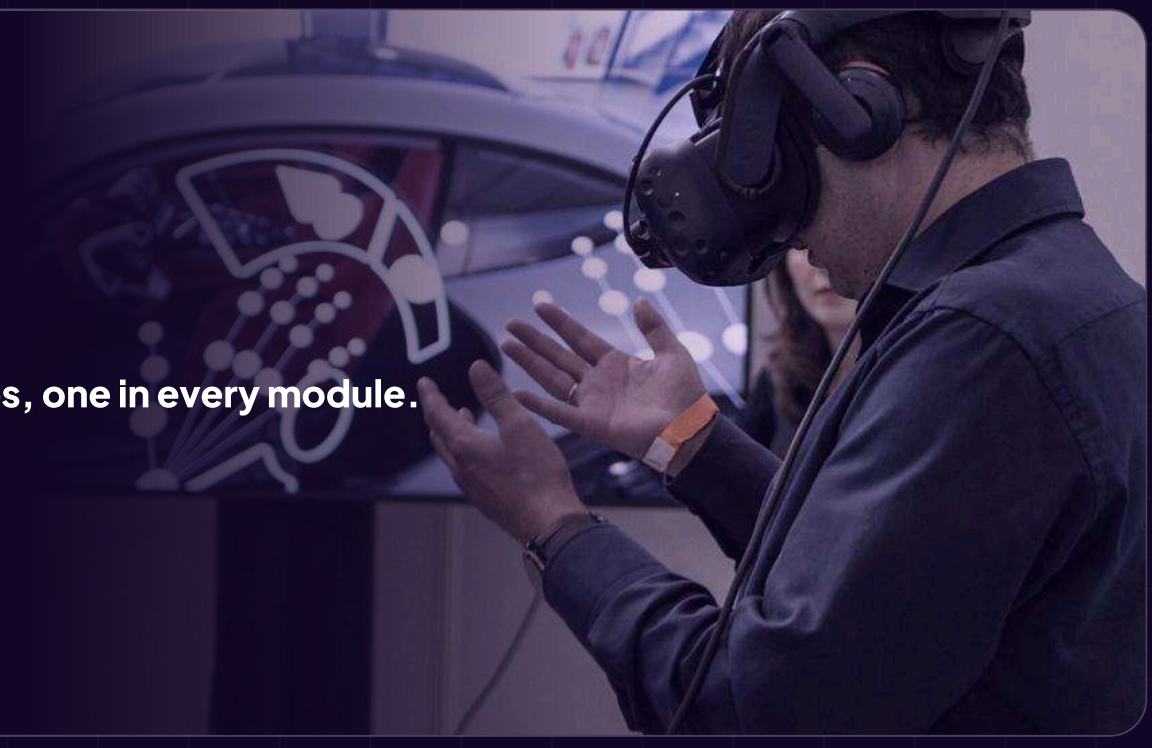
8 hours

Hands-on lab
Deploy a gesture recognition model to Arduino and run live inference.

TOPICS COVERED

- LiteRT for Microcontrollers
- Converting and embedding models
- Arduino deployment workflow
- Real-time inference loops
- Debugging on-device

Arduino



LEARN BY DOING

7 guided labs, one in every module.

✦ DETAILED CURRICULUM

Syllabus, continued.

Modules 06–07

MODULE 06

Edge AI on Linux Devices

6 hours

Hands-on lab
Run real-time object detection on Raspberry Pi with a camera.

TOPICS COVERED

- Raspberry Pi inference with LiteRT
- ONNX Runtime at the edge
- Computer vision on edge devices
- Hardware accelerators and NPUs
- Containerised edge inference deployment

Linux · Raspberry Pi

MODULE 07

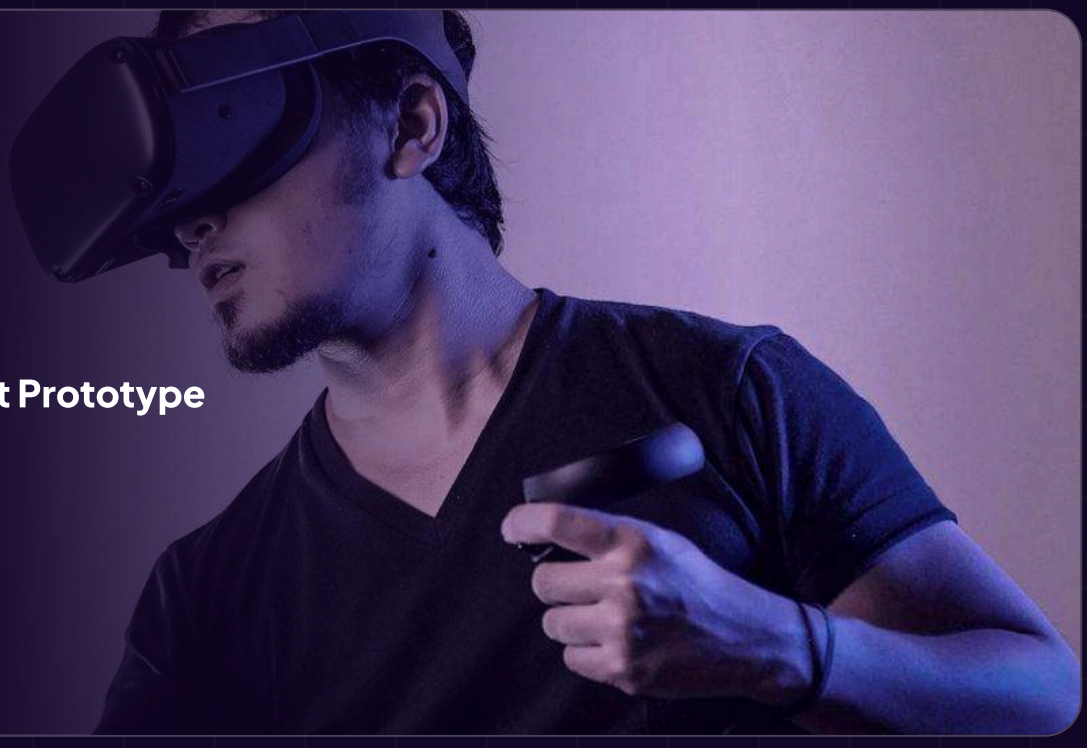
Benchmarking and MLOps at the Edge

6 hours

Hands-on lab
Benchmark two optimised models for latency and power on device.

TOPICS COVERED

- Latency, memory and power measurement
- MLPerf Tiny benchmarks
- Over-the-air model updates
- Monitoring model drift on devices
- Edge Impulse deployment pipelines



CAPSTONE

Edge AI Product Prototype

✦ YOUR STACK

Tools you'll build with.

Real platforms and frameworks — the same stack modern teams ship with, practised in cloud-hosted labs.

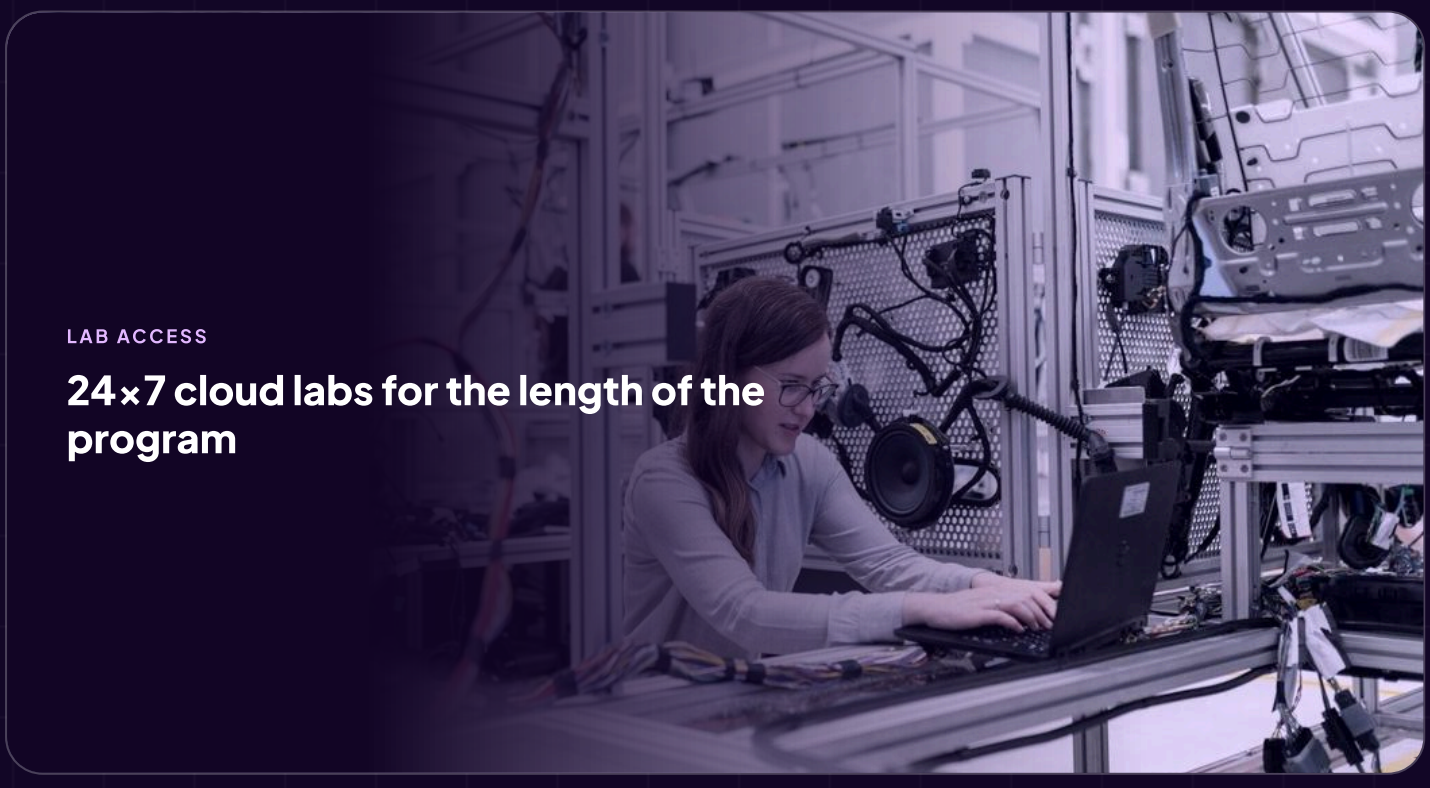
TensorFlow
ML framework

Arduino
Microcontrollers

Raspberry Pi
Edge computing board

Python
Automation & scripting

Linux
Server & CLI fundamentals



LAB ACCESS

24×7 cloud labs for the length of the program

✦ HANDS-ON WORK

Projects that prove you can do it.

01

Gesture Recognition Device

Build an Arduino-based gesture classifier using accelerometer data, with the trained model deployed and running inference entirely on-device.

02

Keyword Spotting Assistant

Train and deploy a wake-word detection model to a microcontroller, optimising its memory footprint while maintaining reliable detection accuracy.

03

Edge Vision Monitor

Deploy an object detection model on Raspberry Pi that counts objects and reports results locally.

CAPSTONE PROJECT

Edge AI Product Prototype

Design and build an end-to-end edge AI prototype for a real-world problem, covering data collection, model training, optimisation, on-device deployment and benchmarking, then present accuracy, latency, memory and power results.

Real-world scenario · Mentor review · Portfolio ready



CERTIFICATION

SAM-EDGEAI

Awarded on successful completion of the program assessments.

- MCQ assessments
- Practical lab evaluation
- Project & capstone review
- Final presentation



✦ HOW YOU LEARN

The SAM Learning Framework™

PHASE 01

S

Scenario

Real-world attack and use-case scenarios open every module.

PHASE 02

A

Apply

Hands-on lab work, CTF challenges and live projects.

PHASE 03

M

Master

Assessment, peer review and certification prep.

PHASE 04

M

Mentor

Post-program career guidance and support.

DELIVERY MODELS

- Instructor-Led (ILT)
- Virtual Instructor-Led
- Self-Paced Online
- E-Learning Licensing
- Blended Learning
- Corporate Onsite
- Bootcamp Intensive
- Hackathon / CTF
- Mentorship

✦ LEARNING PATH · EMERGING TECHNOLOGIES

Where this program fits.

Foundation	Intermediate	Advanced
4 programs	4 programs	You are here

BEFORE THIS

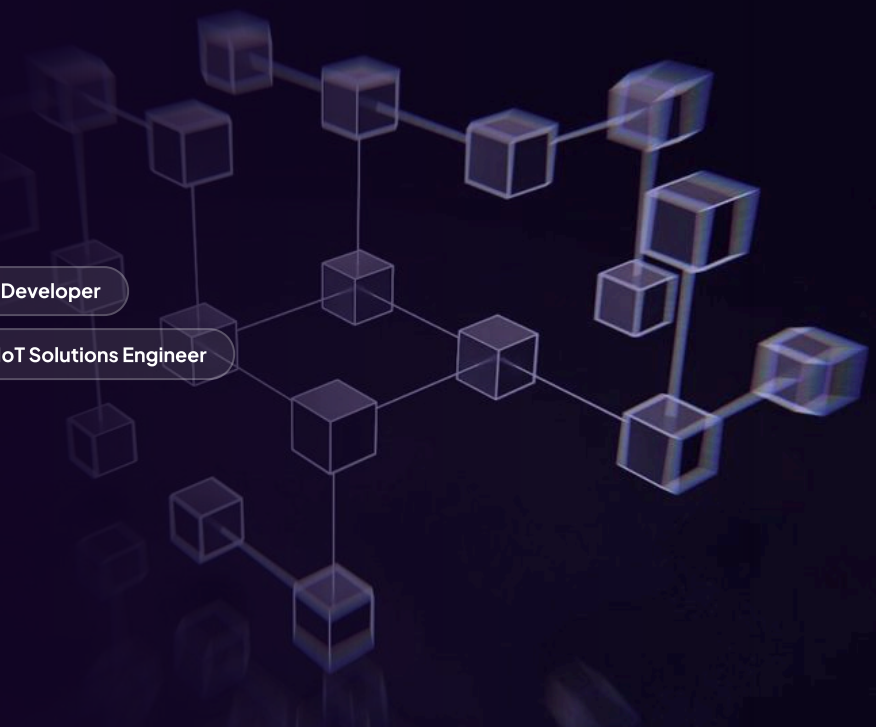
Quantum-Safe Cryptography	48 Hours
Blockchain Development (Solidity/Ethereum)	56 Hours
IoT Security & Architecture	48 Hours
5G Network Security	40 Hours

UP NEXT

The top of this pathway — explore related tracks.

CAREER ROLES

- Edge AI Engineer
- TinyML Developer
- Embedded ML Engineer
- IoT Solutions Engineer
- Applied ML Engineer (Edge)



✦ FAQS

Questions, answered.

Q01

Do I need prior experience to join?

Yes. You should be comfortable with Python and have basic machine learning knowledge, including neural networks. Embedded experience helps but is not essential, as Arduino and Raspberry Pi deployment workflows are taught step by step.

Q02

How is the program delivered and scheduled?

The 48 hours program is instructor-led and delivered live virtual or blended, combining concept sessions, demonstrations and guided hands-on work. Batch timings and session frequency are confirmed with the academy team at enrollment.

Q03

Will I receive a certificate?

Yes. Participants who attend the required sessions and pass the program assessments, including practical tasks and a capstone review, receive the Samcommunity Academy SAM-EDGEAI certificate for Edge AI & TinyML.

Q04

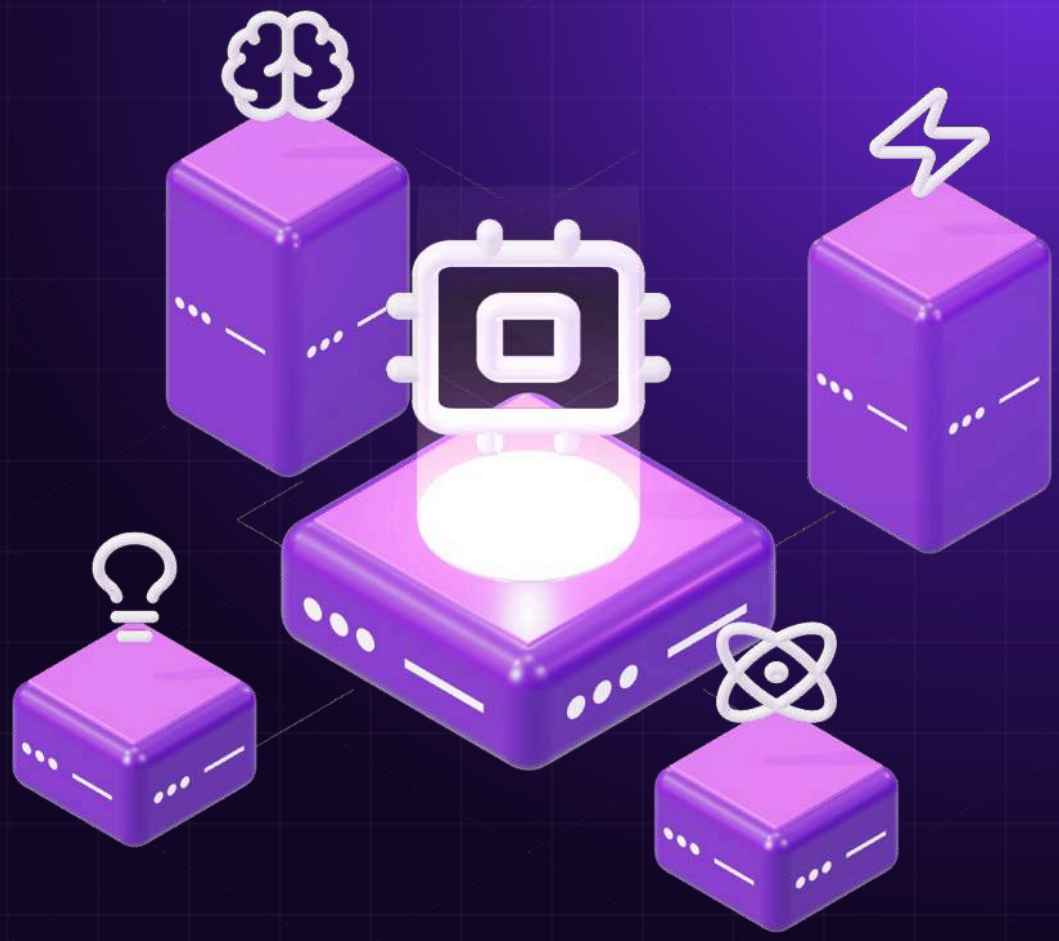
What labs and tools will I have access to?

Labs use TensorFlow, LiteRT, Edge Impulse, Python, Arduino boards and Raspberry Pi with sensors and cameras. Hardware kit arrangements and software setup guidance are shared at enrollment.

Q05

Is career support provided?

Yes. You receive guidance on building a portfolio from your projects, presenting skills on your resume and preparing for interviews. Career support helps you present yourself well, but job placement, interviews and salaries are not guaranteed.



✦ LET'S TALK

Start Edge AI & TinyML with Samcommunity.

INDIVIDUALS

academy@samcommunity.in

Batches, enrolment & career guidance

CORPORATE & INSTITUTIONS

corporate@samcommunity.in

Team batches & custom programs

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