



Deep Learning & Computer Vision Engineering

Build deep-learning vision systems that can classify, detect, segment and understand visual content - then deploy them for real use.



8 weeks

DURATION

78 hours

GUIDED LEARNING

2 projects

PORTFOLIO

ABOUT THE ACADEMY

Practical learning. Work you can demonstrate.

Brightnest AI Academy brings live instruction, guided practice and career preparation together for individuals and teams.

23

FOCUSED COURSES

6

FLAGSHIP PROGRAMMES

Noida

ACADEMY LOCATION

Our approach

1

Learn

Understand concepts through live instruction and current examples.

2

Build

Apply learning through labs, assignments and guided projects.

3

Explain

Document decisions, results, trade-offs and limitations.

4

Prepare

Connect completed work with CVs, interviews and workplace conversations.

PEOPLE BEHIND THE ACADEMY

Meet Ranjeet Kumar



ACADEMY ADVISER

Ranjeet Kumar

Innovation & Growth Leader

15+ years

Experience in data, artificial intelligence and machine learning leadership.

Areas of expertise

- Data science and machine learning solution leadership
- AI product strategy and scalable data platforms
- Technology team leadership and mentorship
- Practical AI and data adoption for business transformation

Education

Master of Information Systems, Anna University, Chennai
Bachelor of Computer Science Engineering



COURSE OVERVIEW

Build your next set of skills

Build practical deep-learning systems using neural networks and vision architectures. Progress from Neural Network Foundations to Computer Vision Engineering Capstone through guided labs, assessed projects, and portfolio evidence.

Who this is for

ML practitioners and developers moving into computer vision and deep learning engineering.

Before you begin

Learners should understand Python and machine-learning fundamentals, including basic linear algebra and model evaluation.

Computer vision work requires more than training a notebook model; learners must understand architectures, data pipelines, evaluation, deployment, and responsible use.



LEARNING OUTCOMES

What you will be able to do

01

Implement and train a small neural network, then visualise learning curves and failure modes.

02

Build a reproducible image-classification training pipeline with checkpoints and metrics.

03

Fine-tune a pretrained model on a custom image dataset and compare frozen versus full fine-tuning.

04

Train or adapt an object-detection/segmentation model for a real-world visual task.

05

Create an image-similarity search or zero-shot classification prototype using embeddings.

06

Benchmark model accuracy versus latency and deploy an inference endpoint.

07

Build an end-to-end vision system such as defect detection, document classification or retail visual search.



CURRICULUM

Course curriculum

8 modules · 8 weeks · 78 hours of guided learning

01 Neural Network Foundations

8 hours

TOPICS

Perceptrons · Activations · Loss functions · Backpropagation · Gradient descent · Regularisation · Initialisation · Optimisers · Training loops

PRACTICAL WORK

Implement and train a small neural network, then visualise learning curves and failure modes.

Tools: PyTorch or TensorFlow, NumPy

Assessment: Notebook and quiz

Portfolio evidence: Neural-network fundamentals notebook

02 Deep Learning Engineering Workflow

8 hours

TOPICS

Tensors · Datasets/dataloaders · GPU training · Checkpoints · Mixed precision · Experiment tracking · Reproducibility · Debugging unstable training

PRACTICAL WORK

Build a reproducible image-classification training pipeline with checkpoints and metrics.

Tools: PyTorch/TensorFlow, MLflow/W&B optional

Assessment: Training pipeline review

Portfolio evidence: Reusable DL training template



CURRICULUM

Course curriculum

8 modules · 8 weeks · 78 hours of guided learning

03 CNNs and Transfer Learning

10 hours

TOPICS

Convolutions · Pooling · Normalisation · Augmentation · Pretrained backbones · Transfer learning · Fine-tuning · Class imbalance

PRACTICAL WORK

Fine-tune a pretrained model on a custom image dataset and compare frozen versus full fine-tuning.

Tools: PyTorch/TensorFlow, torchvision

Assessment: Vision lab

Portfolio evidence: Transfer-learning image classifier

04 Object Detection and Segmentation

10 hours

TOPICS

Detection concepts · IoU · Anchors · Modern detectors · Semantic/instance segmentation · Evaluation with mAP/IoU · Labeling strategy

PRACTICAL WORK

Train or adapt an object-detection/segmentation model for a real-world visual task.

Tools: Ultralytics/YOLO or equivalent, OpenCV

Assessment: Detection project

Portfolio evidence: Detection or segmentation demo

CURRICULUM

Course curriculum

8 modules · 8 weeks · 78 hours of guided learning

05 Vision Transformers and Embeddings

8 hours

TOPICS

Attention intuition · ViT · Image embeddings · Similarity search · Zero-shot concepts · Multimodal representation learning

PRACTICAL WORK

Create an image-similarity search or zero-shot classification prototype using embeddings.

Tools: Transformers, FAISS/vector DB optional

Assessment: Embedding lab

Portfolio evidence: Visual search prototype

06 Multimodal AI and Vision-Language Systems

8 hours

TOPICS

Image-to-text · Visual question answering · Multimodal prompting · Document/image understanding · Grounding · Safety and evaluation

PRACTICAL WORK

Build a multimodal assistant that interprets product, document or inspection images.

Tools: Multimodal model API/open models, Python

Assessment: Prototype review

Portfolio evidence: Multimodal AI demo



CURRICULUM

Course curriculum

8 modules · 8 weeks · 78 hours of guided learning

07 Optimisation, Evaluation and Edge/Cloud Deployment

10 hours

TOPICS

Quantisation · Pruning awareness · Batching · Latency/throughput · Model serving · ONNX concepts · Monitoring · Drift in vision data

PRACTICAL WORK

Benchmark model accuracy versus latency and deploy an inference endpoint.

Tools: ONNX optional, FastAPI, Docker, Cloud endpoint

Assessment: Performance report

Portfolio evidence: Deployed vision endpoint

08 Computer Vision Engineering Capstone

16 hours

TOPICS

Dataset strategy · Annotation · Training · Evaluation · Interpretability · Deployment · Documentation · Product demo

PRACTICAL WORK

Build an end-to-end vision system such as defect detection, document classification or retail visual search.

Tools: PyTorch/TensorFlow, OpenCV, Docker, GitHub

Assessment: Capstone rubric and presentation

Portfolio evidence: Production-style computer vision project

APPLIED PORTFOLIO

Projects you will build

Two portfolio projects supported by guided module work.

PORTFOLIO PROJECT 1

Visual Defect Detection

Detect defects from product/industrial images and deploy inference.

DELIVERABLES

Dataset strategy · Model · Evaluation · Inference API · Demo

PORTFOLIO PROJECT 2

Document/Image Intelligence

Classify and extract insight from document or product images using multimodal models.

DELIVERABLES

Multimodal prototype · Evaluation set · Deployment notes

LEARNING EXPERIENCE

Learn, practise and present

- Live instructor-led sessions that connect concepts to real workplace decisions.
- Guided labs and workshops in every module.
- Assignments, checkpoints and practical feedback.
- Portfolio documentation, demonstrations and capstone review.
- Access to recordings and LMS resources according to the published batch policy.
- Career preparation based on completed work and target roles.

Tools you will work with

PyTorch · TensorFlow · NumPy · MLflow · W&B · torchvision · Ultralytics/YOLO or equivalent · OpenCV · Transformers · FAISS · Vector DB · Multimodal model API · Open models · Python

CAREER PREPARATION

Build confidence for interviews

A structured process to connect your learning with your next career step.

01**Role clarity**

Identify roles that fit your background, interests and current skills.

02**Profile readiness**

Review your CV, LinkedIn, GitHub and project summaries.

03**Project proof**

Prepare to demonstrate completed work and explain your decisions.

04**Interview practice**

Practise technical questions, project walkthroughs and interviews.

05**Opportunity updates**

Receive relevant job openings and employer requirements, subject to availability and learner readiness.

Career support helps you prepare. Employment outcomes depend on experience, project quality, interview readiness and market conditions.

LEARNER JOURNEYS

Companies where our learners have been hired

Across the Brightnest AI Academy learner community



Learner employment history across the academy; not a placement guarantee for this course. Names and logos identify employers; they do not imply endorsement or a hiring partnership.

BEFORE YOU ENROL

Your questions, answered

Is the Deep Learning & Computer Vision course suitable for beginners?

This is an advanced-level course. Learners should understand Python and machine-learning fundamentals, including basic linear algebra and model evaluation.

What will I build during the course?

You will complete guided labs in every module and build two portfolio projects: Visual Defect Detection and Document/Image Intelligence. Deliverables include working files or code, documentation, testing or evaluation evidence, and a final presentation.

Which tools and platforms are covered?

Key tools include PyTorch, TensorFlow, NumPy, MLflow, W&B, torchvision, Ultralytics, and YOLO. Additional platforms are introduced in relevant modules through practical tasks, and the toolset may evolve as industry practice changes.

How long does the course take?

The course includes approximately 78 guided learning hours across 8 modules, delivered over 8 weeks.

Which career paths can this course support?

The curriculum supports the development of skills relevant to roles such as Computer Vision Engineer, Deep Learning Engineer, and AI Engineer. Career outcomes depend on prior experience, project quality, interview readiness and market conditions; employment is not guaranteed.

BEFORE YOU ENROL

Your questions, continued

Will I receive mentor and career support?

The course includes live instruction, lab support, assignment feedback, project reviews and career preparation covering portfolio development, CV writing, LinkedIn profile improvement, and interview guidance.

FEES & ADMISSIONS

Plan your next step

COURSE FEE

INR 35,000 + GST

EMI and easy instalments available

Duration	8 weeks
Level	Advanced
Learning format	Live mentor-led learning
Batch starts	Expected Saturday / Sunday starts

Check the live Batches page for the next expected weekend. Confirm the exact date, class times and availability with admissions.

Book a free demo class >

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