



Consulting and Training | Reach New Heights

Course Name

Deep Learning for AI and computer vision

Sector Name

Digital Transformation and Innovation

Document Type

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Deep Learning for AI and computer vision

Course Introduction

Deep learning has become the backbone of modern artificial intelligence (AI) applications, particularly in computer vision, where it powers systems like facial recognition, object detection, and image classification. As technology evolves, IT professionals are expected to design, develop, and deploy sophisticated AI models that can perform tasks traditionally requiring human vision and cognition.

This course is tailored for IT professionals, data scientists, and AI engineers to learn how deep learning techniques can be applied to solve complex computer vision challenges in various industries.

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Target Audience

- ✓ **AI and Machine Learning Engineers:** Professionals working in AI development who want to deepen their understanding of deep learning techniques, specifically in the context of computer vision.
- ✓ **Data Scientists:** Individuals involved in data analysis and model building, who want to apply deep learning models to vision-related tasks such as image classification, object detection, and segmentation.
- ✓ **Software Developers:** Developers working with AI and computer vision applications who want to expand their expertise in deep learning algorithms and frameworks like TensorFlow or PyTorch.
- ✓ **Computer Vision Specialists:** Experts or aspiring specialists who are focused on computer vision applications and want to learn how to use deep learning techniques to enhance visual recognition and analysis.

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Learning Objectives

- ✓ Understand the fundamentals of deep learning and its role in computer vision.
- ✓ Design, build, and deploy Convolutional Neural Networks (CNNs) for image classification, object detection, and segmentation.
- ✓ Work with deep learning frameworks for AI and computer vision applications.
- ✓ Implement state-of-the-art computer vision techniques, such as object detection, semantic segmentation, and image generation using Generative Adversarial Networks (GANs).
- ✓ Understand and apply transfer learning to leverage pretrained models and optimize deep learning applications.
- ✓ Evaluate and optimize the performance of AI models, ensuring scalability and robustness.
- ✓ Address challenges in deploying deep learning models in real-world environments, particularly in edge computing and cloud infrastructure.

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Course Outline

✓ DAY 01

Module 1: Introduction to Deep Learning and AI in Computer Vision

Overview of Deep Learning

- ✓ Definition of deep learning and its relationship with AI.
- ✓ The evolution of deep learning in computer vision.
- ✓ Applications of deep learning in the IT sector: security, healthcare, robotics, automotive.

Fundamentals of Neural Networks

- ✓ Components of a neural network: neurons, layers, weights, biases.
- ✓ Activation functions and their role in neural networks.
- ✓ Training deep learning models: forward and backward propagation.

Module 2: Convolutional Neural Networks (CNNs) for Computer Vision

Understanding CNNs

- ✓ Layers in a CNN: convolutional layers, pooling layers, fully connected layers.
- ✓ Feature extraction and pattern recognition in images.
- ✓ CNN architectures: AlexNet, VGG, ResNet.

Building CNNs for Image Classification

- ✓ Designing and implementing a basic CNN for image classification.
- ✓ Training and evaluating a CNN model using real-world datasets (e.g., MNIST, CIFAR-10).
- ✓ Fine-tuning hyperparameters and evaluating model performance using accuracy, precision, recall, and F1-score.

Transfer Learning with Pretrained Models

- ✓ Using pretrained models for faster development and better performance.
- ✓ Fine-tuning popular models like VGG16, Inception, and ResNet.
- ✓ Applications of transfer learning in resource-constrained environments.

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Course Outline

✓ Day 02

Module 3: Advanced Computer Vision Techniques

Object Detection

- ✓ Key concepts in object detection: bounding boxes, anchor boxes, and intersection over union (IoU).
- ✓ Implementing popular object detection models: R-CNN, Fast R-CNN, YOLO (You Only Look Once), SSD (Single Shot Multibox Detector).
- ✓ Real-world applications: surveillance, autonomous vehicles, retail.

Image Segmentation

- ✓ Differences between image classification, object detection, and segmentation.
- ✓ Semantic segmentation vs. instance segmentation.
- ✓ Implementing segmentation models like U-Net and Mask R-CNN.
- ✓ Applications in medical imaging, autonomous driving, and environmental monitoring.

Generative Models: GANs

- ✓ Introduction to Generative Adversarial Networks (GANs): architecture and components (generator and discriminator).

- ✓ Applications of GANs in image generation, style transfer, and data augmentation.
- ✓ Hands-on implementation of simple GANs for generating synthetic images.

Module 4: Tools and Frameworks for Deep Learning in Computer Vision

Deep Learning Frameworks

- ✓ Overview of popular frameworks: TensorFlow, Keras, PyTorch.
- ✓ Differences and use cases for each framework in computer vision applications.
- ✓ Setting up a deep learning environment: hardware considerations (GPU, cloud, edge).

Image Processing and Augmentation

- ✓ Preprocessing images: resizing, normalization, and augmentation.
- ✓ Using image augmentation techniques (rotation, flipping, zooming) to improve model robustness.
- ✓ Implementing data augmentation using Keras and TensorFlow.

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Course Outline

✓ Day 03

Module 5: Model Deployment and Optimization

Evaluating Deep Learning Models

- ✓ Techniques for evaluating model performance: accuracy, confusion matrix, ROC curve.
- ✓ Handling overfitting and underfitting: dropout, regularization, early stopping.
- ✓ Model validation and cross-validation for robust performance evaluation.

Optimizing Deep Learning Models

- ✓ Hyperparameter tuning: grid search and random search.
- ✓ Optimization techniques: learning rate schedules, gradient clipping.
- ✓ Model compression and quantization for deploying on edge devices.

Deploying AI Models in Production

- ✓ Strategies for model deployment: on-premise, cloud-based, and edge deployment.
- ✓ Integration of deep learning models with real-time applications.
- ✓ Using Docker containers and Kubernetes for scaling AI solutions.

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Course Outline

✓ Day 04

Module 6: Challenges and Future Trends in Computer Vision

Challenges in Deploying Deep Learning Models

- ✓ Addressing data issues: data quality, bias, and privacy concerns.
- ✓ Real-time processing challenges: latency and computational resources.
- ✓ Ensuring model robustness across different environments and data types.

Ethical and Regulatory Considerations

- ✓ Bias in AI models and its impact on fairness and transparency.
- ✓ Privacy concerns in facial recognition and surveillance.
- ✓ Understanding AI regulations and ethical guidelines.

Future of AI and Computer Vision

- ✓ Emerging trends in deep learning for computer vision: 3D vision, attention mechanisms, transformer models.
- ✓ The role of AI in augmented reality (AR), virtual reality (VR), and mixed reality (MR).
- ✓ The future of AI-powered autonomous systems in the IT sector.

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
March 15, 2027	March 18, 2027	4 days	4250.00 \$	UAE , Dubai
May 3, 2027	May 6, 2027	4 days	2150.00 \$	Virtual , Online
Aug. 23, 2027	Aug. 26, 2027	4 days	4950.00 \$	England , London
Oct. 4, 2026	Oct. 7, 2026	4 days	4250.00 \$	KSA , Riyadh
Nov. 23, 2026	Nov. 26, 2026	4 days	4950.00 \$	Netherlands , Amsterdam

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