Computer Vision Intermediate

Duration - 1 Day / 8 Hours

Program Description

This training program offers a comprehensive introduction to computer vision and image processing using deep learning. Participants will learn to build, train, and evaluate Convolutional Neural Networks (CNNs) using TensorFlow/Keras. The program covers essential techniques such as image preprocessing, data augmentation, transfer learning, and fine-tuning pre-trained models. Practical sessions include working with popular datasets like CIFAR-10 and Fashion MNIST. By the end, learners will be equipped to develop and assess image classification models effectively

Learning Goals

- Understand the core principles of computer vision and master image preprocessing techniques, including data augmentation.
- Gain hands-on experience in building and training Convolutional Neural Networks (CNNs) from scratch using TensorFlow/Keras.
- Apply CNNs and transfer learning techniques for image classification tasks using datasets like CIFAR-10 and Fashion MNIST.
- Evaluate model performance using metrics such as accuracy, precision, recall, and confusion matrix, and visualize feature maps and filters for deeper insights

Course Topics

- Fundamentals of Computer Vision & Image Processing
- Image Preprocessing and Data Augmentation
- Building CNNs from Scratch using TensorFlow/Keras
- Image Classification using CNNs (e.g., CIFAR-10, Fashion MNIST)
- Visualizing Feature Maps and Filters
- Transfer Learning for Image Classification
- Fine-tuning Pre-trained Models (e.g., MobileNet, VGG16)
- Evaluation Metrics: Accuracy, Precision, Recall, Confusion Matrix

Computer Vision Advance

Duration - 1 Day / 8 Hours

Program Description

This training program offers a comprehensive deep dive into advanced computer vision techniques using Convolutional Neural Networks. Participants will explore state-of-the-art architectures like ResNet, Inception, and EfficientNet, and apply object detection and image segmentation methods such as YOLO, SSD, U-Net, and Mask R-CNN. The course includes hands-on sessions with real datasets using TensorFlow or PyTorch, focusing on practical challenges like class imbalance and large-scale data handling. Learners will also gain exposure to model optimization, real-time inference, and deployment strategies for edge devices. The program culminates in an end-to-end project, enabling participants to build and deploy a real-time vision system

Learning Goals

- Gain in-depth understanding and practical skills in using state-of-the-art CNN architectures (ResNet, Inception, EfficientNet), object detection models (R-CNN, SSD, YOLO), and segmentation techniques (U-Net, Mask R-CNN).
- Develop the ability to implement, fine-tune, and evaluate pre-trained models for detection and segmentation tasks using TensorFlow or PyTorch.
- Learn strategies for handling large datasets, addressing class imbalance, and deploying models in real-time using formats like TFLite and ONNX on edge devices.
- Apply acquired knowledge in a practical project, building a complete real-time object detection or segmentation system ready for deployment.

Course Topics

- Advanced CNN Architectures: ResNet, Inception, EfficientNet
- Object Detection Techniques: R-CNN, SSD, YOLO (overview and hands-on with pre-trained models)
- Image Segmentation: Semantic vs Instance Segmentation
- Hands-on with U-Net and Mask R-CNN (using TensorFlow or PyTorch)
- Handling Large Datasets and Class Imbalance
- Real-Time Inference and Deployment Strategies
- Exporting and Deploying Models (TF Lite, ONNX, Edge devices)
- End-to-End Project: Real-Time Object Detection or Segmentation System

The modules will be tailored to address UPS-specific supply chain problem statements