AI Powered Computer Vision

- 3-Day Class
- Hands-on labs

Course Overview

AI Powered Computer Vision is a comprehensive 3-day course that prepares students for obtaining and organizing data for fine-tuning a pre-trained ViT (Vision Transformer)! Select your own ViT Image Classification model, and fine-tune it with datasets you've prepared, or gathered. This course offers a combination of lectures and hands-on labs, providing participants with a solid understanding of AI concepts and the skills to design and implement AI solutions.

Throughout the course, you will learn about ViT transformer-based architectures, the fundamentals of Python programming for AI models, and the deployment of open source Transformer models. You will begin with data preparation by gathering, cleaning, labeling, and organizing data for the purpose of fine-tuning a ViT.

You will gain practical experience through hands-on exercises with open source ViT frameworks, allowing you to work with fine-tuned models and run workloads on different models to understand their strengths and weaknesses. Additionally, the course covers model formats and provides in-depth exploration of AI programming environments like PyTorch.

Towards the end of the course, you will delve into advanced topics such as context extension through fine-tuning and quantization for a specific application target environment: Road Surface Image Classification. By the completion of the course, you will have the opportunity to earn an AI certification from Alta3 Research, further enhancing your credentials in the field of Artificial Intelligence. This course is ideal for Python Developers, DevSecOps Engineers, and Managers or Directors seeking a overview of AI and its practical application in the enterprise.

Note: Students are expected to already have basic Python skills.

- Access the classroom from anywhere via browser and internet
- Each participant will have access to a fully configured, GPU-accelerated server.
- Obtain hands-on experience with the most widely used, industry-standard software, tools, and frameworks.
- Learn to build deep learning and accelerated computing applications Review this course online at https://www.alta3.com/courses/ai-vision

Who Should Attend

- Project Managers
- Architects
- Developers
- Data Acquisition Specialists

What You'll Learn

- Understand Visual Transformer Model architecture.
- Describe the role of patches and patch embeddings in ViT.

- Install and use ViT frameworks like Google ViT, Microsoft BEiT, and Swin.
- Prepare Dataset for ViT.
- Establish guidelines for obtaining RAW Data for ViT Fine-Tuning.
- Clean and Curate Data for ViT Fine-Tuning.
- Fine-Tune ViT Models with PyTorch.
- Deploy and Maximize ViT Model Performance.
- Perform End-to-End procedure for Fine-Tuning a Road Surface ViT.

Outline

The Visual Transformer Model

- 💬 Lecture: What is Intelligence?
- 💬 Lecture: Generative AI
- 💬 Lecture: The Transformer Model
- 💬 Lecture: Feed Forward Neural Networks

Computer Vision

- 💬 Lecture: Introduction to Computer Vision
- 💬 Lecture: NLP to ViT: Key Modifications
- 🖥 Lecture + Lab: Patch Embedding
- 🖥 Lecture + Lab: Positional Encoding in Vison Transformer
- 💬 Lecture: CNN vs ViT - A Comparison

Pre-trained ViT

- 💬 Lecture: Preparing A100 for Server Operations
- 💬 Lecture: Selecting a Pre-Trained ViT Model
- 🖥 Lecture + Lab: Operating Google ViT Model for Face Recognition
- 🖥 Lecture + Lab: Operating Microsoft BEiT Model for Scene Segmentation

Data Curation for Road Surface ViT

- 💬 Lecture: Curating Data for ViT
- 🖥 Lecture + Lab: Gathering Raw Data
- 🖥 Lecture + Lab: Data Cleaning and Preparation
- 🖥 Lecture + Lab: Data Labeling
- 🖥 Lecture + Lab: Data Organization
- 💬 Lecture: Premade Datasets for Fine Tuning
- 🖥 Lecture + Lab: Obtain and Prepare Premade Datasets

Fine Tuning for Road Surface Image Classification

- 💬 Lecture: Fine-Tuning a Pre-Trained ViT
- 💬 Lecture: PyTorch
- 🖥 Lecture + Lab: Fine Tuning ViT with PyTorch
- 🖥 Lecture + Lab: Operating our Road Surface Image Classification ViT Model

Prerequisites

- Python - PCEP Certification or Equivalent Experience
- Familiarity with Linux
- Familiarity with Natural Language Processing