

# Deep Learning with Vision Systems - TTAI3020

Hands-on course that thoroughly explores TensorFlow, the brand-new version of Google's open source framework for machine learning. You will understand how to benefit from using convolutional neural networks (CNNs) for visual tasks.

**Duration:** 5 Days

**Skill Level:** Intermediate

**Available Format:** Instructor-Led Online; Instructor-Led, Onsite In Person ; Blended; On Public Schedule

Hands-On Computer Vision with Tensorflow is a hands-on course that thoroughly explores TensorFlow, the brand-new version of Google's open source framework for machine learning. You will understand how to benefit from using convolutional neural networks (CNNs) for visual tasks.

## What You'll Learn

### Overview

Computer Vision solutions are becoming increasingly common, making their way into fields such as health, automobile, social media, and robotics. Hands-On Computer Vision with Tensorflow is a hands-on course that thoroughly explores TensorFlow, the brand-new version of Google's open source framework for machine learning. You will understand how to benefit from using convolutional neural networks (CNNs) for visual tasks.

This course begins with the fundamentals of computer vision and deep learning, teaching you how to build a neural network from scratch. You will discover the features that have made TensorFlow the most widely used AI library, along with its intuitive Keras interface. You'll then move on to building, training, and deploying CNNs efficiently. Complete with concrete code examples, the course demonstrates how to classify images with modern solutions, such as Inception and ResNet, and extract specific content using You Only Look Once (YOLO), Mask R-CNN, and U-Net. You will also build generative adversarial networks (GANs) and variational autoencoders (VAEs)

to create and edit images, and long short-term memory networks (LSTMs) to analyze videos. In the process, you will acquire advanced insights into transfer learning, data augmentation, domain adaptation, and mobile and web deployment, among other key concepts.

This "skills-centric" course is about 50% hands-on lab and 50% lecture, with extensive practical exercises designed to reinforce fundamental skills, concepts and best practices taught throughout the course. Working in a hands-on learning environment, led by our Computer Vision expert instructor, students will learn about and explore how to:

- Build, train, and serve your own deep neural networks with TensorFlow 2 and Keras
- Apply modern solutions to a wide range of applications such as object detection and video analysis
- Run your models on mobile devices and web pages and improve their performance.
- Create your own neural networks from scratch
- Classify images with modern architectures including Inception and ResNet
- Detect and segment objects in images with YOLO, Mask R-CNN, and U-Net
- Tackle problems faced when developing self-driving cars and facial emotion recognition systems
- Boost your application's performance with transfer learning, GANs, and domain adaptation
- Use recurrent neural networks (RNNs) for video analysis
- Optimize and deploy your networks on mobile devices and in the browser

## Objectives

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## Audience

This course is geared for experienced data scientists, machine learning engineers, and AI researchers interested in understanding and developing algorithms for image recognition, object detection, and visual data analysis.

## Pre-Requisites

- Basic to Intermediate IT Skills. have some knowledge of Python.
- Good basic understanding of image representation (pixels, channels, etc.)
- Understanding of Matrix manipulation (shapes, products, etc.)

TTML5503                      Introduction to AI & Machine Learning JumpStart

## Agenda

- Computer Vision and Neural Networks
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- Technical requirements
- Computer vision in the wild
- A brief history of computer vision
- Getting started with neural networks
- TensorFlow Basics and Training a Model
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- Technical requirements
- Getting started with TensorFlow 2 and Keras
- TensorFlow 2 and Keras in detail
- The TensorFlow ecosystem
- Modern Neural Networks
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- Technical requirements
- Discovering convolutional neural networks
- Refining the training process
- Influential Classification Tools

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- Technical requirements
- Understanding advanced CNN architectures
- Leveraging transfer learning
- Object Detection Models
- Object Detection Models
- Technical requirements
- Introducing object detection
- A fast object detection algorithm - YOLO
- Faster R-CNN - a powerful object detection model
- Enhancing and Segmenting Images
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- Technical requirements
- Transforming images with encoders-decoders
- Understanding semantic segmentation
- Training on Complex and Scarce Datasets
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- Technical requirements
- Efficient data serving
- How to deal with data scarcity
- Video and Recurrent Neural Networks
- Video and Recurrent Neural Networks
- Technical requirements
- Introducing RNNs
- Classifying videos
- Optimizing Models and Deploying on Mobile Devices
- Optimizing Models and Deploying on Mobile Devices
- Technical requirements
- Optimizing computational and disk footprints
- On-device machine learning
- Example app - recognizing facial expressions

## For More Information

Please [contact us](#) or call 844-475-4559 toll free for more information about our training services (instructor-led, self-paced or blended), coaching and mentoring services, public

course enrollment or questions, partner programs, courseware licensing options and more.