Updated 10/05/2024

Sign up

OpenCV training

3 days (21 hours)

Presentation

Our OpenCV training course will enable you to develop image detection and processing applications using Python.

We'll start with an introduction to this development framework, explaining the implications and importance of computer vision. Once OpenCV has been configured, you can familiarize yourself with the main functions.

You'll discover basic and advanced image processing techniques such as binarization, blurring and dilation. You'll learn how to apply detection methods such as SIFT, SURF and ORB.

Finally, you'll deploy a neural network-based machine learning model to take full advantage of OpenCV's power.

As with all our training courses, this one will introduce you to the latest stable version of OpenCV 4.9, coupled with Python 3.12.

Objectives

- Master OpenCV installation and configuration
- Understand and apply basic and advanced image manipulation and processing techniques
- Implementing machine learning models

Target audience

- Data Analyst / Data Scientist / Data Engineer
- Developers, Big Data Architects, Lead Developers

Prerequisites

- Knowledge of Python
- Knowledge of deep learning
- Mathematical knowledge (e.g. gradient)

OPENCV TRAINING PROGRAM

INTRODUCTION AND CONFIGURATION

- Introduction to computer vision
- Why use OpenCV?
- OpenCV vs Tensorflow
- Installing OpenCV and Python on different platforms
- Configuring the development environment
- The main functions of the OpenCV library
- Getting started

Use cases

- Facial recognition
- Expression analysis
- Motion detection
- Behavioral analysis
- Applications for security systems

BASIC IMAGE MANIPULATION

- Opening
- Display
- Backup
- Understanding color formats and conversions
  - RGB
  - BGR
  - Grayscale
- Adjustment
  - Resize
  - Reframing
  - Rotation
- Perform arithmetic operations on images
- Exploring color spaces
- Image channel manipulation

IMAGE PROCESSING

- Understanding image morphology
- Filter, blur and refine
- Binarize images
- Erosion and expansion techniques to modify shape geometry
- Detecting edges and contours

DETECTION

- Detection methods
  - SIFT
  - SURF
  - ORB
- Extraction and comparison of points of interest
- Analyze color distributions
- Image segmentation based on color and texture
- Reinforcing learning

OBJECT RECOGNITION AND TRACKING

- Shape and object recognition techniques
- Cascading classifiers for face detection
- Object tracking using statistical methods (MeanShift, CAMshift)
- Development of a real-time object tracking application

AUTOMATIC LEARNING

- Introduction to machine learning for computer vision
- Introduction to convolutional neural networks (CNN)
- Implementation of a CNN for image classification
- Using TensorFlow and Keras to develop vision models
- Mini-project: Handwritten digit recognition with a CNN

DEPLOYMENT AND INTEGRATION

- Techniques for creating standalone executable applications
- Use frameworks like Streamlit to deploy web applications
- Best practices for integrating computer vision models into mobile applications
- Safety and performance of computer vision applications in production
- Open discussion on current and future challenges in deploying computer vision solutions

Computer Vision training with Tensorflow

Pytorch training

Companies concerned

This training course is aimed at both individuals and companies, large or small, wishing to train their teams in a new advanced computer technology, or to acquire specific business knowledge or modern methods.

Positioning on entry to training

Positioning at the start of training complies with Qualiopi quality criteria. As soon as registration is finalized, the learner receives a self-assessment questionnaire which enables us to assess his or her estimated level of proficiency in different types of technology, as well as his or her expectations and personal objectives for the training to come, within the limits imposed by the selected format. This questionnaire also enables us to anticipate any connection or security difficulties within the company (intra-company or virtual classroom) which could be problematic for the follow-up and smooth running of the training session.

Teaching methods

Practical course: 60% Practical, 40% Theory. Training material distributed in digital format to all participants.

Organization

The course alternates theoretical input from the trainer, supported by examples, with brainstorming sessions and group work.

Validation

At the end of the session, a multiple-choice questionnaire verifies the correct acquisition of skills.

Sanction

A certificate will be issued to each trainee who completes the course.