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Sign up

GANs Image Generation training

3 days (21 hours)

Presentation

Our training course introduces you to GANs (Generative Adversarial Networks), a major advance in Deep Learning. Designed to generate realistic images by opposing a generator and a discriminator, they are transforming research and industry by opening up new possibilities in visual creation, synthetic data and business applications.

Our GANs Image Generation training course will enable you to master the design, training and deployment of modern GAN models such as DCGAN, WGAN, StyleGAN or CycleGAN.

You'll learn how to prepare your datasets, train your models stably, use TensorFlow and PyTorch, and evaluate quality with metrics like FID and Inception Score.

At the end of the course, you'll be able to develop a complete image generation pipeline, put your models into production, integrate GANs into your Data projects and understand the issues surrounding the ethics and governance of generative models.

Like all our training courses, this one is based on the latest stable versions of PyTorch and TensorFlow.

Objectives

- Understand the architecture and variants of GANs
- Train and optimize with TensorFlow and PyTorch
- Evaluate with FID, IS and advanced metrics
- Deploy and industrialize an image generator
- Apply responsible AI practices

Target audience

- Data scientists
- AI engineers
- Web developers
- Machine Learning students and researchers

Prerequisites

- Solid knowledge of Python

Our GANs Image Generation training program

[Day 1 - Morning]

Introduction to GANs and generative networks

- History and early uses of generative networks
- Principle of adversarial training: generator vs. discriminator
- Applications: images, audio, synthetic data
- Comparison with VAE and Diffusion Models
- Limits and challenges (instabilities, evaluation)
- Practical workshop: First mini-GAN (TensorFlow/PyTorch).

[Day 1 - Afternoon]

Mathematical and technical fundamentals

- Reminders: deep networks, convolution, backpropagation
- Adversarial cost function, L/R objectives
- Optimization (SGD, Adam) and stability
- Generator/discriminator balance
- Overlearning and vanishing gradients
- Practical workshop: Training a GAN on MNIST.

Advanced variants and architectures

- DCGAN: convolution and image generation
- WGAN / WGAN-GP: Wasserstein distance and stability
- Conditional GANs: label-guided generation
- StyleGAN: HR photorealistic images
- CycleGAN: image-to-image translation
- Practical workshop: Implementing a DCGAN.

[Day 2 - Morning]

Preparing and processing image data

- Pre-processing: resizing, normalization
- Datasets: CIFAR-10, CelebA, ImageNet
- Data augmentation adapted to GANs
- Dataset bias and diversity
- Input pipelines (map, cache, prefetch)
- Practical workshop: Building a GAN-ready image pipeline.

[Day 2 - Afternoon] Training and optimization

- Anti-instability and anti-mode collapse strategies
- Regularizations (gradient penalty, label smoothing)
- Training follow-up: TensorBoard & logs
- Evaluation: FID, IS, perceptual metrics
- Tips & tricks (LR, batch, init, spect. norm)
- Practical workshop: Monitored training (curves + images).

Generating realistic images

- Generating faces with StyleGAN
- Super-resolution, inpainting, restoration
- Conditional generation (class, text, sketch)
- Creative cases: art, illustration, design
- Generator packaging for demo
- Practical workshop: Realistic portraits with StyleGAN-like.

[Day 3 - Morning]

Business use cases and applications

- Synthetic data for ML training
- Health imaging (precautions & constraints)
- Video games, VFX, marketing and design
- Dataset compliance and traceability
- Limits: deepfakes, reputational risks
- Practical workshop: image generation POC.

[Day 3 - Afternoon]

Ethics, bias and governance

- Identifying data biases and their impact
- Detection/mitigation of deepfakes
- Copyright, consent and licensing
- Responsible AI best practices
- Model and usage documentation
- Practical workshop: Critical analysis of a real case.

Deployment and industrialization

- Backup and serving (ONNX, TF Serving, TorchScript)
- Integration into a Python/Web app
- GPU/TPU optimization and costs
- Monitoring & continuous updates
- Path to production (security & quotas)
- Practical workshop: Producing a mini-generator.

Companies concerned

This 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 forthcoming training course, 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 training: 60% hands-on, 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 is used to check that skills have been correctly acquired.

Certification

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