Advanced Deep Learning for Medical Imaging Training Course

22 – 26 February 2027
Madrid

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Training Center

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Overview

Advanced Deep Learning for Medical Imaging Training Course is a one-week advanced course for imaging data scientists, radiology AI engineers, clinical informaticians, imaging researchers, and technical leads who leave with a Medical Imaging Model Evidence Dossier. Participants develop classification, detection, segmentation, and multimodal systems while addressing reference standards, external testing, calibration, uncertainty, interpretability, dataset shift, workflow integration, and monitoring. Agile Leaders Training Center presents medical imaging deep learning through reproducible experiments and clinical evidence.

Who Should Attend

- Data science functions responsible for imaging datasets, model experiments, and performance analysis
- Engineering functions responsible for model pipelines, deployment, integration, and monitoring
- Clinical informatics functions responsible for intended use, workflow fit, and user requirements
- Imaging research functions responsible for reference standards, testing, and reproducible reporting
- Technical governance functions responsible for bias, privacy, risk, and lifecycle evidence

The course assumes participants already use Python-based machine learning and medical image data and leaves out introductory programming, diagnostic training, and product-specific regulatory advice.

Departments and Industries

The course supports departments and industries that develop, evaluate, deploy, or govern deep-learning systems for medical images.

- Radiology, pathology, ophthalmology, and imaging research departments
- Medical-device and clinical-software development teams
- Hospital data science and clinical informatics functions
- Biotechnology and pharmaceutical imaging-analysis groups
- Digital health, research institute, and cloud engineering teams

Learning Objectives

By the end of this course, participants will be able to:

- Build reproducible medical image preprocessing pipelines
- Apply convolutional and transformer imaging architectures
- Use reference standards for classification and segmentation
- Analyze calibration, uncertainty, bias, and dataset shift
- Evaluate internal, external, and clinical workflow tests
- Prioritize deployment, monitoring, and lifecycle controls

Course Agenda

Day 1: Imaging Data and Experiment Design

- Medical Image Cohort Definition Canvas
- DICOM Preprocessing and Normalization Pipeline
- Reference Standard Annotation Protocol
- Patient-Level Dataset Split Method
- Experiment Reproducibility Register

Day 2: Classification and Detection Models

- Convolutional Neural Network Architecture Map
- Vision Transformer Patch-Encoding Design
- Transfer Learning Selection Matrix
- Lesion Detection Anchor Strategy
- Class-Imbalance Loss Function Guide

Day 3: Segmentation and Multimodal Learning

- U-Net Segmentation Architecture
- Volumetric Imaging Patch Pipeline
- Segmentation Boundary Error Analysis
- Image-Text Representation Alignment Model
- Multimodal Fusion Design Canvas

Day 4: Evaluation and Clinical Readiness

- CLAIM Evidence Reporting Checklist
- Internal and External Testing Matrix
- Calibration and Uncertainty Assessment
- Subgroup Bias Evaluation Scorecard
- Clinical Workflow Integration Risk Map

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Day 5: Medical Imaging Model Practice

- Exercise: Build an Imaging Preprocessing Pipeline
- Exercise: Compare Classification Architectures
- Exercise: Evaluate a Segmentation Error Profile
- Exercise: Design a Drift Monitoring Dashboard
- Capstone Exercise: Medical Imaging Model Evidence Dossier

Practical Exercises

The course uses suggested activities from radiology, pathology, ophthalmology, medical-device, and research settings.

- Suggested activity: define an imaging cohort, normalize acquisitions, set patient-level splits, and document reference-standard provenance.
- Suggested activity: compare convolutional and transformer models using task-appropriate classification and detection metrics.
- Suggested activity: inspect segmentation failures, calibration, uncertainty, and subgroup performance across an external dataset.
- Suggested activity: assemble an evidence dossier linking intended use, experiments, clinical tests, deployment, and monitoring controls.

FAQs

Who suits deep learning for medical imaging training, and what does it assume?

Deep learning for medical imaging training suits experienced imaging data, engineering, informatics, research, and governance functions. It assumes working Python machine-learning skills and familiarity with medical image data rather than introductory coding.

How does deep learning for medical imaging differ from general healthcare AI training?

Deep learning for medical imaging focuses on acquisition-aware preprocessing, reference standards, classification, detection, segmentation, volumetric data, image-text models, and imaging workflow tests. General healthcare AI training covers broader clinical and administrative data use.

Why are patient-level splits important in medical imaging deep learning?

Patient-level splits prevent images from the same patient appearing across training and test sets. They reduce leakage and provide a more credible estimate of performance on unseen patients.

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What does external testing show for medical imaging models?

External testing evaluates performance on data from a separate institution, population, device mix, or acquisition process. It helps expose dataset shift and limits that internal testing may not reveal.

How should medical imaging deep-learning models be monitored?

Monitoring should track input characteristics, software and device versions, model outputs, user concordance, subgroup performance, calibration, errors, and drift. Defined thresholds guide investigation, updating, restriction, or retirement.

Conclusion

The course connects imaging data, architectures, reference standards, evaluation, clinical integration, and lifecycle monitoring. Participants take back a Medical Imaging Model Evidence Dossier. The dossier changes how their teams document experiments, challenge performance, assess workflow risks, and govern deployed imaging models.