

# Art Recognition – where AI meets Art

*Thesis & Project Opportunities — November 2025*

## About Us

Art Recognition is a startup based near Zurich that specializes in authenticating artworks using Artificial Intelligence. The company applies machine learning to analyze artworks and provide data-driven authenticity assessments. We work at the intersection of computer vision, signal processing, and art history, partnering with collectors, galleries, and institutions to bring scientific rigor to the art world. More information is available at [www.art-recognition.com](http://www.art-recognition.com).

## Why Work With Us?

- Real impact: your work feeds directly into our development and production pipeline.
- Interdisciplinary mentorship: collaborate with ML engineers and art historians.
- Flexible scope: projects can be tailored to Bachelor's or Master's level requirements.

## Projects

### 1) Physics-Based Image Augmentation for Art Authentication

Goal: Build a realistic augmentation toolkit that simulates how paintings are photographed in the real world — including lighting direction, varnish glare, pigment aging, and camera optics — so our models perform reliably across varied capture conditions.

What you'll do:

- Design physically inspired effects (directional lighting, glare, lens blur, chromatic shifts).
- Package the effects into a training-ready library with simple presets.
- Demonstrate improved robustness on held-out artist datasets.

Why it's exciting: You'll translate optics and radiative models into practical tools that make our AI more reliable.

### 2) Explainability Through Feature Attribution

Goal: Reveal which visual, textural, and frequency-domain features drive model decisions. You'll connect ML attributions to physically meaningful descriptors (e.g., stroke orientation, energy at specific scales, color statistics) and present them in clear visual summaries.

What you'll do:

- Extract interpretable features (FFT/wavelet/scattering energies, Gabor orientation, color moments).
- Correlate feature families with model predictions and build compact visual reports.
- Create a small dashboard for analysts to review case studies.

Why it's exciting: Turn black-box predictions into narratives grounded in physics and image science.

### **3) High-Fidelity Diffusion for Artistic Domains (Super-Resolution)**

Goal: Upgrade our synthetic images from 1080p to 4K with preserved brushstroke fidelity. You'll help build a super-resolution pipeline that turns 1080p synthetic images into 4K synthetic images that preserve and enhance micro-texture detail critical for art analysis and validation.

What you'll do:

- Fine-tune an upscaling module tailored for oil-painting textures.
- Validate fidelity with frequency-domain comparisons and illustrative before/after visuals.

Why it's exciting: Bridge generative models and physics-based texture analysis to unlock fine detail.

### **4) Feature-Space Modeling of Art Authentication**

Goal: Build a transparent, physics-aligned model that operates entirely in a hand-crafted feature space. Using signal-processing descriptors (FFT statistics, wavelet/scattering energies, Gabor orientation histograms, color distribution moments), the system creates a fixed-length vector per image and predicts authenticity from this vector.

What you'll do:

- Design the feature-space schema and implement robust extraction and normalization.
- Train and calibrate a classical ML predictor; visualize feature-family importance.
- Benchmark on multiple artists and capture conditions; compare with our existing pipeline.

Why it's exciting: A highly interpretable alternative and cross-check for deep networks, rooted in physics.

## **How to Apply / Next Steps**

Please send an email to [backoffice@art-recognition.com](mailto:backoffice@art-recognition.com) and tell us a bit about your background and which project(s) interest you most. You can also share any prior coursework or small projects you've worked on (links are fine). We'll be in touch shortly!