ALEXANDRE OLIVÉ PELLICER

Machine Learning · **Diffusion Models** · **Anomaly Detection** · **Computer Vision** · **Generative Models**

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SUMMARY

- 2+ years of experience in ML and generative models in both an academic research laboratory and industry
- First author of 2 published papers in video diffusion models and anomaly detection within the last year
- Computer vision experience in camera calibration, image classification and image segmentation
- Experience fine-tuning forecasting foundation models and training image super-resolution models

EDUCATION

MSc (with thesis) in Electrical and Computer Eng., Purdue University — West Lafayette, USA
Advised by Prof. Edward J. Delp. GPA: 4/4 — *Jan. 2024 – Present*

BSc in Electrical Eng., Universitat Politècnica de Catalunya (UPC) — Barcelona, Spain
Focus on signal/audio/image processing. Top 5% — *Sept. 2019 – June 2023*

WORK EXPERIENCE

VIPER Lab, Purdue University — Feb. 2023 – Present
Research Assistant — *West Lafayette, USA*

- Developed a Video Diffusion Model for generating synthetic video echocardiograms (IEEE SSIAI) [**publication**]
- Learned and experimented with GAN-based super-resolution models to enhance ultrasound image resolution
- Fine-tuned forecasting foundation models for anomaly detection in multivariate time series
- Researched on unsupervised transformer and LSTM autoencoder for anomaly detection in spacecraft multivariate time series (IEEE Aerospace Conference, co-authored with **Lockheed Martin**)
- **Skills:** Python, PyTorch, Bash, GIT

Accenture — Nov. 2023 – Jan. 2024
Machine Learning Engineer — *Barcelona, Spain*

- Worked on an offer generator for the marketing team of a telecommunications company
- Implemented zero-shot and few-shot prompting of GPT-3.5 Turbo to generate personalized descriptions of products according to the profile of the clients
- Automated the creation of product bundle images, combining product visuals, personalized descriptions and title
- **Skills:** Python, GIT

CERN — Sept. 2022 – Jan. 2023
Challenge Based Innovation Program Participant — *Geneva, Switzerland*

- Developed an Arduino-based prototype for early-stage lung cancer detection using exhaled air and analyzed its real-world implementation with the goal of reducing diagnosis and treatment costs by 80% [**report**]
- Collaborated with researchers from CERN together in a team of students from 12 different countries studying at ESADE (MBA Business school), IED (Design school) and UPC (Engineering school)
- **Skills:** Teamwork, cross-collaboration, Arduino, MATLAB

Accenture — June 2022 – Sept. 2022
Software Engineer Intern — *Barcelona, Spain*

- Performed front-end development of a webpage using Adobe Experience Manager (AEM)
- **Skills:** HTML, CSS, JavaScript, AEM, GIT

AWARDS

2023 **Finalist team** of the ABDataChallenge, organized by the Barcelona Water Management Company
2023 **MOBINT Fellowship**, International Research Program for non-European countries
2022 **Winner team** of the bitsxlaMarató (HackUPC) hackathon
2020 **Excellence Fellowship** covering all expenses for the first year of undergraduate studies
2019 **Best high school research thesis** awarded by Universitat de Vic

Selected Services and Positions of Responsibility

2024-Present	**Graduate Mentor, Purdue Vertically Integrated Projects on Image Processing.** Mentoring, helping and grading undergraduate projects on image processing and computer vision
2023	**Reviewer** at IEEE Southwest Symposium on Image Analysis and Interpretation 2024 (IEEE SSIAI 2024)
2020-2021	**Co-founded Olimat Academy**, an online academy, to provide accessible video courses on mathematical subjects supporting undergraduate freshman students during COVID
2019-2022	**Student Representative, Telecommunications Student Delegation**. Worked on polices related on academic help and mental health

Publications

Alexandre Olivé Pellicer, Amit Yadav, Kratika Bhagtani, Ziyue Xiang, Zygmunt Pizlo, Irmina Gradus-Pizlo, Edward J. Delp, **Generation of Synthetic Echocardiograms Using Video Diffusion Models**, IEEE Southwest Symposium on Image Analysis and Interpretation (**SSIAI 2024**) [**paper**][**demo**]

Alexandre Olivé Pellicer, Sundip R. Desai, Richard H. Foster, Moses W. Chan, Mary L. Comer, Edward J. Delp **Spacecraft Multivariate Time Series Anomaly Detection in the Presence of Non-Anomalous Spikes**, IEEE Aerospace Conference (**Aerospace Conference 2025**) [accepted]

Other Projects

Computer Vision Modules: Projective transformations and homographies for image alignment. Keypoint detection systems. Zhang's algorithm for camera calibration. Image segmentation, image rectification and image classification. **Skills:** Python, PyTorch, OpenCV

Automatic Detection of Aortic Aneurysm and 3D Render of Aorta: Detection of aortic aneurysms from ultrasound videos using morphological snake. Pre-processed the frames of the ultrasound videos using morphological filters to improve detection performance. Creation of 3D renders of the aortas from different ultrasound videos with Unity. **Skills:** Python, OpenCV, Shapely, Pillow, Unity

Audio and Speech Processing Modules: Pitch and Sonority Detection using autocorrelation. Speaker recognition and verification with GMM and feature extraction with LPC, LPCC and MFCC. Development of polyphonic synthesizer for managing multiple instruments and sound effects. **Skills:** C++, FFmpeg, Bash

Optimal Water Distribution in the City of Barcelona: Trained DeepAR to predict water consumption at each district of Barcelona. Implemented a Particle Swarm Optimization (PSO) method to compute the optimal distribution of water across the different districts considering several factors. Created an interactive interface to visualize the obtained results over the map of the city of Barcelona. **Skills:** Python, PyTorch, GluonTS, GeoPy

Client-Server Application for Subject Scheduling: Possibility to check marks, university schedule, future work and university deliverables. **Skills:** Java, Ruby, PHP, MySQL, HTML, CSS, JavaScript

Relevant Coursework

Mathematics Courses: Probability and Statistics, Calculus, Linear Algebra and Vector Calculus

Core Courses: Deep Learning, Computer Vision, Digital Image Processing, Audiovisual Coding, Audio and Speech Processing, Image and Video Processing, Signal Processing for Communications and Audiovisual Systems, Acoustics and Electroacoustics and Multimedia Communications

Technical Skills

Python	C++	C	PyTorch	Java	Ruby	MATLAB
JavaScript	Unity	HTML	CSS	GIT	Bash	Arduino

Languages

Spanish: Native **Catalan:** Native **English:** Professional Proficiency **French:** Basic