

Arthur PASSUELLO

Applied AI/ML Engineer | Production Systems & Education

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French (Native) • English (Fluent) • German (Basics)



Skills

Software Engineering

- ✓ Python, C++
- ✓ FastAPI, REST
- ✓ Git Version Control
- ✓ Docker, CI/CD
- ✓ Technical Leadership
- ✓ System Architecture
- ✓ Technical Documentation
- ✓ Hardware-Software Integration
- ✓ Real-time Systems
- ✓ Hardware Optimization

ML & LLMs

- ✓ PyTorch, TensorFlow
- ✓ Transformers, LLMs
- ✓ RAG, Vector Search
- ✓ Multimodal AI
- ✓ Constitutional AI
- ✓ Neural Networks, Deep Learning
- ✓ Model Optimization
- ✓ Production ML

Data Science

- ✓ NumPy, Pandas
- ✓ Matplotlib, Seaborn
- ✓ Jupyter, Data Analysis
- ✓ Gradio & Streamlit
- ✓ Statistical Analysis
- ✓ Data Engineering
- ✓ Cross-cultural Communication
- ✓ Educational Content Creation

Work Experience

Tandem Diabetes Care Switzerland

Lausanne, Switzerland

Embedded Software Engineer & Technical Lead (Ref. Patrick Segura)

December 2022 - June 2025

- **Clinical Trial Leadership:** Led firmware development for Sigi™ insulin pump delivering FDA-compliant system for First In Human clinical trial, ensuring ISO-13485/IEC-62304 compliance with comprehensive regulatory documentation
- **Technical Documentation System:** Designed and prototyped RAG-based technical documentation search system for complex medical device specifications, implementing intelligent document retrieval to improve engineering team efficiency
- **Data Pipeline Development:** Implemented Hall effect signal modeling and data analysis pipelines using Python for simulation experiments and sensor validation in medical device applications
- **Production Systems:** Architected safety-critical software with 99.9% uptime, implementing comprehensive testing (96% coverage) and real-time monitoring
- **Cross-functional Leadership:** Organized and facilitated Scrum ceremonies (standups, sprint planning, retrospectives, demos) while coordinating with hardware, QA, regulatory affairs, and clinical teams across multiple time zones
- **Technical Infrastructure:** Developed comprehensive HIL (Hardware-in-the-Loop) test infrastructure achieving 96% code coverage, enabling automated firmware validation and accelerating development cycles by 40%
- **Embedded Architecture:** Designed and implemented embedded software architecture for medical device combining Bluetooth communication stack with real-time insulin delivery protocols and safety-critical algorithms

Signal Processing Statistical Analysis Production Systems Team Leadership Technical Training Software Architecture
Testing Infrastructure CI/CD QMS GitHub Actions Grafana Real-time Monitoring Medical Device Development

IMD Business School

Lausanne, Switzerland

Lead AI/ML Instructor & Curriculum Designer (Ref. Marc Chauvet)

July 2018 - August 2021

- **ML Curriculum:** Designed 40-hour hands-on curriculum covering supervised learning, neural networks, and PyTorch, achieving 4.8/5.0 rating from 100+ international executives
- **Technical Translation:** Developed innovative methods to explain backpropagation, attention mechanisms, and gradient descent to non-technical business leaders
- **Applied Projects:** Led implementation of business-focused ML projects including demand forecasting and sentiment analysis, with students presenting to C-suite
- **Advanced Pedagogical Skills:** Demonstrated advanced pedagogical skills in technical education, successfully translating complex ML algorithms into actionable business insights for diverse international professional backgrounds

PyTorch Teaching Neural Networks Python Curriculum Design Technical Communication Training Development
Cross-cultural Communication Educational Content Creation

ADEPT Neuro SA

Lausanne, Switzerland

Research Project Student Intern (Ref. Dr. Jason Ruan)

September 2021 - March 2022

- **Neural Signal Processing:** Performed time series analysis on 300+ parallel neural signals at 50-60Hz for epilepsy onset detection, implementing feature extraction algorithms for medical diagnostic applications
- **Signal Processing Pipelines:** Developed signal processing pipelines using Python visualization libraries for ASIC-based neural electrode data acquisition and analysis
- **Medical AI Algorithms:** Developed machine learning-based seizure detection algorithms achieving 87% accuracy with <100ms real-time processing latency
- **High-Frequency Processing:** Processed neural signals at 30kHz sampling rate contributing to 2 patent applications for novel electrode technology

Neural Signal Processing Python Machine Learning Signal Processing Pipelines Medical AI Feature Extraction
Time Series Analysis Seizure Detection High-Frequency Processing Data Visualization Medical Diagnostics

Projects

Enterprise RAG System (Personal Portfolio Project)

June 2025 - Present

[Github](#) | [Demo](#)

- **Personal Portfolio Project:** Architected production RAG processing 10,000+ documents with hierarchical parsing and multi-stage query processing
- **Hybrid Retrieval:** Implemented hybrid retrieval: FAISS vector search + BM25 + neural reranking, achieving 94% relevance and <100ms latency
- **Auto-scaling Infrastructure:** Built auto-scaling infrastructure handling 1,000+ QPS with A/B testing framework improving satisfaction 35%
- **Enterprise Deployment:** Deployed enterprise solution with Weaviate integration and comprehensive LLM integration pipeline

RAG FAISS Vector Search Neural Reranking Production ML NLP LangChain A/B Testing Weaviate Deployment
Query Processing LLM Integration

MultiModal AI Research Implementation (Personal Project)

Feb 2025 - May 2025

[Github](#)

- **Transformer Implementation:** Implemented transformer architectures from scratch (Attention is All You Need) with multi-stage training pipeline
- **Multimodal Fusion:** Built CLIP and ViT implementations for vision-language tasks with cross-modal attention and progressive training stages
- **Safety Framework:** Developed Constitutional AI safety framework with red teaming suite testing 500+ adversarial cases
- **Performance Optimization:** Optimized for Apple Silicon achieving 6x inference speedup through custom MPS kernels and multi-stage optimization

Transformers CLIP ViT Multimodal AI PyTorch Constitutional AI Research Implementation Multi-stage Training
Progressive Training Model Optimization

Data-Driven Analysis of DeepWeb Marketplace Dynamics

2019

[Demo](#) | [Github](#)

- **Statistical Modeling:** Implemented statistical modeling pipeline to reconstruct missing marketplace data, addressing data sparsity challenges in large-scale behavioral datasets
- **Big Data Processing:** Built scalable data processing system using PySpark and distributed databases handling 1TB+ of historical marketplace data on standard hardware
- **Data Extraction Pipeline:** Developed comprehensive data extraction and cleaning pipeline processing mixed HTML content using BeautifulSoup and custom parsing algorithms
- **Interactive Visualization:** Created interactive JavaScript visualization dashboard demonstrating complex market dynamics and regulatory policy impact analysis
- **Statistical Analysis:** Conducted rigorous statistical analysis of police intervention effects on marketplace behavior, revealing no significant long-term market disruption

Statistical Modeling Data Engineering PySpark Distributed Computing Big Data Analytics ETL Pipelines Data Quality
Exploratory Data Analysis Time Series Analysis A/B Testing Data Visualization D3.js Behavioral Analytics
Causal Inference

Education

EPFL

Lausanne, Switzerland

Master's in Computer Science and Engineering

2019 - 2022

Data Science specialization with Machine Learning research and production deployment experience

HEIG-VD

Yverdon-les-Bains, Switzerland

Bachelor's in Computer Science, Major in Embedded Systems

2016 - 2018

High-performance computing foundation with hardware acceleration and parallel processing experience