

AMIR TABATABAEI

AI / ML Engineer · Python · PyTorch · RAG & Computer Vision

+90 541 516 4562 · amir.alba4@gmail.com · linkedin.com/in/amirtabatabaei10 · github.com/amiralba · Bornova, İzmir, Türkiye

PROFILE

Python engineer working across applied machine learning and the backend systems that put models in front of users. I build models rather than only calling them — a convolutional VAE written from scratch, a Siamese network for signature verification, and full supervised pipelines with class-imbalance handling and hyperparameter search. I care about explainability (SHAP, Grad-CAM) and about decision policy: where a model should abstain instead of guessing. What I add beyond the modelling is delivery — I build the FastAPI services and deployment around a model, having shipped authentication, multi-tenant and API systems in client projects.

CORE SKILLS

Deep Learning PyTorch, CNN / ResNet, Siamese networks, Variational Autoencoders, transfer learning, CosineEmbeddingLoss, reparameterisation trick

Computer Vision OpenCV, InsightFace, DeepFace, YOLO, Segment Anything (SAM), ControlNet, Stable Diffusion, ONNX Runtime

Classical ML scikit-learn, XGBoost, Random Forest, Ridge / Lasso, SMOTE, GridSearchCV, feature engineering

Explainability SHAP, Grad-CAM, confusion-matrix and failure-mode analysis, threshold & abstention policy design

LLM / GenAI Retrieval-Augmented Generation, chunking & retrieval pipeline design, Gemini API, embeddings, prompt design

ML Engineering Model serving via FastAPI, joblib serialisation, Docker, GitHub Actions CI, Linux, AWS (S3, EC2), Jupyter / Colab

AI & MACHINE LEARNING PROJECTS

Signature Verification — Siamese Network with Grad-CAM · PyTorch, FastAPI

GitHub

- Built a Siamese ResNet18 trained with CosineEmbeddingLoss to embed signature pairs so genuine pairs cluster and forgeries separate in the learned space.
- Designed a dual-threshold decision policy — accept at cosine similarity ≥ 0.90 , reject at ≤ 0.50 , flag the borderline band for human review — rather than forcing a binary call on ambiguous inputs.
- Added Grad-CAM overlays to show which regions of a signature drove each verdict, and served real-time verification through a FastAPI endpoint with a CLI harness alongside.

Credit Card Fraud Detection — End-to-End ML Pipeline · Python, scikit-learn

GitHub

- Built a full pipeline on the 284,807-transaction Kaggle dataset (492 frauds): scaling, IQR and Z-score outlier handling, and SMOTE to address severe class imbalance.
- Trained and tuned Logistic Regression and Random Forest with GridSearchCV — 96.93% ROC AUC, 82.65% recall, 85.26% precision.
- Added SHAP explainability for feature attribution, and served the model through a FastAPI /predict endpoint with interactive Swagger documentation.

Ames Housing Price Prediction — Full ML Pipeline · XGBoost, SHAP

GitHub

- End-to-end regression pipeline over the 2,930-row Ames dataset (80+ features): log-transformed the skewed target, imputed missing values, scaled features and applied ordinal and one-hot encoding.
- Benchmarked five models — XGBoost best at R^2 0.9282 / RMSE 0.1152, ahead of Ridge, Lasso, Random Forest and Linear Regression.
- Used SHAP to attribute predictions, surfacing OverallQual, GrLivArea, TotalBsmtSF and GarageCars as the dominant price drivers; serialised the model with joblib for serving.

Variational Autoencoder on CIFAR-10 · PyTorch, from scratch

GitHub

- Implemented a convolutional VAE from scratch with Conv2d and ConvTranspose2d, training against a combined reconstruction (MSE) and KL-divergence objective.
- Applied the reparameterisation trick to keep latent sampling differentiable, and visualised reconstructions and latent structure to compare against a standard autoencoder.

AI Product Styler — Computer Vision & Generative AI · PyTorch, Stable Diffusion

May 2025

- Automated product-image pipeline: object segmentation, background removal, diffusion-based background generation and final compositing.
- Integrated Segment Anything (SAM) and ControlNet with Stable Diffusion to preserve product integrity while restyling backgrounds; exposed through a FastAPI backend for batch processing.

Face Access Control — Real-Time Recognition System · InsightFace, DeepFace, ONNX

GitHub

- Real-time webcam access-control system: InsightFace buffalo_l embeddings for identity recognition, DeepFace for emotion and gender analysis, with live bounding boxes and similarity scores.
- Added offline voice feedback via pyttsx3, on-screen notifications and CSV session logging; accelerated inference through ONNX Runtime on Apple Silicon.

Smart PDF GenAI Assistant — Retrieval-Augmented Generation · Gemini API

May 2025

- PDF analyser and categoriser built on the Gemini API with RAG; designed the ingestion, chunking and retrieval pipeline to extract, structure and summarise document content.
- Submitted to the Kaggle GenAI Capstone and documented in a public Medium article.

EXPERIENCE

Freelance Software Engineer — Independent three-person team

Sep 2024 – Present

İzmir, Türkiye · Remote · Backend owner across all client engagements below.

EVO — Field Merchandising Route Planner · .NET 10, React, TypeScript

Jul 2026 – Present

- Route-planning tool for field merchandising supervisors — store visits, visit frequencies, in-store tasks and schedules. In active development for a prospective client.
- Drove the architecture: contract-first design where the backend emits an OpenAPI specification that generates the typed client for the React and Vite panel.
- Defined the layered service boundaries, the SQL Server and MinIO storage design, and the Docker Compose environment.
- Set the test strategy across unit and end-to-end layers, and authored the specifications, architecture decisions and roadmap the build was executed against. 170+ commits.

KohaApp — Tournament Management Platform · paid engagement

Oct 2024 – Dec 2025

- Built the FastAPI backend for tournament registration — player and team models, submission forms, and an admin panel replacing paper-based registration with digital verification.
- Implemented automatic ID-card generation, including bulk generation, removing the manual card-making step for tournament organisers.
- Secured registration with reCAPTCHA and JWT authentication; added Sentry error monitoring and a GitHub Actions deployment workflow.
- Deployed with Docker Compose and maintained the platform through December 2025.

Dubai Visa Platform — Multi-Tenant Agency Dashboard

Aug 2025

- Designed a FastAPI and Jinja2 dashboard for visa request management, document uploads, accounting pages and user administration.
- Implemented white-label multi-tenancy so each agency sees only its own data and branding.
- Built role-based access control across five roles — SuperAdmin, Manager, Agent, Accountant and Visa Editor — with permission-driven adaptive menus.
- Integrated with a core backend over JWT-secured APIs, enforcing one-device login, Google OTP, reCAPTCHA and full audit logging.

RashApp — Product Warranty & Customer Platform

Sep 2024 – Mar 2025

- Owned the FastAPI backend: account, authentication and user CRUD modules, Pydantic schemas, and SQLAlchemy models.
- Implemented two-factor authentication for both sign-up and login, plus password reset and an SMS verification service.
- Built profile management with avatar upload and file size and type validation, and a product warranty-check flow.
- Collaborated with two front-end developers on feature integration. Project reached completion but was cancelled by the client before launch.

EDUCATION

Bachelor's Degree, International Trade and Finance

2019 – 2023

Pamukkale Üniversitesi (PAÜ), Türkiye

LANGUAGES

English (Professional) · Turkish (Professional) · Persian (Native)