SYSTEMS ARCHITECT · AI-NATIVE SAAS · FRACTIONAL CTO

Arash Banaeian

I take ambiguous, high-constraint problems from first principles to production systems, and stay accountable for them there.

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IN BRIEF

Give me the goal. The specification, architecture, scenarios and edge cases are my job. I work like a researcher (question the assumptions, read the evidence, model the people, data, constraints and failure modes) and then build for production. My work spans **systems architecture**, **AI and agent systems** and **data science and statistical modelling**, with earlier depth in **psychometrics, cognitive science and business planning**.

01 Strongest proof: elEMZA, a regulated e-signature platform

2026

5.8×

CONTRACTS

2,167 contracts in September 2026, against 372 in the old platform's best full month.

One-page brief to a live platform in 70 days, then five straight months of growth before any marketing.

220+
releases to live production since May
each snapshotted for instant rollback

4.5×
revenue collected, September 2026
vs old best full month (Apr 2025)

99.98%
of 491K requests without a server error
4–30 September; 74 server errors

32K/day
fully signed forms, measured on one 4-core server
61K API contracts a day; CPU-bound

02 The thread through my work

FOUR DOMAINS, ONE ARCHITECTURE

	01 Elicit *what the person gives*	02 Model *how the system holds it*	03 Decide *what it chooses*	04 Act *what it does*
Poian talent & career guidance 2020–23	Intake, family interview, six psychometric instruments	Scored profile joined to qualitative case notes	Career-fit matching; a three-advisor commission sets three paths	Final consultation and report; 4,000+ people assessed
EduGPT Persian-first AI tutor 2023–25	The learner's question, history and level	Textbook rebuilt as structured knowledge; learner memory	Hybrid retrieval (dense + BM25, RRF, reranking); adaptive path	Grounded answer citing page and paragraph
BITA AI sales agent 2023–25	Conversation, voice, product photos, receipts	Layered memory; intent, sentiment, personality, journey state	Adaptive sales strategy under live A/B tests	Quote, confirmation, payment evidence, human hand-off
elEMZA regulated e-signature 2026–	Form fields on scanned originals; identity and face match	Contracts, parties, roles, organisations, audit trail	Signing workflow with provider health gates	PAdES signature via a licensed CA; API and signed webhooks

Each time: enter an unfamiliar domain, learn how its people actually behave, and build the system around it.

elEMZA · CTO & Systems Architect — JAN 2026 – NOW

Sole engineer and technical owner of an e-signature, identity and PKI platform, rebuilt from its business and regulatory contract rather than from the legacy code.

- **Owned the whole path from a one-page brief**: market research, business plan, UML, BPMN, DFD and ERD models, product, architecture, build, compliance, migration and production. Live in 70 days, on 21 April 2026, with two years of data (18,470 rows) moved in a two-minute cut-over.
- **Outcome, before any marketing.** September 2026: 2,167 contracts and 1,725 new users, against the old platform's best month of 372 and 298, plus 394 signers paying their own share under a new counterparty-pays model (25% of contracts).
- **Twelve subsystems, one codebase**: PAdES signatures via a licensed CA; KYC with face match; forms on scanned documents; billing, invoicing and finance; multi-tenant organisations with role-based access (RBAC) and 35 admin screens; two SMS carriers and a self-hosted mail server; a REST API with signed webhooks, SDK and WordPress plugin; and three AI systems: a LangGraph legal assistant, a grounded article writer and a support chatbot.
- **Identity checks that survive a failing national registry**: circuit breakers, a lookup cache and a retry queue absorbed outages on 41 of 46 days and recovered 92% of failed checks.
- **Designed and governed the engineering system** (right): my architecture and specifications, built by AI coding agents inside an agent harness of enforced rules and adversarial review. 4,462 commits since February; about 7,800 test methods; ≈914K lines of code, 308K of them tests.
- **In progress, October 2026:** an ERP-style core joining chatbot, CRM, sales, blog and notifications to finance and HR, with tools for advisers and lawyers.

BITA · Founder — 2023 – 2025

A multi-channel AI sales agent on WhatsApp, Instagram and Eitaa, rebuilt four times in 14 months against real conversations.

- **FastAPI and Qdrant core** (17,051 lines, 72 endpoints, 270 tests): a plan-then-respond loop over layered memory, with retrieval across product and business documents.
- **Reflective customer model**: reflection turns related memories into higher-level insights about each customer's personality and behaviour, used in the conversation; in effect a conversational CRM, driving adaptive sales strategies under live A/B tests.
- **Carried a whole sale in chat**: discovery, quote, confirmation, payment evidence read from a receipt photo, and hand-off to a human, across multi-tenant accounts.

EduGPT · Founder & AI Systems Architect — 2023 – 2025

A Persian-first tutor that treats the textbook as a knowledge source, not as prompt context.

- **OCR ingestion** that rebuilt document hierarchy and normalised Persian text.
- **Hybrid retrieval** (dense vectors, BM25, reciprocal-rank fusion, reranking) behind query analysis that chose the execution path.
- **Grounded answers** citing page and paragraph, with learner memory, adaptive difficulty and knowledge-gap detection.

Poian · Co-founder & R&D Lead — 2020 – 2023

A talent-assessment centre, still operating; I remain a shareholder. Turning complex human information into structured decisions, with psychologists.

- **Designed the service end to end**: business model, assessment logic and one integrated system from intake to counselling and reports.
- **Joined numbers with judgement**: six psychometric instruments, a family interview, a three-advisor commission; R, SPSS, clustering; 4,000+ people assessed.

MOST USEFUL FOR

01 Idea to production

02 Rebuilding a system that outgrew its design

03 Production AI, agent and data systems

04 Fractional CTO or technical co-founder

THE AGENT HARNESS

Rules as code	23
Enforcing hooks	18
Verification law	every claim
Adversarial review	every change
Deploy assertions	7
Failure catalogue	100

observed failure, then a mechanical guard

TOOLKIT

Systems & product design
UML, BPMN, DFD, ERD, C4, DDD, ADRs · AI-native, multi-tenant SaaS (B2B, consumer), RBAC, ERP-style integration, API-first · PRD, SOW

Software & data
Python, FastAPI, Django, PHP, Laravel, Filament, Livewire · React, Next.js, Vue, TypeScript, Alpine.js, Tailwind · microservices, REST, GraphQL, gRPC, WebSockets · PostgreSQL, SQL Server (certified), Redis · Kafka, RabbitMQ, Celery

AI & agents
Agent harnesses, adaptive agents · LangGraph, LangChain, LlamaIndex, Langfuse, Hugging Face, fine-tuning (LoRA), RAGAS · Qdrant, Weaviate, pgvector

ML & data science
PyTorch, TensorFlow, scikit-learn, XGBoost · CNNs, GNNs, reinforcement learning, genetic algorithms, time series · R, SPSS, Bayesian and multivariate statistics

Delivery & security
Docker, CI/CD, Linux, Nginx, Grafana · PKI, PAdES, KYC, security certification in progress

04 Beyond the main line

THE SAME CURIOSITY, OTHER DOMAINS

01

Medical imaging
A CNN classifier that detects breast cancer in radiology images, from data collection to evaluation.

02

Financial markets
A trading system with statistical and time-series signals, back-testing, and Telegram bots to run it.

03

Agent-based simulation
Research and simple prototypes simulating populations: demographic and economic behaviour, herd dynamics.

04

Mind and sky
Neuroscience behind my reflective agents; at 18, the youngest paid astronomy instructor in Mashhad.