

Aaron Manning

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Summary

AI-first backend engineer with experience building reliable, cost-efficient systems across Node.js, Python, cloud infrastructure, and computer vision. I pair strong ownership of complex technical problems with clear communication, thoughtful collaboration, and a genuinely team-first approach—helping teammates move quickly while delivering secure, high-quality products.

Work Experience

DATA ENGINEER | CURV HEALTH | 2021-PRESENT

- Built the AI-native TypeScript/Node.js backend for a sports-training platform, using PostgreSQL, Redis, Docker, and typed API contracts for complex multi-role workflows.
- Built distributed computer-vision assessment pipelines coordinating video artifacts, cloud storage, Google Pub/Sub inference, external analysis services, and explicit state transitions.
- Evaluated state-of-the-art MMPose models across keypoint accuracy, coverage, latency, and deployment requirements; converted selected models to TensorRT for GPU inference.
- Redesigned video inference around GCS/Pub/Sub, idempotent output handling, bounded producer-consumer frame processing, and batched top-down detection and pose estimation.
- Scaled processing to **10,000 video assessments per month** while reducing per-video GCP inference spend from **more than \$5 to under \$0.35—a 93%+ cost reduction**.
- Designed AI training-plan generation with OpenAI Agents, structured outputs, tool calling, and retrieval over a controlled exercise and assessment catalog.
- Implemented semantic retrieval using OpenAI embeddings, PostgreSQL/pgvector HNSW indexing, and Redis caching for low-latency, relevance-ranked results.
- Secured the platform through fine-grained authorization, Stripe/Stripe Connect webhook verification, advisory locks, idempotent payment handling, and transactional fulfillment.
- Built AI-native workflows for video ingestion and assessment processing, with dry-run safeguards, resumable uploads, polling, artifact validation, and atomic publishing.
- Architected the asynchronous and event-driven foundation for AI workloads: transactional outbox jobs, Faktory workers, retries, timeouts, logging, notifications, audit feeds, and real-time Server-Sent Events.
- Managed Terraform/Garden GCP infrastructure across isolated environments, including Cloud Run, Cloud SQL, Redis, storage, Pub/Sub, secrets, networking, and monitoring.
- Developed versioned schemas for computer-vision activities, metrics, scoring, and coaching content, with baseline regression coverage for analytical correctness.

MOVEMENT SCIENTIST | CURV HEALTH | 2020-2021

- Built Python data-analysis pipelines for human-motion video using ML pose estimation to extract movement metrics.
- Developed computer-vision assessments that provide automated feedback on movement quality and technique.

- Implemented pose-analysis rep detectors and biomechanics utilities, including frame-range detection, side-aware peak measurements, joint-angle geometry, and registry integration.

Skills

Backend & Data: TypeScript, Node.js, Python, Express, REST APIs, PostgreSQL, Sequelize, Redis, pgvector, database design, transactions, caching, idempotency

AI & Computer Vision: OpenAI API and Agents SDK, LLM tool calling, structured outputs, embeddings, semantic retrieval, vector search, pose estimation, video processing, biomechanics metrics

Cloud & Reliability: GCP, Cloud Run, Cloud SQL, Cloud Storage, Pub/Sub, Terraform, Garden, Docker, Kubernetes, GitHub Actions, CI/CD, Factory, observability

Integrations & Security: Stripe/Stripe Connect, Auth0, webhooks, Server-Sent Events, multi-tenant authorization, SOC 2, HIPAA, PIPEDA, COPPA, RBAC, auditability, secure credential management, least-privilege access

Education

MASTER OF SCIENCE | BIOMECHANICS | MCGILL UNIVERSITY | MONTREAL, QC

- Built and validated a 3D aerodynamic model to predict the flight trajectory of hockey shots

BACHELOR OF SCIENCE | ENGINEERING PHYSICS | QUEEN'S UNIVERSITY | KINGSTON, ON

- Dean's Scholar; Graduated with First Class Honours, Cumulative GPA 3.9

Personal

- Competitive distance runner and endurance sport coach