

Aravind Jayasankar, PhD

Software Engineer | Healthcare AI | Full-Stack Clinical Workflows | Agentic Systems

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LIVE AI product shipped	~1,800 patient scans processed	8h -> 3min clinical workflow	<10min report generation
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PROFILE

Healthcare AI engineer with hands-on experience building **full-stack AI systems** used in clinical and health-adjacent settings. Built and shipped **UrCoach**, a live browser-based AI movement analysis platform using **FastAPI, React/TypeScript, computer vision, 3D pose analysis, and LLM-assisted feedback**. Also built **NHS-facing medical device workflows** and **surgeon-facing decision-support systems**, working directly with clinicians to turn workflow friction into reliable product improvements. Strong fit for Heidi's mission: turning clinical complexity into simple, trustworthy systems that clinicians can depend on.

ROLE-RELEVANT ACHIEVEMENTS

- **Shipped a live AI product:** UrCoach is deployed online and used by coaches, biomechanics researchers, and personal trainers.
- **Built for trust and edge cases:** Validated AI pipelines across pretrained datasets and real-world failures: bad camera angles, noisy landmarks, false detections, demographic variation, and inconsistent lighting.
- **Built agentic LLM pipelines:** Implemented Claude/Groq workflows with function calling, structured JSON outputs, tool use, and chained reasoning.
- **Reduced clinical workflow time:** Medical device design from 8 hours to 3 minutes; surgeon-facing report generation from several hours to under 10 minutes.
- **Handled messy healthcare data:** Resolved noisy scans, failed AI detections, incomplete geometry, and edge cases across ~1,800 patient scans.
- **Worked directly with clinical users:** On-site at Sheffield Children's Hospital and directly with orthopaedic surgeons to close the loop between users and system behaviour.

CORE SKILLS

Stack: Python, FastAPI, React, TypeScript, REST APIs, PostgreSQL, Google Colab, Playwright, cloud tunnel architecture

Healthcare AI: clinical workflow automation, AI landmark detection, scan ingestion, **computer vision, pose estimation, 3D reconstruction**, structured outputs

Agentic AI: Claude API, Groq API, LLM chains, **function calling, tool use, structured JSON outputs**, human-in-the-loop review

Engineering Practice: edge-case validation, failure-mode testing, error handling, observability thinking, rapid iteration, prototype-to-deployment

Clinical Collaboration: clinicians, nurses, surgeons, non-technical users, workflow mapping, feedback loops, trust-building

PROFESSIONAL EXPERIENCE

Full-Stack AI Engineer - UrCoach (Live Product)	Aug 2024 - Present
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Independent | London, UK

- Built and deployed a **browser-based AI movement analysis platform** from zero, currently live online and used by coaches, biomechanics researchers, and personal trainers.
- **Stack:** **FastAPI backend, React/TypeScript frontend**, video ingestion, MediaPipe and YOLO pose estimation, joint-angle metrics, 3D reconstruction experiments, confidence signalling, and session history.
- Integrated **Claude API** to convert structured biomechanics data into human-readable coaching feedback using function calling, structured JSON outputs, and controlled prompt logic.
- Validated AI pipelines across pretrained datasets and real-world failure modes including poor camera angles, noisy landmarks, false rep detection, setup movement, and lighting variation.
- Designed confidence signals, fallback logic, and failure-state handling so users understand when outputs are reliable and when they are not.

AI/ML Engineer - NHS-Facing Medical Device Pipeline

Aug 2024 - Apr 2026

Imperial College London, Dyson School of Design Engineering | London, UK

- Built an end-to-end **NHS-facing AI pipeline** from patient scan ingestion through AI facial landmark detection, 3D reconstruction, geometry processing, validation logic, and automated output generation.
- Validated pipeline reliability across **~1,800 patient scans**, resolving noisy inputs, failed detections, incomplete geometry, demographic variation, and clinical review edge cases.
- Worked on-site at **Sheffield Children's Hospital** with nurses, caregivers, and clinicians to identify workflow friction and translate user feedback into product improvements.
- Reduced manual device design time from **8 hours to 3 minutes** and per-device cost from **~£300 to £7** through automation, validation checks, and repeatable outputs.
- Pipeline progressed to **NHS clinical trials**, reflecting clinical stakeholder trust in AI-generated outputs as a measurable system quality outcome.

AI Pipeline Engineer - Clinical Decision-Support Workflows

Aug 2023 - Aug 2024

Philomec Inc / Polytechnique Montreal | Canada

- Built **digital surgical planning workflows for orthopaedic knee replacement surgery** using Python, OpenSim, 3D geometry, FEA, implant alignment metrics, and simulation-derived evidence.
- Reduced surgeon-facing report generation from several hours to **under 10 minutes** through Python automation, reusable reporting logic, and structured clinical output pipelines.
- Validated biomechanical modelling outputs under clinical scrutiny, rebuilt methodology using a peer-reviewed approach, validated across 34 patients, and measured a **44% increase in surgeon confidence**.
- Translated surgeon requirements into structured decision-support outputs, improving clinical interpretability and trust in computational recommendations.

Research Fellow - Medical Device Product Development

Sep 2019 - Dec 2021

HP-NTU Digital Manufacturing Corporate Lab / SUTD | Singapore

- Led development of a **patented self-assembling medical device concept** with HP Labs, from concept through design validation, prototyping, simulation, and manufacturing-aware development.
- Built **Python-Abaqus and Rhino-Grasshopper workflows** translating material behaviour and manufacturing constraints into repeatable design rules, reducing simulation time by **~90%** and 3D print failure rates by **over 40%**.

PhD Researcher - Computational Modelling & Experimental Validation

Jun 2015 - Apr 2019

Max Planck Institute / Harvard University | Germany and USA

- Conducted PhD research combining **parametric modelling, FEA, additive manufacturing, mechanical testing, and experimental validation** across international teams.

EDUCATION

PhD, Materials Science - Max Planck Institute of Colloids and Interfaces / TU Berlin | Structural and biomechanical analysis of interlocking skeletal tessellations

MEng, Engineering Science - University of Auckland | Design, fabrication and FEA validation of prosthetic knee implants

B.E., Electronics Engineering - Anna University

PATENT & RECOGNITION

- **International Patent WO2022177571A1** - Self-Assembling Fracture Cast, HP Labs collaboration
- **HP Labs Best Product Concept Award**, 2021; peer-reviewed publication including Journal of the Mechanics and Physics of Solids