

# Ayush Mishra

Product Engineer focused on AI-native platforms, knowledge systems, and scalable SaaS architecture

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Computational architect and product engineer building AI-native platforms for the AEC industry. My work sits at the intersection of architecture, parametric design, and software engineering, where I develop systems that turn complex building data, construction documents, and infrastructure knowledge into intelligent digital tools. With a background in architectural design and distributed systems, I focus on creating software that improves how the built environment is designed, analyzed, and managed. This includes developing AI-driven platforms, computational design workflows, and knowledge systems that help professionals navigate the complexity of architecture, construction, and infrastructure projects.

## Experience



### Studio ISA — Computational Architect & Systems Engineer

Nov 2024 - present

Architectural practice focused on large-scale infrastructure and SaaS & computational design for the AEC industry.

[Next.js](#) [React](#) [TypeScript](#) [Node.js](#) [PostgreSQL](#) [LLM pipelines](#) [API systems](#)

- Contributed to the design and development of the Delhi Metro Skywalk (Ajmeri Gate) connecting New Delhi Railway Station with Delhi Metro transit infrastructure.
- Designing and creating React components for the application dashboard
- Developed computational design and parametric workflows for complex infrastructure geometries and architectural systems.
- Built internal AEC software platforms and digital infrastructure to improve knowledge management, documentation intelligence, and design automation across architecture and construction workflows.
- Designed automation pipelines and computational tooling integrating architectural data, contracts, and project documentation.

#### End to End Digital Platforms Developed



##### AECOS Insights

AECOS-Work is a structured intelligence layer for architecture, engineering, and construction organizations.

It enables firms to: • Ingest project data • Organize knowledge • Retrieve context intelligently • Generate professional deliverables • Build infinite institutional memory shared brain org wide

Led the technical architecture and scaling of a multi-tenant project intelligence platform (successfully acquired), implementing a strictly typed Layered Clean Architecture using Next.js 15, Drizzle ORM, and PostgreSQL with Enterprise SSO and BYOK security orchestration.

Engineered an asynchronous document ingestion and Two-Stage RAG pipeline via GCP Cloud Tasks and pgvector, utilizing Docling for hierarchical structural chunking and Gemini 1.5 360-dimensional embeddings with BM25 domain-weighted re-ranking for ultra-precise retrieval.

Architected a multi-agent orchestration engine leveraging the Vercel AI SDK, featuring dynamic tool-calling, Deep Research subagent delegation, and a "Studio" artifact engine that synthesizes isolated data points into complex deliverables via K-means clustering and strict Zod schemas.



##### Archade

Architected a high-performance platform using Next.js 16, React 19, and PostgreSQL, implementing a strict read/write separation pattern (Loaders vs. Server Actions) to guarantee <50ms page loads and eliminate N+1 queries. Engineered a polymorphic social feed and complex entity relationships using Drizzle ORM, TanStack Query, and virtualized lists, supporting real-time messaging, reaction batching, and an automated daily recommendation engine.

Designed and integrated a multi-tier subscription and dual-sided marketplace using Stripe and Dodo Payments, featuring hierarchical product catalogs, gig proposals, and digital asset licensing.



##### QwikRender

Architected an 8-stage "Technical Moat" rendering pipeline and orchestrator, dynamically routing generative requests across Gemini 2.5 Flash/Pro, Google Veo, and Hunyuan3D based on task complexity to optimize quality while maintaining ultra-low costs (~\$0.04/render).

Engineered a stateful, node-based workflow editor (Canvas) and conversational "Render Chains," implementing RAG-style "Pipeline Memory" with Gemini Vision to extract and persist architectural geometry, materials, and style codes across multi-turn sessions.

Designed a strictly layered Next.js 15 and Drizzle/PostgreSQL backend utilizing Server Actions, integrating an automated prompt-refinement detour stage that intercepts system-generated prompts to drastically reduce failure rates and hallucination.



### Inheritance.Foundation — Founding Engineer & Systems Architect

Jul 2022 - Nov 2024

Built and operate the worlds leading AI ready, open-source, standards-compliant digital infrastructure powering national heritage documentation used by UNESCO, Wikimedia Foundations, Archeological Survey of India (ASI), Indian State tourism Bodies, and research institutions.

[Next.js](#) [React](#) [TypeScript](#) [Node.js](#) [PostgreSQL](#) [LLM pipelines](#) [API systems](#)

- Platform & Standards:** Architected the Inheritance SDK & API ecosystem (TypeScript & Python SDKs) delivering ISO 21127:2023 Compliant, CIDOC-CRM, JSON-LD, LIDO XML and OAI-PMH exports for institutional archives.

## Experience

- **Point-cloud Engine:** Engineered a WebGL2/GPU pipeline with octree spatial indexing that renders **100+ billion points (50 GB apprx) <50ms** and achieves ~70% compression for field datasets.
- **APIs & GIS:** Designed REST, GeoJSON, WMS/WFS spatial endpoints and enterprise **GIS services with <100ms typical responses and PostgreSQL/PostGIS-optimized queries.**
- **Operational Excellence:** Serverless, CDN-edge architecture (Next.js route handlers, Postgres/PostGIS, AWS Lambda, CloudFront) **delivering 99.995% SLA** and scalable performance for government-scale datasets
- **Impact: A Product of NATIONAL IMPORTANCE** Enabled digital twins with sub-millimetre accuracy (0.4mm), reduced documentation time ~65%, and facilitated nationwide institutional integrations and automated regulatory reporting. Adopted and used by Wikimedia, Archeological Survey of India, and State tourism departments.

### Technologies

Tech stack (short): Next.js • React • TypeScript • Node.js • Supabase/Postgres/PostGIS • WebGL2/GPU • AWS Lambda • CloudFront • CIDOC-CRM / LIDO / OAI-PMH • GeoJSON • LangChain / LlamaIndex • Embeddings • Serverless • RAG architecture • Knowledge graphs • API systems



**Fantom.Foundation** — Software Engineer (Frontend / Ecosystem Infrastructure) 📅 Mar 2021 - Apr 2022

Worked on frontend infrastructure and ecosystem platforms supporting the Fantom blockchain network.

Next.js React TypeScript Node.js PostgreSQL LLM pipelines API systems

- Engineered the core frontend architecture for SpookySwap using React and TypeScript, implementing robust state management to handle high-frequency RPC node polling, real-time token pricing, and complex decentralized transaction lifecycles
- Architected scalable ecosystem infrastructure leveraging Next.js and Node.js, delivering modular DAO governance interfaces, secure grant portals, and centralized developer documentation systems
- Optimized rendering cycles and standardized component libraries across DeFi interfaces, ensuring low-latency interactions and high availability for a massive, highly concurrent blockchain user base.
- Designed automation pipelines and computational tooling integrating architectural data, contracts, and project documentation.

## Skills & Tools

Underline indicators

Frequently Used

Occasionally

### Programming & Languages

TypeScript Python C++ JavaScript HTML CSS/SCSS

### Web & API Development

Next.js React JavaScript HTML CSS/SCSS REST APIs Docker Storybook Gulp  
ExpressJS NestJS GraphQL Framers Motion Redis MongoDB Turbopack/Webpack  
MaterialUi Shadcn PWA's Electron

### AI & Data Systems

LLM pipelines RAG systems vector embeddings LangChain LlamaIndex OpenAI APIs  
Docling by IBM Google Vertex AI

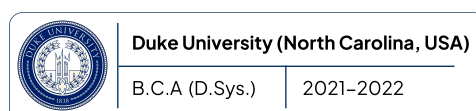
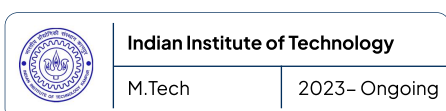
### Spatial & 3D Systems

WebGL2 GeoJSON Three.js PostGIS point cloud rendering octree spatial indexing mesh generation

### Databases & Cloud

PostgreSQL Supabase Firebase serverless architecture GCP AWS Lambda CloudFront Vercel

## Education



Selected work and references available upon request from Studio ISA and Inheritance Foundation leadership.