Ainesh Chatterjee

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<> Projects

OpenSkills (active) | Solo Developer
- Open-source, agent-framework-agnostic implementation of Anthropic's Skills protocol with full parity vs their first-party version — github.com/ain3sh/openskills
- Only open-source implementation with full parity; improves skill activation without manual prompting via a CLI + AGENTS.md-driven spec

CodeCanvas (active) | Solo Developer
- MCP tool for code-editing agents that emits image-based architecture/impact maps + a persistent Evidence Board — github.com/ain3sh/codecanvas
- Reduced average agent backtracking from 4.57→2.14 vs text-only baseline across a 7-task Terminal-Bench 2.0 eval subset
- Built LSP-first + tree-sitter fallback call-graph analysis, returning all agent-facing artifacts as PNG images (architecture, impact slices, task board); added hooks to auto-init on session start and auto-impact after file reads

context-mcp (active) | Solo Developer
- Context tooling for agents (ask-docs-agent, fetch-docs, fetch-site) optimized for low latency + token efficiency — github.com/ain3sh/context-mcp
- fetch-docs wraps Context7 into a single agent-friendly call, avoiding multi-round tool trips
- Cuts token usage by persisting fetched context locally and avoiding full re-fetches

climb-cli (active) | Solo Developer
- Auto-generates TUIs for CLIs by extracting arg info + manpages; includes a non-interactive mode for LLM agents — github.com/ain3sh/climb-cli
- Eliminates manual CLI argument lookup and reduces agent/human errors

CoronaSafe | Team Lead/Backend Developer
- Python/Flutter app for global COVID-19 risk assessment using time-weighted foot traffic + urban density analytics — github.com/ain3sh/coronasafe
- **Award:** Congressional App Challenge Winner (MD08)

🔧 Skills

- **Agents/LLMs:** MCP, Kosong, LMCache, DSPy/GEPA, Claude Code SDK, Google Agent ADK/A2A, LiteLLM, Context Engineering
- **ML:** Transformers, Agentic LLMs, RAG, Mechanistic Interpretability, Deep RL (GAIfO), PyTorch, HuggingFace
- **Engineering:** Python, C/C++, Rust, Docker, Git/GitLab CI, FastAPI, React, AWS, PostgreSQL/NeonDB ; Familiar: Neo4j, Dask, Java
- **Recognitions:** Congressional App Challenge Winner (MD08), Eagle Scout, National Merit Scholar

📖 Publications

- *Ipelets for the Convex Polygonal Geometry*, published at SoCG 2024, 2024
- *AgreeMate: Teaching LLMs to Haggle*, published at arXiv, 2024

🛄 Experience

Tilli Software | *AI Engineering MTS*
Applied Research:Project ISO
July 2025 - Present (Full-time since Jan 2026) | Hybrid
- **Engineered** the Tilli Agent MVP (Kosong + DSPy + lastmileai/mcp-agent) to act autonomously on behalf of users, on any crawled site *at < $0.01/task*
- **Developed** site2mcp and leading the effort to extract structured data from arbitrary sites and generated template-derived MCP servers (Kosong + browser-use + Claude Agent SDK)
- **Architected** a shared, multi-tenant MCP Super-Server as a centralized auth and tool/resource store across usecases; instrumented automated performance logging for post-hoc analysis and GEPA-optimization pipelines, *increased cache-hit rate; reduced p50 latency and token cost*
- **Driving** Project ISO into closed beta and shipping Bridge, an enterprise ERP-automation offering *~100k users; rolling out for Oracle, SAP, QuickBooks, FreshBooks*

University of Maryland CMNS | *Student Researcher*
Crowd Simulation
September 2024 - June 2025 | College Park, MD
- **Investigated** non-Euclidean crowd navigation + interaction (Hilbert-ball/hyperbolic distances; curvature-aware costs)
- **Applied** transformer models for language-directed crowd navigation: map natural-language instructions to motion goals and primitives

Johns Hopkins University Applied Physics Laboratory |
Computer Science Intern - Interim Security Clearance
Force Projection Sector: Ocean Systems & Engineering Group
May 2024 - Aug 2024 | Laurel, MD
- **Developed** an optimized GAIfO variant leveraging architectural insights *improved long-horizon performance versus prior iterations already outperforming baseline imitation models*
- **Extended** GTRI's SCRIMMAGE mass-simulation framework with *higher scenario complexity and expert controller functionality*
- **Revamped** GitLab CI + Docker pipelines: remediated vulnerabilities and improved build efficiency *≈25% faster CI; ≈50% faster builds; ≈40% lower memory footprint (project-wide Docker base image)*
- **Led** the winning team for the sector Intern Challenge, delivering a secure, non-GPS intra-campus navigation prototype
- **Synthesized** state-of-the-art Transformer literature into internal design memos guiding downstream model selection and project roadmap

University of Maryland MIND Lab | *Research Intern*
Breathing Analysis Project
October 2023 - December 2024 | College Park, MD
- **Optimized** dataset ingestion + loading with Dask and multithreading for longitudinal breathing datasets *≈400%+ higher throughput on high-tens-of-GB/patient-day data; enabled real-time visualization for analysis and feature extraction*
- **Evaluated** breath-segmentation baselines and sequence models (XGBoost, random forests, CRF, LSTM) to improve segmentation consistency

🎓 Education

University of Maryland - College Park
Dual BS in Computer Science (Machine Learning) and Mathematics
December 2025
University, Departmental Honors; Dean's List