

CHAITANYA ANAND

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EDUCATION

IIIT Sri City

Bachelor of Technology in Computer Science

Chittoor, Andhra Pradesh

2024 – 2028

EXPERIENCE

Human-Computer Interaction (HCI) Lab Research Intern

Mar 2025 – Present

IIIT Sri City

Chittoor, Andhra Pradesh

- Spearheaded multi-disciplinary ML and systems research across budgeted neural retrieval cascades, autonomous agent architectures, real-time kinematics, and explainable decision systems.
- Led data collection, kinematic state-machine design, and statistical analysis for human-subject evaluations ($N = 21$ stroke rehabilitation, $N = 40$ motor coaching), quantifying usability (SUS) and cognitive workload (NASA-TLX).
- Co-authored 3 accepted peer-reviewed papers at top-tier venues (**ACM CHI EA '26**, **IEEE ISMAR '25**, **IEEE ISMAR '26**), alongside systems research under review at **Elsevier IP&M**.

PROJECTS

DPLA-Retriever (Budgeted RAG Cascade)

Python, PyTorch, FAISS, Cross-Encoder, Llama-3

- Architected a budgeted multi-hop RAG cascade executing exactly one call to an unftrained **Llama-3-8B** reader on a single 24 GB RTX 4090 GPU; engineered hybrid dense + BM25 retrieval over 21M DPR passages with learned sufficiency gating to skip unnecessary second hops.
- Benchmarked under FlashRAG protocol: delivered **54.2 F1 on HotpotQA** and **38.1 EM on NQ**; reduced cross-encoder evaluations from 368 to 205 pairs, cutting end-to-end retrieval latency from **1,820 ms to 664 ms**.

xoult (Explainable arXiv Recommender)

Python, FastAPI, PostgreSQL, pgvector, Langfuse

- Engineered a live paper recommendation engine (xoult.onrender.com) ingesting $\sim 1,900$ arXiv preprints/day across 6 ML categories; generated local ONNX embeddings (**all-MiniLM-L6-v2**) stored in PostgreSQL with **pgvector** for cosine search and transparent historical explanations.
- Implemented dynamic Rocchio centroid updates on user interactions; benchmarked on CiteULike-a (5,551 user libraries), achieving **0.1005 NDCG@10** and **0.2728 Recall@50** with automated CI regression gates.

Minecraft-Helper (System-1 Companion)

Node.js, PyTorch, Jev (System-1), Mineflayer, SSE

- Built an autonomous game companion implementing TypeSafe AI's Jev System-1 architecture (**/v1/systemone** wire format), decoupling fast intuitive intent classification from deterministic System-2 planners (recipe-tree synthesis, 3D A* navigation, combat kinematics).
- Deployed a local 2B Decider model (4 GB VRAM) achieving **88% intent accuracy** across 175 evaluation queries with **~ 185 ms GPU inference**; validated via **198 unit tests** with zero hallucinations.

Briefed (AI Context Sync CLI)

TypeScript, Node.js, Git Hooks, AST, Vitest

- Published an open-source CLI (**briefed-cli** on npm) that coordinates post-pull Git hooks with AST parsing to eliminate AI context drift for agentic editors like Cursor and Claude Code.
- Engineered a rebase-safe hook pipeline with cross-process synchronous file locking and atomic temporary file swaps (**renameSync**) to prevent race conditions and context file corruption; backed by an 89-test Vitest suite.

XR Badminton (Biomechanical Coaching Platform)

Unity C#, Python, Sony Mocopi IMU, PyTorch

- Built a standalone Quest athletic simulator streaming real-time 12-IMU Sony Mocopi forward kinematics at **72.5 Hz** over UDP with quadratic aerodynamic drag physics and preemptive haptic feedback; peer-reviewed paper accepted at **IEEE ISMAR 2026**.

PUBLICATIONS & MANUSCRIPTS

One Reader Call Is Enough: Budgeted Two-Hop Retrieval for Multi-Hop RAG – Under Review, Elsevier IP&M (2026)

Adaptive Coaching System for VR Badminton – IEEE ISMAR 2026 (Accepted)

Joint-Level Feedback for Unsupervised Upper-Limb Rehabilitation – ACM CHI EA '26 (Published)

Towards a Modular XR Platform for Personalized Upper Limb Rehab – IEEE ISMAR 2025 (Published)

TECHNICAL SKILLS

Languages: Python, TypeScript, JavaScript, SQL, C/C++, C#

ML, RecSys & Search: PyTorch, Hugging Face Transformers, FAISS, pgvector, fastembed (ONNX), Llama-3,

Sentence-Transformers, Rocchio Recommenders, Jev (System-1), scikit-learn, NumPy, Pandas

Systems, Cloud & Tools: FastAPI, PostgreSQL, Docker, GitHub Actions CI/CD, Langfuse, DuckDB, Linux, Git, Unity, Vitest, pytest

Core Domains: Multi-Hop RAG, Cascade Ranking, Explainable Recommender Systems, Autonomous Agents, Interactive Systems