

Avani Gupta

avani17101.github.io | avani17101@gmail.com | [Google Scholar](#) (180+ citations, 5+ h-index) | [GitHub](#): [avani17101](https://github.com/avani17101)

Education

IIT Hyderabad

Hyderabad, India

B.Tech (Honours) + Masters By Research in Computer Science & Engineering, 2023

Advisor: Prof. P. J. Narayanan, MS specialization: AI, MS CGPA: 9/10

Thesis: Leveraging Human-Centered Explanations for Model Improvement & Evaluation [Link](#)

Skills

Languages/Libraries: Python, C/C++, PyTorch, TensorFlow, JAX, transformers.

Frameworks: Polars, RLLib, MARL (Mujoco, Gym), Distributed Training (DDP, FSDP), Synthetic Dataset Generation (Distilabel), AI Agents Development (MCP, A2A protocols, LangChain, ADK, OpenClaw), FastAPI, SQL.

Research Experience

MBZUAI Client AI Engineer and Researcher

Abu Dhabi, UAE

Jun 2025 - Present

- Translated industry problems into research formulations, facilitating faculty-industry partnerships which led to 5+ active collaborations and signed MOUs with stakeholders.
- Built AI Agents for various internal and stakeholder use-cases using k2-think series of foundation model released by IFM.
- Owned evaluation and safety checks of RAG assistant: created scalable pipelines and generated synthetic persona-conditioned datasets, evaluated for correctness and safety.
- Overseeing project on customised AI advisor assistant for family businesses including training data curation, model finetuning and POC development; mentoring junior engineers and post-docs, collaborating with PI and stakeholders.
- Independently proposed research on collective-survival-based multi-agent reinforcement learning paradigm aimed to induce pro-social values and inculcate explicit learning from both success and failures of peers; designed novel peer-learning loss & survival-shaped rewards with promising results on benchmarks like SISL and Smac-v2 (research ongoing with [Prof. Abdalla](#) and [Prof. Razzak](#)).

Stealth AI Company AI Engineer

Abu Dhabi, UAE

March 2024 - May 2025

- Trained small LLMs (1-3B parameters, 2T tokens) for efficient edge deployment (using FSDP, megatron); proposed a novel MLA+GQA hybrid attention mechanism improving compute efficiency for coding & tool-calling capabilities.
- Owned post-training small LLMs for code and tool calling: generated synthetic datasets and did supervised finetuning and evaluation which achieved 2-3% improvements on code/tool calling benchmarks.
- Architected and owned end-to-end development of production-scale agents serving 3,000+ users (multi-modal RAG, SQL, voice-call, marketing content generation including social media posts and high quality posters) using MCP/A2A protocols; also built several components including custom safety stack having content moderation, jailbreak and toxicity detection and flagging, & hallucination filters.

G42 Healthcare AI Research Associate

Abu Dhabi, UAE

Mar 2023 - Mar 2024

- Owned EHR foundation model development: modeled large-scale EHR sequences & trained a foundation model for patient trajectory prediction (processed 2.2 million records to get 4.3B tokens dataset), including chronic disease predictions, personalized medicine recommendation & mortality forecasting.
- Obtained patient embeddings revealing clinical coherence (chronic disease clusters, comorbidities) and EHR foundation model achieving high scores (0.99 precision and 0.99 recall in top@5) in prediction of next procedures, conditions (including chronic diseases), and medications.
- Curated training corpora from 10M+ articles & contributed to evaluation pipelines for [Med42](#) (70B open-

source medical LLM achieving 72% on USMLE, AAAI FM Symposium 2024) and 89B dataset for building trust and bias analysis (EMNLP 2025).

Centre for Visual Information Technology (CVIT), IIIT Hyderabad Researcher

Hyderabad, India

May 2020 - Mar 2023

- Originated a unified line of research under my advisor [Prof. P. J. Narayanan](#) on concept-based learning for inducing knowledge priors, interpretable control, and debiasing neural networks.
- Introduced the concept-sensitivity loss (NeurIPS 23) & sensitivity-based disentanglement metric (ICVGIP 22).
- Guided students in research on using activation space manipulations for backdoor defense (ICCV 25) & controllable style transfer (ICVGIP 25).
- Also worked on neural rendering, particularly NeRFs and temporal consistency in loose clothing animations of 3D Human with [Prof. Avinash Sharma](#).

IBM Research Research Intern

Bangalore, India

Sep 2022 - Dec 2022

- Researched on anomalous IT events prediction using transformers and published my work in CODS-COMAD 2024.

IBM Research Research Intern

Bangalore, India

May 2021 - Aug 2021

- Formulated reinforcement learning based next-best-action recommendation for business processes with conflicting goals; trained PPO with action masking to handle dynamically evolving action spaces from process flow graphs (deployed on IBM Business Automation Workflow, US patent application pending).

Honors & Awards

- **Best Paper Award**, ICGIP 2022 1/400+ papers. [\[Link\]](#)
- **Global Rank 14**, Amazon ML Challenge 2021 3,000+ teams, 12K participants. [\[Link\]](#)
- **National Winner**, Smart India Hackathon 2020 Top 0.1% from 100,000+ teams. [\[Link\]](#)
- **National Winner**, Microsoft Mars Program 2020 Selected from 100,000+ students. [\[Link\]](#)
- **Dean's List** (Top 1% SGPA, Monsoon 2021) & **Merit List** (Top 5% SGPA, Spring 2021), IIIT Hyderabad
- **Merit-Based Chief Minister's State Scholarship** (2017, 2018), Chhattisgarh

Service & Leadership

- **Reviewer**: ICML 2026, CVPR 2026, NeurIPS 2025, ACL 2024, AAAI 2023.
- **Teaching & Mentorship**: Teaching Assistant for *Statistical Methods in AI* (Spring 2022); gave guest talks on NeRFs, GANs, and interpretability at the 3D Vision Summer School and IIIT-H Computer Graphics course (2021 – 2022); AI Tutor and Mentor for the TalentSprint Professional AI Program (2022 – 2023).
- **Workshops & Community Engagement**: Instructor for the GANs Workshop [\[GitHub\]](#); Organizer of the AIcrowd *ML Battleground* challenge (2021) [\[Link\]](#); Student Volunteer at NeurIPS RL Workshop (2021).
- **Student Organizations**: Events Wing Member, Robotics Club, IIIT Hyderabad.

Peer-Reviewed Publications

- **Prototype Guided Backdoor Defense via Activation Space Manipulation**, ICCV 2025.
Venkat Adithya Amula, Sunayana Samavedam, Saurabh Saini, **Avani Gupta**[†], P. J. Narayanan. [\[paper\]](#) | [\[project page\]](#)
- **CAV Styler: Interpretable & Controllable Style Transfer**, ICGIP 2025.
Sunayana Samavedam, Venkat Adithya Amula, Saurabh Saini, **Avani Gupta**[†], P. J. Narayanan.
- **Concept Distillation: Leveraging Human-Centered Explanations for Model Improvement** NeurIPS 2023. **Avani Gupta**, Saurabh Saini, P. J. Narayanan. [\[paper\]](#) | [\[project page\]](#)
- **Interpreting Intrinsic Image Decomposition using Concept Activations**, ICGIP 2022 (Oral + Best Paper). **Avani Gupta**, Saurabh Saini, P. J. Narayanan. [\[paper\]](#) | [\[project page\]](#)
- **Building Trust in Clinical LLMs: Bias Analysis & Dataset Transparency**, EMNLP 2025.

*Equal Contribution [†]Advisory Contribution

Svetlana Maslenkova, Clement Christophe, Marco AF Pimentel, Tathagata Raha, Muhammad Umar Salman, Ahmed Al Mahrooqi, **Avani Gupta**, Shadab Khan, Ronnie Rajan, Praveenkumar Kanithi. [\[paper\]](#)

- **Med42 - Evaluating Fine-Tuning Strategies for Medical LLMs: Full-Parameter vs. Parameter-Efficient Approaches**, AAAI FM Symposium 2024.
Clement Christophe, Praveenkumar Kanithi, Prateek Munjal, Tathagata Raha, Nasir Hayat, Ronnie Rajan, Ahmed Al Mahrooqi, **Avani Gupta**, Muhammad Umar Salman, Marco AF Pimentel, Shadab Khan, Boulbaba Ben Amor. [\[paper\]](#) [\[HuggingFace\]](#)
- **Predicting Business Process Events in Presence of Anomalous IT Events**, CODS-COMAD 2024.
Avani Gupta, Avirup Saha, Sambit Ghosh, Neelamadhav Gantayat, Renuka Sindhgatta. [\[paper\]](#)
- **CitRet: A Hybrid Model for Cited Text Span Retrieval**, COLING 2022.
Amit Pandey*, **Avani Gupta***, Vikram Pudi. [\[paper\]](#).

Preprints

- **A survey on Concept-based Approaches For Model Improvement**, **Avani Gupta**, P. J. Narayanan. [arXiv:2403-14566](#)
- **Goal-Oriented Next Best Activity Recommendation using Reinforcement Learning**, Prerna Agarwal*, **Avani Gupta***, Renuka Sindhgatta, Sampath Dechu. [arXiv:2305.03219](#)

Patent

- **Generating organizational goal-oriented & process-conformant recommendation models using artificial intelligence techniques**, [\[US Patent Application\]](#), Status: Pending. Prerna Agarwal, Sampath Dechu, **Avani Gupta**, Renuka Sindhgatta