Sanjit Dandapanthula

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ML researcher passionate about creating theoretically principled models to solve hard practical problems.

EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Ph.D. in Statistics and Machine Learning (in progress) — *Aug. 2024 –*

University of California, Los Angeles (UCLA) — Los Angeles, CA
M.A. in Applied Mathematics (GPA: 3.92 / 4.00) — *Apr. 2023 – Mar. 2024*
B.S. in Mathematics w/ highest honors, minor in Data Science and Engineering — *Sep. 2020 – Mar. 2023*

TECHNICAL SKILLS

Languages: Python, C/C++, Rust, JavaScript, Haskell, Java, MATLAB, R, SQL, Bash, LaTeX
Technologies: PyTorch, TensorFlow, CUDA Spark, Hadoop, Ray Tune, Git, AWS, numpy, sklearn, pandas
Expertise: ML/AI, deep learning, NLP, high-performance computing, big data, algorithm design, optimization

EXPERIENCE + RESEARCH

Narya.ai (The Mumble App) — San Jose, CA
Lead Machine Learning Engineer — *May 2024 – Aug. 2024*

- **AI Note-Taking:** Managed entire ML pipeline for new AI note-taking app in a fast-paced startup environment.
- **State-of-the-art LLMs:** Fine-tuned latest LLM models (GPT-4o, Llama 3.1 405B, Claude 3.5 Sonnet, Perplexity APIs) for efficient voice-based editing, re-writing, finding keywords, and search indexing on user notes.
- **Transcription:** Used Google's WebRTC-VAD model to reduce transcription hallucination during silence in audio.
- **Vision RAG:** Wrote retrieval-augmented generation model to find link to original social media post or article given a user screenshot, or do other helpful contextual research using real-time information from the Internet.
- **LLM Privacy:** Ported many fine-tuned open-source models to Apple CoreML to use private on-device LLMs.

Institute for Pure and Applied Mathematics (IPAM) — Los Angeles, CA
ML Research Intern + Project Manager — *Jun. 2023 – Sep. 2023*

- **Game-Playing Algorithms:** Led a team of 4 researchers using techniques from nonlinear dynamical systems to develop patented game-playing AI algorithms for Pong, Pac-Man, and the Nvidia Omniverse twin world.
- **Particle Methods for AI:** Trained a network using a new particle-type Monte Carlo tree search to solve the cart-pole problem in 10 seconds (roughly 30x faster than a state of the art deep Q-network).
- **High-Performance Computing:** Wrote low-level systems code in Rust to implement multi-threading and used the CUDA platform to enable fast GPU-level concurrency.

David Harold Blackwell Summer Research Institute (DHBSRI) — Berkeley, CA
ML Research Intern (under Dr. Jelani Nelson – UC Berkeley EECS) — *Jun. 2022 – Sep. 2022*

- **Algorithm Development:** Developed new algorithms to solve the learning-augmented sorting problem in Levenshtein distance, ℓ_∞-normed, and ℓ_2-normed metric spaces and wrote a paper proving their optimality.

UCLA Math 199: Directed Research — Los Angeles, CA
Research Intern (under Dr. Rishi Sonthalia) — *Jan. 2022 - Apr. 2022*

- **Optimization Algorithms:** Modified the Project-and-Forget algorithm for metric-constrained optimization to solve mixed-integer linear programs using Gomory cuts and branch-and-bound methods.

Polymath REU — Seattle, WA
Research Intern (under Dr. Zoran Šunić) — *Jun. 2021 – Sep. 2021*

- **Computational Graph Theory:** Led a 10-person team's programming efforts to conjecture and prove recurrence relations describing the spectra of Schreier graphs of self-similar groups, which I solved explicitly.

PROJECTS

Technical blog: Created a website discussing solutions to interesting math problems and personal ML projects.

NLP + Transformers: Fine-tuned the BERT transformer model on the SST-2 dataset for sentiment analysis.

Deep RL: Trained an AI agent to play Ashta Chamma using a deep Q-network with genetic-style training.

WaveGAN: Implemented WaveGAN as described in a 2018 paper to generate more audio in the style of an input.

Dimensionality Reduction: Wrote a paper benchmarking various dimensionality reduction techniques, including MDS, Isomap, Diffusion Maps, and UMAP.

Blockchain: Implemented a distributed ledger system using blockchains and SHA-256 hashing for checksums.

CONFERENCE PRESENTATIONS

Joint Mathematics Meetings (2023): Particle methods can improve Monte Carlo tree search for game-playing.

Simons Institute for the Theory of Computing (2022): New algorithms and optimality results for the learning-augmented sorting problem in assorted metric spaces.

Joint Mathematics Meetings (2021): Explicit formulas for the spectra of Schreier graphs of self-similar groups.

AWARDS

UCLA Departmental Scholar Award (2023): Passed UCLA's Basic Qualifying Exam for PhD students in math.

Putnam Exam Top 500 Scorer (2021): Scored in the top 500 nationally for the Putnam Exam in mathematics.

National Merit Scholar (2020): One of 8,000 students (out of 1.6 million applicants) to be awarded the scholarship.

TEACHING

CMU 36-700 TA (Fall 2024): Teaching assistant for an introductory graduate course in mathematical statistics.

ORMC Lead Instructor (2022-2024): Lead instructor for the Advanced I section at the Olga Radko Math Circle.

EXTRACURRICULARS

Crisis Counselor - Crisis Text Line: I'm a trained volunteer providing counseling to people at risk of suicide.

Flutist: I've been playing Indian classical music (Carnatic style) on the bamboo flute for the last four years.

Endurance sports: I run marathons (26.2 miles), bike long-distance (200+ miles), and hike beautiful glacier mountains.