Amol Budhiraja

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EDUCATION

University of California, Berkeley — Berkeley, CA
Bachelor of Science in Electrical Engineering and Computer Sciences — *Aug. 2021 – May 2025*
- **Relevant Coursework:** Machine Learning, Deep Learning for Computer Vision, Optimization Models in Engineering, Signals and Systems, Multi-variable Calculus, Operating Systems, Database Engineering, Data Science Foundations, Discrete Mathematics and Probability Theory, Designing Information Devices and Systems, and Computer Architecture.
- **Extracurriculars:** VP of Education: Mobile Developers of Berkeley (2022-Present). Lab Assistant and Section Leader: CS61A, CS61B, EECS16A Courses (2021-22). Technical Director: Berkeley Engineering Student Council (2021-22).

PROFESSIONAL EXPERIENCE

Software Engineering Intern — Jun. 2024 – Present
Meta — *Menlo Park, CA*
- Engineered the backend of a new platform for businesses to configure and customize large language model (LLM) AI agents to fully automate their customer service capabilities. Applied Hack (PHP) and GraphQL alongside the Ent framework to develop the entire messaging workflow and designed a scalable, multi-threaded system robust to high traffic and utilization, ensuring seamless integration and high performance with 2x speedup across platforms with billions of users.
- Integrated AI-driven response mechanisms into Messenger and WhatsApp, leveraging machine learning to improve user engagement and business communication.

Undergraduate Researcher — Aug. 2023 – Present
Berkeley Netsys Lab — *Berkeley, CA*
- Spearheaded the development of SpaceGPT, a Large Language Model designed to optimize IoT device programming and usage based on the digispace paper insights. Integrated various NLP models including Sentence Transformers, Tokenizers, and pioneered vectorized search techniques, enhancing query accuracy and optimizing device-to-query mapping.

Software Engineering Intern — May. 2023 – Aug. 2023
Apple — *Cupertino, CA*
- Developed a robust, full-stack MacOS/CLI application using Swift, Python, PyTorch, and OpenCV, streamlining the extraction, prediction, and data visualization of user discomfort metrics utilizing gaussian probability distributions and bayesian inference for Apple Vision Pro. Skillfully configured and fine-tuned cutting-edge machine learning models like YOLO and ResNet and a suite of 25+ computer vision algorithms for real-time object and feature classification tasks.
- Achieved performance optimization through Image Pyramid analysis and pre-processing techniques like gaussian filters, contour detection, and edge detection. Final software product is now a cornerstone in the workflows and pipelines employed by 10+ teams across Apple.

PROJECTS

Neural Style Transfer | *Machine Learning Paper Implementation* | *PyTorch* — March 2024
- Devised a style transfer model by extending a VGG-19 model and fine tuning key layers to create a model that accurately captures the distinct content and style representations from two images.
- Formulated custom loss functions to measure discrepancies in image content and computed a Gram Matrix to quantify style correlations between various filter responses within the convolutional network.
- Executed LBFGS-based gradient descent optimization with extensive hyper-parameter tuning to generate an image that emulates the desired artistic style of one image while preserving the original content of another.

Neural Radiance Field | *Machine Learning Paper Implementation* | *PyTorch* — December 2023
- Developed an advanced 3D reconstruction algorithm, NeRFNet, synthesizing a neural representation of scenes from a dataset of 2D images using a Multilayer Perceptron framework, as proposed in the groundbreaking NeRF paper.
- Enhanced spatial resolution and network training dynamics by incorporating sinusoidal positional encoding, multi-view geometry handling, structure from motion analysis, and residual skip connections, leading to notable improvements in the fidelity of the 3D rendered outputs.

TECHNICAL SKILLS

Languages: Python, C, C++, Java, Swift, Rust, Go, x86, RISC-V, SQL/NoSQL, MongoDB, JavaScript, Hack, PHP, TypeScript, Scheme, Latex, and Git.
Frameworks/Libraries: PyTorch, OpenCV, NumPy, Pandas, Anaconda, Sklearn, PIL, TQDM, JDBC, GraphQL, Flask, Springboot, OpenMP/OpenMPI, Multiprocessing, Tesseract, React.JS/Next.JS, Swift, Express.js, MapReduce, Spark, Springboot, Node.JS, React Native, MySQL, PostgresSQL, SQLlite, MongoDB, Firebase, ZSH/Bash Scripting, TailwindCSS, Splunk, Docker, Jenkins, AWS, GCP, CvxPy, and Kubernetes.