

DHRUV KUDALKAR

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EDUCATION

University of Southern California, Viterbi School of Engineering

Master of Science in Computer Science

Coursework: Algorithms, Software Architecture, Web Technologies, Machine Learning, NLP, Adv. Computer Vision

Aug 2024 - May 2026

Los Angeles, CA

GPA: 3.88/4.00

Dwarkadas J. Sanghvi College of Engineering

Bachelor of Technology in Information Technology (Minor in Data Science)

Coursework: Data Structures and Algorithms, Software Design, Databases, Computer Networks, Operating Systems

Dec 2020 - Jun 2024

Mumbai, India

GPA: 3.97/4.00

TECHNICAL SKILLS

- **Programming Languages:** Python, JavaScript, TypeScript, C++, Java, HTML, SQL, Go
- **Frameworks & Libraries:** React.js, Next.js, Node.js, Django, Flask, Pytest, Express, gRPC, REST APIs, FastAPI
- **Machine Learning & AI:** PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, YOLO, RAG, LangChain, CLIP, FAISS
- **Systems, DevOps & Databases:** Google Cloud, AWS, Kubernetes, Docker, Git, CI/CD, MongoDB, MySQL, PostgreSQL, Firebase

EXPERIENCE

Viasat, Inc.

Software Engineer Intern (Key-Value Store Team)

May 2025 - Present

Carlsbad, CA

- Built a **Pytest-based** regression testing framework for a high-availability distributed key-value store supporting **20+ customers** in satellite operations infrastructure (~\$150M annually), now part of the **production release validation process**
- Integrated testing framework into existing **CI/CD pipelines** to standardize pre-release testing and **catch regressions** before deployment
- Created **8+ modular test suites** covering functional, ACL, and tenancy scenarios, delivering **~95% code coverage** across environments
- Designed a **configuration loader module** for SSL certificates and service endpoints, removing a bottleneck **affecting 50+ engineers**
- Automated secure build workflows leveraging **Makefiles, Docker, JFrog Artifactory, Helm charts**, and internal AWS security tooling

USC's Mark and Mary Stevens Neuroimaging and Informatics Institute

Graduate Research Assistant (Machine Learning)

Feb 2025 - Present

Los Angeles, CA

- Constructed an MRI generation pipeline using **PixArt-XL diffusion** with LoRA, producing synthetic scans conditioned on patient labels
- Developed a multi-task vision-language model with **Vision Transformers** across **8,000+ ADNI MRI scans**, incorporating FAISS-based MRI retrieval, diagnosis classification, and VQA pipelines via CLIP-style contrastive learning with **~0.80 top-k retrieval accuracy**
- Led design of a **custom transformer architecture** for T1-weighted to Mean Diffusivity MRI translation on both 2D slices and 3D volumes
- Achieved an **MS-SSIM score of 0.87** and **PSNR of 24.393** on T1-to-MD MRI translation, outperforming three transformer baselines

Tata Advanced Systems Limited

Software Development Intern

Aug 2023 - May 2024

Mumbai, India

- Built an end-to-end facial recognition system using a **dlib-based approach**, supporting **real-time** suspect identification from CCTV feeds
- Deployed the pipeline on an internal cloud with a criminal database backend, enabling **location-based retrieval** and **sub-second alerts**
- Achieved **94.17% accuracy** across video streams and images, **reducing suspect identification time by 60%** in real-world deployments

ArbDossier

Software Development Intern

Jul 2023 - Aug 2023

Mumbai, India

- Designed and integrated a core legal case analysis module with an **LLM-powered QA engine** into a **Next.js and Django** web platform
- Implemented the QA engine with transformer-based LLMs and retrieval methods, improving **accuracy by 8%** while lowering query costs
- Engineered large-scale data ingestion and web-scraping workflows over international legal databases, cutting lawyer **workload by ~70%**

ACADEMIC PROJECTS

ResearchSC: Research Network Mapper | React.js, Python, TF-IDF, Scikit-learn, Scholarly API | [\[Final Report\]](#)

Mar 2025 - May 2025

- Led development of an NLP-driven research discovery platform enabling **topic-based exploration** across **50+ USC faculty members**
- Engineered a robust end-to-end semantic search system with **ingestion, indexing, and Scholarly API-driven data extraction** pipelines
- Applied TF-IDF vectorization, PCA reduction, and Gaussian Mixture Models, yielding a **silhouette score of 0.61** in optimal clustering

Clima: Weather Intelligence | React.js, TypeScript, GCP, MongoDB, Google APIs | [\[Web Demo\]](#) | [\[App Demo\]](#)

Sep 2024 - Nov 2024

- Created a live weather analytics platform and partner **iOS application** covering all U.S. states with **interactive Highcharts visualizations**
- Architected a scalable **Google Cloud-hosted backend** combining Google's weather and geospatial APIs to support real-time forecasts
- Developed a **MongoDB-backed favorites** system with persistent location tracking and Twitter sharing, handling **500+ user locations**

SafeGuard AI: Real-Time Weapon & Fire Detection | PyTorch, YOLOv5, CNN, OpenCV | [\[IEEE\]](#) | [\[Springer\]](#)

Nov 2022 - May 2023

- Devised a novel **low-latency real-time** detection system leveraging **YOLOv5** on video streams, triggering automated alerts to authorities
- Initiated design of a **custom post-processing method** reducing false positives and improving **accuracy by 12%** over baseline models