Sagar Patel

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I develop practical **machine learning** solutions for **systems,** focusing on performance, trust, and explainability.

EDUCATION

University of California, Irvine — Irvine, CA
Ph.D. in Computer Science, Advisor: Dr. Sangeetha Abdu Jyothi — Sep 2020 - Sep 2025

University of California, Irvine — Irvine, CA
M.S. in Computer Science — Sep 2020 - Jun 2022

Texas A&M University — College Station, TX
B.S. in Computer Science, Magna Cum Laude, Undergraduate Research Scholar — Aug 2017 - May 2020

SKILLS

Machine Learning: Pytorch, TensorFlow, PySpark, Python, C++, Scikit-learn, Reinforcement Learning
Data: Numpy, Pandas, Polars, Matplotlib, Tableau
Other: Git, Bash, Docker, AWS, GCP, Microsoft Office (Excel, PowerPoint)

EXPERIENCE

VMware by Broadcom — Palo Alto, CA
Research Scientist Intern — Jun 2023 - Sep 2023
Research Scientist Intern — Jun 2022 - Sep 2022

- Framework for future scenario-based explainability for Deep Reinforcement Learning for Systems
  - Introduced an outcome-based perspective on understanding Reinforcement Learning systems controllers, revealing **hidden motivation** through key performance metrics (e.g. throughput, loss for congestion control). Achieved **state-of-the-art fidelity** across **12** benchmarks and **3** use cases: critical **network observability**, guided design, and **debuggability**.

University of California, Irvine — Irvine, CA
Graduate Student Researcher — Sep 2021 - Present

- Natural Language Understanding of Learning-Enabled Systems
  - Designed a concept-based explainer for learning-enabled systems, developing a way to understand **deep learning** controllers with high-level natural language concepts through **Large Language Models (LLMs)**, Text Embedding models, and **data-driven analysis**. Attained **93+%** fidelity across **3** applications, using human-understandable concepts to tackle **data shift**, dataset expansion, and more.

- Practically High-Performant Neural Adaptive Video Streaming
  - Uncovered practical solutions to address noise and data skew of Reinforcement Learning solutions in systems. Introduced a state-of-the-art controller for Adaptive Video Streaming, achieving a **10X quality improvement** and **75% reduction** in video buffering compared to prior work, streaming **58 stream-years** of live TV to **280,000+ users** across the wide area Internet.

- Reassessing Data-Driven Learning for Systems by Profiting off of the Stock Market
  - Designed a **deep learning**-based approach to reevaluate assumptions about **noise and uncertainty** in systems applications by analyzing real-time stock market data streams. The model aims to improve prediction **robustness** and inform trading strategies in dynamic, real-time environments, highlighting gaps in current system assumptions.

Instructor — Jun 2024 - Oct 2024
Teaching Assistant — Sep 2020 - Present

- Designed course syllabi, material, and assessments. Executed lectures, labs, and discussion sessions.
- Earned an **8.5/9** overall course rating average and a **4.5/5** learning environment average across 9 courses.

EXPERIENCE (CONT.)

Texas A&M University — College Station, TX
Peer Teacher — Aug 2020 - Dec 2020

- Assisted with lectures and coding exercises. Held 3 hour weekly programming helpdesk
- Led 2 hour-weekly labs to reinforce lecture concepts.

REFEREED PUBLICATIONS

Practically High Performant Neural Adaptive Video Streaming ✦ Best Paper Award
Proceedings of the ACM on Networking (CoNEXT), 2024
Sagar Patel, Junyang Zhang, Nina Narodytska, Sangeetha Abdu Jyothi

Toward Trustworthy Learning-Enabled Systems with Concept-Based Explanations
Proceedings of the 20th ACM Workshop on Hot Topics in Networks (HotNets), 2024
Sagar Patel, Dongsu Han, Nina Narodytska, Sangeetha Abdu Jyothi

CrystalBox: Future-Based Explanations for Input-Driven Deep RL Systems
The 38th Annual AAAI Conference on Artificial Intelligence (AAAI-24)
Sagar Patel, Sangeetha Abdu Jyothi, Nina Narodytska

Towards Future-Based Explanations for Deep RL Network Controllers
ACM SIGMETRICS Performance Evaluation Review, 2023
Sagar Patel, Sangeetha Abdu Jyothi, Nina Narodytska

SERVICE

American Red Cross
Biomedical Volunteer — Mar 2024 - Present

By Any Means, UC Irvine
Volunteer at OC Food Bank and Hub RC — Jan 2023 - Present

ENGin
English Tutor — Aug 2020 - Present

ACM HotNets 2024
Web Chair — Jan 2024 - Nov 2024

Venado Middle School, Irvine Unified School District
Title I Mentor — Oct 2023 - Jun 2024

Save Our Youth, Costa Mesa
Mentor — Jan 2023 - Jun 2023

Memorial Assistance Ministries, Houston
Intermediate ESL Instructor — Aug 2020 - Dec 2020

HONORS

Best Paper Award, ACM CoNEXT — Dec 2024

Invited to Google Networking Research Summit, Mountain View — Oct 2023

Invited for talk to SIGMETRICS Workshop on Measurements for Self-Driving Networks — Aug 2023

Industrial Affiliates Program Scholarship — Jan 2020