

Sagar Patel

Donald Bren Hall, 3243, Irvine, CA 92697 | sagar.patel@uci.edu | <https://sagar-pa.github.io/>

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
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 Mar 2024 - Present
Biomedical Volunteer

ACM HotNets 2024 Jan 2024 - Present
Web Chair

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

ENGIN Aug 2020 - Present
English Tutor

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

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

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

HONORS

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