

Haoran Su, Ph.D.

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EDUCATION	New York University, Ph.D. in Transportation Systems	2025
	University of California, Berkeley, M.Sc. in System Engineering	2018
	University of California, Berkeley, B.Sc. in Civil Engineering	2017
	University of California, Berkeley, B.A. in Computer Science	2017
EXPERIENCE	Senior Machine Learning Engineer, TikTok	2022.8 – Present
	Search Recommendation (<i>You May Also Like</i> , <i>Post-View</i> → <i>Search Attribution</i>)	
	• Designed and deployed a multi-modal post-view→search attribution model as a core cross-surface retrieval layer, enabling feed→search semantic understanding and significantly improving short-text query recall across TikTok. • Built a large-scale training corpus from in-session logs by pairing recently viewed content with subsequent user queries within temporal windows; incorporated dwell-time and click signals for positive sampling and hard negatives using BM25 and cross-user contrastive mining. • Developed a dual-tower encoder (video vs. query) with late-interaction retrieval (ColBERT-style), initialized from CLIP and multilingual GPT embeddings; trained with hybrid InfoNCE+BPR objectives and IPS-based exposure debiasing for reliable causal attribution. • Delivered strong online impact: passive searches initiated from feed increased by +12.5%, search CTR by +8.3%, feed→search latency decreased by 9.1%, and downstream user-satisfaction metrics improved by +4.7%. • Partnered with Search Ranking and Feed Infrastructure teams to integrate attribution embeddings as unified relevance features; deployed real-time ANN retrieval with scalable cross-surface joiners supporting high-QPS production traffic. • Built automated dataset-quality and label-validation pipelines (noise filtering, dwell-time checks, session-level deduplication), enabling reliable weekly backfills and consistent offline-to-online evaluation.	
	Machine Learning Research Intern, Siemens Research	2021.5 – 2021.8
	• Developed reinforcement learning–based longitudinal control models for microscopic traffic simulation in collaboration with the AIMSum autonomous-driving simulator team (later acquired), contributing core ML modules used in their driver-model pipeline. • Implemented PPO and DDPG policies in PyTorch with customized reward structures targeting headway stability and ride-comfort optimization; produced substantially smoother acceleration trajectories and reduced simulated time-to-collision risk by 35%.	

- Integrated the RL controller into the AIMSum simulation stack and built reproducible experiment pipelines (dataset preprocessing, rollout evaluation, and safety-metric logging), enabling the team to benchmark alternative driver models under consistent evaluation settings.

TECHNICAL SKILLS

ML / DL	PyTorch, TensorFlow, Hugging Face, XGBoost, Scikit-learn, JAX
Data / Infra	Spark, Flink, Kafka, Ray, Airflow, Redis, MLflow, Faiss, Feature Store
Systems / Programming	Python, C++, Scala, SQL, Docker, Kubernetes, TorchScript, TensorRT
Ops / Observability	Prometheus, Grafana, A/B Testing, Canary, Drift Detection, Causal Metrics

SELECTED PUBLICATIONS

- **Su, H.**, Zhong, Y., Chow, J. Y. J., Dey, B., & Jin, L. “EMVLight: A multi-agent reinforcement learning framework for joint dynamic EMV routing and traffic signal pre-emption.” *Transportation Research Part C: Emerging Technologies*, 146 (2022)
- **Su, H.**, Zhong, Y. D., Dey, B., & Jin, L. “EMVLight: A Decentralized Reinforcement Learning Framework for Joint Dynamic EMV Routing and Traffic Signal Pre-emption.” *Proceedings of the AAAI Conference on Artificial Intelligence*, 36(4), 4593–4601 (2022)
- **Su, H.**, Shi, K., Chow, J. Y. J., & Jin, L. “Dynamic Queue-Jump Lane for Emergency Vehicles under Partially Connected Settings: A Multi-Agent Deep Reinforcement Learning Approach.” *arXiv preprint arXiv:2003.01025* (2020)
- **Su, H.** “Facilitating Emergency Vehicle Passage in Congested Urban Areas Using Multi-Agent Deep Reinforcement Learning.” PhD dissertation, New York University Tandon School of Engineering (2025).

AWARDS

- Dwight David Eisenhower Transportation Fellowship Research Grant
- Dwight David Eisenhower Transportation Fellowship
- New York University School of Engineering Fellowship

LEADERSHIP AND SERVICE

- President of Chi Epsilon, Engineering Honor Society at UC Berkeley Chapter
- Reviewer for IEEE T-ITS, M-ITS, TR Part C/D/E, TRR
- Reviewer for AAAI