Haoran Su

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EDUCATION

New York University   New York, NY
Ph.D. in Transportation Engineering (Data Science and Machine Learning)   expected 12/2021
Thesis Advisors: Li Jin, Ph.D. and Joseph Chow, Ph.D.
<u>Selected Courses</u>: Data Mining, Machine Learning, Deep Learning, Stochastic Modeling

University of California, Berkeley   Berkeley, CA
M.Sc. in System Engineering   05/2018
<u>Selected Courses</u>: Artificial Intelligence, Dynamic Programming, Statistical Modeling

University of California, Berkeley   Berkeley, CA
B.Sc. Computer Science   05/2017
B.Sc. Civil Engineering   05/2017
<u>Selected Courses</u>: Data Structure, Algorithms, Computer Architecture, Software Engineering, Database

TECHNICAL SKILLS

Programming Languages	Python, PyTorch, TensorFlow, Java, C/C++, Ruby-on-rail, Matlab, R
Libraries & Toolbox	Pandas, NumPy, SciKit-learn, TensorBoard, Matplotlib, Seaborn, Gym
Platforms & Tools	Git, Docker, Bash, Apache Hadoop, Jupyter, PySpark, AWS EC2, S3

EXPERIENCE

C2SMART Center, New York University   New York, NY
Research Assistant   *Jan. 2020 - present*

- Leading the project of deep reinforcement learning-based connected vehicles coordination for emergency services in mixed-connectivity urban settings. Conducted experiments on simulation software as well as in-field tests.
- Bridged the deep reinforcement learning and simulation software with Python and PyTorch packages. Maintaining the interaction channel for performance and scalability to cope with intensive dataset generated from field tests.
- Participated in autonomous vehicles platooning project to reduce congestion in traffic bottlenecks. Developed a LSTM-based model to send real-time control strategies to target vehicles.

Tandon School of Engineering, New York University   New York, NY
Teaching Assistant   *Aug. 2018 - Dec. 2019*

- Instructed selected classes in graduate-level courses of Stochastic Modeling and Operation Research. Taught fundamentals in dynamic programming and linear programming.
- Drafted and graded homework assignments, coursework materials and exams. Held weekly office hours to help students solve questions in homework.

BUILT Lab, New York University   New York, NY
Research Assistant   *06/2018 - 12/2019*

- Lead the multimodal commute booking service analysis with Uber Denver through data science approaches.
- Launched a machine learning/deep learning pipeline to model and predict the probability of successful ordering.
- Designed and performed experiments for machine learning approaches and benchmark multinomial logit model.

Tencent   Shanghai, China
Software Development Engineer Internship   *06/2016 - 08/2016*

- Developed a web application for Tencent mobile gaming department to monitor price item in-store to alert users.
- Established the backend with MVC framework under RESTful strategies and implemented with Python Flask.

- Integrated Mailgun as mailing API to send/receive emails with users.
- Styled the frontend with HTML5, CSS, JavaScript as well as JQuery etc.
- Deployed into the main Tencent gaming store to provide better user experience.

RESEARCH

Uber-Transit Booking Service Analysis through Machine Learning Approaches

- Conducted data mining and wrangling based on self-designed data schema with users and trip information. Formulated model scope and identified as well as labeled users. Performed feature engineering including PCA and LDA to further reduce dimensionality.
- Applied state-of-the-art classification algorithms including Logistic Regression, Random Forest, SVM, XGBoost and KNN, via built-in and self-developed python packages.
- Established a LSTM-based deep neural network model to predict target user's multimodal traveling demand in proposed time-frame. Experimented on target population and increases ordering by 30% through revenue management.

Deep Reinforcement Learning on Emergency Vehicles Coordination in Mixed-autonomy Settings

- Customized OpenAI Gym to model urban roadway from microscopic motion planning perspective to macroscopic traffic management perspective. Established an interface to bridge PyTorch-RL frameworks with simulation software.
- Reproduced state-of-the-art value-based learning algorithms with prioritized experience replay and fixed targets through dueling/double DQN to dispatch real time coordination strategies for vehicles.
- Extended the model into Dec-POMDP settings against non-stationarity. Designed and improved multi-agent actor-critic methods for vehicle coordination. Saved 30% time for emergency vehicle passage than the benchmark system.

Survey of Supervised Learning CNN Models on Image Classification

- Reproduced various versions of ResNet, DenseNet, DarkNet(Yolo) and Inception CNNs as well as their combinations to test t1 and t5 accuracy on ImageNet/MNIST dataset. Applied overfitting by adopting early stopping and dropout.
- Developed and verified a new image augmentation method to improve testing accuracy by 2.5%.
- Compared model performance w.r.t training time, GPU usage, classification accuracy etc.

AWARDS AND CERTIFICATES

Dwight David Eisenhower Transportation Fellowship	10/2020
NYU School of Engineering PhD Fellowship	09/2019
C2SMART Student Scholarship	08/2018
Dean's List multiple semesters, UC Berkeley College of Engineering	2013 - 2017
Certificate: Deep Reinforcement Learning: Actor-critic Methods	
Certificate: Deep Q Learning in PyTorch	
Certificate: Machine Learning in Python Scikit-learn	

PUBLICATIONS AND PRESENTATIONS

Dynamic Queue-Jump Lane for Emergency Vehicles under Partially Connected Settings: A Multi-Agent Deep Reinforcement Learning Approach. **H Su**, K Shi, JYJ Chow, L Jin, arXiv preprint `arXiv:2003.01025` (Under Revision of Transportation Research Part C: Emerging Technologies)

V2I Connectivity-Based Dynamic Queue-Jump Lane for Emergency Vehicles: A Deep Reinforcement Learning Approach **H Su**, K Shi, L Jin, JYJ Chow arXiv preprint `arXiv:2008.00335` (Submitted to IEEE Intelligent Transportation System Conference)

Guiding and Coordinating for Emergency Vehicles under V2X communication protocols. (Transportation Research Annual Conference 2021)

LEADERSHIP AND SERVICE

Reviewer for IEEE Transactions Intelligent Transportation Systems	
Reviewer for Transportation Research Part C: Emerging Technologies	
President of Chi Epsilon	2016 - 2017