DONGPING QI

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WORK EXPERIENCE

Software Engineer, Full Time
Aurora Innovation,   *07/2023 -*

Work as a Software Engineer in the Motion Planning Team.

Network Software Engineer Internship
Google,   *08/2022 - 12/2022*

Work with the Global Network team on network topology optimization and capacity planning project.

Motion Planning Software Engineer Internship
Aurora Innovation,   *05/2022 - 08/2022*

Work with the Motion Planning team on building safer and faster driving strategies.

EDUCATION

Cornell University   *08/2017 – 08/2023*
Ph.D. in Applied Mathematics
Adviser: Alexander Vladimirsky

Shanghai Jiao Tong University   *09/2013 – 06/2017*
B.S. in Mathematics (Zhiyuan Honor Program)

SKILLS

Programming Languages	C++, Python, TensorFlow, MATLAB, Julia
Software & Tools	Linux, GitHub, LaTeX

RESEARCH EXPERIENCE

High-Performance Deep Learning Algorithms Using Dynamical Systems
Lawrence Livermore National Laboratory (virtual), NSF MSGI   *06/2020 - 08/2020*

Research about interpretable deep neural networks and connections between deep learning and continuous dynamical systems.

Together with my mentors, I implemented a new type of neural network, named "SpliNet", which uses B-Spline basis functions to parameterize the layer weights and biases. The performance and robustness of this neural network has been tested on various supervised learning problems. SpliNet in general improves training accuracy and provides more robust predictions.

PUBLICATIONS

1. D. Qi, D. Bindel, A. Vladimirsky, "Surveillance Evasion Through Bayesian Reinforcement Learning." Proceedings of The 26th International Conference on Artificial Intelligence and Statistics, PMLR 206:8448-8462, 2023.

2. S. Günther, W. Pazner, D. Qi, "Spline parameterization of neural network controls for deep learning." *arXiv preprint arXiv:2103.00301.*

3. D. Qi, A. Dhillon, A. Vladimirsky, "Optimality and robustness in path-planning under initial uncertainty." *Submitted for publication.*

4. D. Qi, A. Vladimirsky, "Corner cases, singularities, and dynamic factoring." Journal of Scientific Computing 79/3: 1456–1476 (2019).

TALKS & POSTERS

Surveillance Evasion Through Bayesian Reinforcement Learning. AISTATS 2023 Poster Session	04/25/2023
SpliNet: Modeling Neural Network Using B-Splines NSF MSGI Virtual Presentation	08/27/2020
Path Planning Under Initial Uncertainty Algorithms for Threat Detection Workshop (poster session), George Washington University	10/22/2019
Rarefaction Fans and Dynamic Factoring in Eikonal Equation International Congress on Industrial and Applied Mathematics (ICIAM), Valencia, Spain	07/17/2019

COURSEWORK

Real & Functional Analysis	Linear Programming
Convex Optimization	Matrix & Sparse Matrix Computations
Dynamical Systems	Partial Differential Equations
Probability & Stochastic Processes	Parallel Computing
Machine Learning for Intelligent Systems	Numerical Data Science
Reinforcement Learning	

RESEARCH INTERESTS

- Numerical Analysis; Computational Mathematics; Scientific Machine Learning.

- Optimal Control; Path Planning; Planning Under Uncertainty; Reinforcement Learning.