Xinyi Ni

+1 (530)-304-7833 linkedin.com/in/xinyi-ni xyni.maxxx@gmail.com

Education

University of California, Davis — Davis, CA, USA
Ph.D. Electrical and Computer Engineering, Advisor: Lifeng Lai — *Sept. 2019 - Dec. 2024*
Zhejiang University — Zhejiang, China
B.S. Information Engineering — *Sept. 2015 - Jun. 2019*

Coursework

Courses: Machine Learning, Reinforcement Learning, Deep Learning, Mathematics and Statistics, Optimization, Digital Image Processing, Data Structures & Algorithms, Time Series, Signal Processing.
Honors: Dean's Distinguish Scholarship, Academic Excellence Student Honor (x3).

Skills

Language: Python, MATLAB, C/C++, Java, R, Latex, SQL.
Tools: TensorFlow, Keras, Caffe, PyTorch, GPT-4, Azure ML, AWS, GCP.

Research Experience

Risk-Sensitive Reward-Free RL with CVaR | *Paper accepted by ICML 2024* — Jun. 2023 - Jan. 2024

- **Method:** Proposed an algorithm to explore environments efficiently without reward information; developed algorithms that solve CVaR RL with any given reward function solely based on exploration data.
- **Analysis:** Demonstrated the approach is PAC, analyzed sample complexity, and validated through experiments.

Policy Gradient for ϕ-Divergence Risk Measure | *Paper submitted to NeurIPS 2024* — Nov. 2022 - May. 2023

- **Method:** Developed a comprehensive ϕ-divergence risk measure encompassing a wide range of objectives in risk-sensitive RL; introduced a novel policy gradient algorithm tailored for these risk measures.
- **Analysis:** Conducted near-optimal convergence analysis and experimentally validated using Python.

Robust Risk-Sensitive RL with CVaR | *Paper submitted to IEEE ITW 2024* — Mar. 2022 - Oct. 2022

- **Method:** Built the equivalence between robust RL and risk-sensitive RL; proposed robust CVaR algorithms under various predetermined model uncertainties; introduced a new risk measure NCVaR, as a variant of CVaR and developed NCVaR-VI to enhanced CVaR's robustness under decision-dependent uncertainties.
- **Analysis:** Provided near-optimal convergence and error bound analysis, confirmed through Python simulations.

Risk-Sensitive RL via EVaR Optimization | *Two papers published by IEEE 2022* — Sept. 2020 - Feb. 2022

- **Method:** Applied a novel risk measure EVaR to better capture decision-makers' risk preferences and proposed EVaR Value Iteration and EVaR Policy Gradient to solve risk-sensitive RL with EVaR.
- **Analysis:** Demonstrated the optimality convergence and error bounds; validated by simulation through Python.

Project Experience

Autonomous Driving with Distributed RL | *Azure ML, Keras, DQN, Python* — Sept. 2023 - Feb. 2024

- **Method:** Developed a simulation platform on Azure ML with N-series GPUs.
- **Implement:** Employed a Deep Q-Network (DQN) with a three-layer convolution architecture and modified the Q-function according to risk-sensitive criterion; demonstrated its practicality in autonomous driving system.

Deep Risk-Sensitive RL in Video Games | *Linux, TensorFlow, DQN, LSTM* — May. 2021 - Dec. 2021

- **Platform:** Constructed an learning environment based on OpenAI in Linux and wrote a replay buffer.
- **Implement:** Integrated deep RL networks: Deep Q-learning Network (DQN) and Deep Recurrent Q-learning Network (with LSTM) with risk-sensitive RL, resulting in an 11.6% increase in game scores.

Clinical Diagnosis of HPV based on Deep Learning | *Caffe, CNN, Python* — Sept. 2018 - Jun. 2019

- **Data Preprocessing:** Detected the blur degree and applied blind deconvolution for image restoration; combined histogram equalization and the Laplace algorithm for image enhancement; utilized Otsu's method to partition the target area; applied data augmentation and zero-mean normalization.
- **Implement:** Employed SE-ResNet50 for classification, achieving a 15.3% improvement in the Youden index.