Yansong Gao

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Research interests

Computer Vision, Machine Learning, Transfer learning, Unsupervised Learning, Diffusion-based Generative Models, Information Theory, Bayesian Deep Learning

Education

University of Pennsylvania Philadelphia, PA
PhD Candidate in Applied Math and Compytational Science Sept. 2017 – Present
Advisor: Pratik Chaudhari. *GPA: 3.95/4.0*

Shanghai Jiao Tong University Shanghai, China
BA in Applied Mathematics, minor in Physics Sept. 2013 – May 2017
Advisor: Yaokun Wu. *GPA: 93.2/100.*

Experience

Computer Vision Research Intern
Advisor: Xin Zhou and Zhihong Pan May. 2022 – Sept.2022
Generative Models, Diffusion-based Generative Modeling
Baidu Research, Sunnyvale, California, United States

Research Assistant
Ph.D Advisor: Pratik Chaudhari Sept. 2019 – Present
GRASP Robotics Laboratory, University of Pennsylvania

Honors and scholarships

National High School Mathematics Olympiad League, First Prize	2012
Chinese Physics Olympiad, First Prize	2012
Academic Excellent Scholarship	2014-2015
National Scholarship	2015-2016
Benjamin Franklin Fellowship	2017-2019

Selected publications

Tracked publications in *ICML2022, ICML2021, ICML2020, IJCAI2019, Journal: Information and Computation 2022, Machine Learning: Science and Technology 2021*

1. Fast Diffusion Probabilistic Model Sampling through the lens of Backward Error Analysis

Yansong Gao, Zhihong Pan, Xin Zhou, Le Kang, Pratik Chaudhari.
In submission 2023

2. Deep Reference Priors: What is the best way to pre-train a model?
Yansong Gao, Rahul Ramesh, Pratik Chaudhari.
ICML, 2022.

3. Beyond the worst-case analysis of random priority: Smoothed and average-case approximation ratios in mechanism design
Xiaotie Deng, Yansong Gao, Jie Zhang
Information and Computation 2022

4. An Information-Geometric Distance on the Space of Tasks
Yansong Gao, Pratik Chaudhari.
ICML, 2021.

5. A Free-Energy Principle for Representation Learning
Yansong Gao, Pratik Chaudhari.
ICML, 2020.

6. Average-case Analysis of the Assignment Problem with Independent Preferences
Yansong Gao, Jie Zhang.
IJCAI, 2019.

7. Smoothed and Average-case Approximation Ratios of Mechanisms: Beyond the Worst-case Analysis
Xiaotie Deng, Yansong Gao, Jie Zhang.
MFCS, 2017.

8. Comparison of Scheduling Mechanisms from a Average-case Analysis Lens
Yansong Gao, Jie Zhang.
In Review, 2022.

Talks

International Conference on Machine Learning(ICML) 2022
Title: Deep Reference Priors

International Conference on Machine Learning(ICML) 2021
Title: An Information-Geometric Distance on the Space of Tasks

NeurIPS 2020 Workshop: Deep Learning through Information Geometry
Contributed Talk: An Information-Geometric Distance on the Space of Tasks

ICLR 2020 Workshop: Deep Neural Models and Differential Equations
Contributed Talk: A Free-Energy Principle for Representation Learning

International Conference on Machine Learning(ICML) 2020
Title: A Free-Energy Principle for Representation Learning

Skills

Programming

Proficient in: Python, PyTorch, MatLab, LATEX.
Familiar with: C, C++, TensorFlow.

Teaching experience

Teaching Assistant, ESE Department (Upenn) Fall 2019
ESE 546: Principles of Deep Learning

Teaching Assistant, Department of Mathematics (Upenn) Spring 2018
MATH 210: Math in the Media

Recitation Instructor, Department of Mathematics (Upenn) Fall 2018
MATH 104: Calculus

Graduate Courses

Representation Learning in Computer Vision — Deep Learning
Statistical Mechanics — Optimization Methods in Machine Learning
Mathematical Statistics — Advanced Topics in Mathematical Statistics
Advanced Probability — Stochastic Processes
Reinforcement learning — Geometric Methods in Computer Science
Functional Analysis — Real and Complex Analysis
Combinatorial Analysis and Graph Theory — Algebra
Condensed Matter Physic

Other interests

Soccer.