Sihan Wei

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Education

University of Minnesota, Twin Cities, Minneapolis, MN 09/2018 – 12/2020

M.S. in Computer Science, GPA: 3.54/4

Wuhan University, Wuhan, China 09/2014 – 06/2018

B.E. in Electrical Engineering, GPA: 3.74/4

Course Highlights:

Machine Learning (A), Nonlinear Optimization (A), Deep Learning (A), Artificial Intelligence (A), Computer Vision (A^-), Matrix Theory (A), Probability and Statistics (A), Linear Algebra (A), Calculus (A), Spatial Data Science Research (A)

Research Experience

Non-convex min-max optimization, Georgia Institute of Technology 09/2020 – Present

Advisor: Prof. Yongxin Chen

- Reviewed classic first-order methods in min-max optimization problems, such optimistic GDA, proximal point methods, extragradient method and etc.
- Currently working on applying these methods under non-convex problem settings.

Tensor methods and applications, University of Minnesota 01/2020 – Present

Advisor: Prof. Ju Sun

- Implemented second-order and third-order tensor methods as well as their accelerated versions, proposed by Yurii Nesterov
- Assessed the performance of tensor methods on different problems, including a parametric family of difficult functions and logistic regression
- Currently working on applying cubic regularized Newton's method in different problems, e.g., escaping from saddle points and GAN training.

Real-time maritime route planning, Wuhan University 03/2016 – 03/2017

Advisor: Prof. Xiongbin Wu

- Implemented the route planning algorithm based on Ant Colony Optimization and simulated in MATLAB
- Built database for storing radar data and supporting website functions with MySQL

Professional Experience

China Academy of Electronics and Information Technology, Beijing, China 05/2017 – 10/2017

Research Intern

- Implemented the KLT algorithm in C++ to track human keypoints with OpenPose and OpenCV
- Proposed an algorithm to detect the abnormal behavior of pedestrians
- Modified the vanilla OpenPose libaray to promote concurrency for multi-cameras and cut down the cost of thread scheduling, which improved the video performance by 30%, from 15 FPS to 20FPS

Selected Projects

Non-negative Matrix Factorization Using Deep Neural Networks 02/2020 – 05/2020

Think Deep learning Course Project

- Introduced an end-to-end deep neural network framework GAN-UNet for non-negative matrix factorization (NNMF)

- Tested our model on different datasets to assess the performance in terms of reconstruction error to show our method has a generalization ability under different scenarios
- Discussed the ability of symmetry breaking in our model from a perspective of inverse problems

Regional Co-location Pattern Detection 02/2020 – 05/2020

Spatial Data Science Research Course Project

- Proposed a Unique Quadruplet Enumeration algorithm to detect regional co-location patterns
- Introduced a number of new pruning metrics that lay the ground work to developing even better algorithms in future
- Conducted experiments and a case study on the Chicago Crime Dataset to assess the performance and validate the robustness of our model

Assistant Decision-making System of Maritime Search and Rescue 03/2016 – 03/2017

National Undergraduate Innovation and Entrepreneurship Training Program

- Presented a new algorithm based on 2-D spatial grid interpolation to locate the drowning people with real-time radar data
- Simulated the algorithm and plotted the trajectory in MATLAB
- Developed a website in PHP to demonstrate the trajectory of people using BaiduMap API

Awards and Honors

Academic Excellence Scholarship(top 5%),Wuhan University 2015, 2016, 2017
Outstanding Award(0.13%), Hubei Undergraduate Innovation and Entrepreneurship Competition 2017
First Prize(top 1%), China Undergraduate Mathematical Contest in Modeling 2017
First Prize(top 2%), TI Cup Undergraduate Electronic Design Contest 2017
Outstanding Graduate(top 10%), Wuhan University 2018

Teaching Experience

Teaching Assistant, MSBA 6310: Programming for Data Science Fall 2020
Teaching Assistant, MABA 6311: Programming for Business Analytics Fall 2020

Skills

Programming Languages: Python, MATLAB, Java, C/C++, JavaScript, HTML/CSS, Bash (ranked by proficiency)
Tools and Frameworks: Git, LaTeX, PyTorch, TensorFlow, OpenCV, django, Bootstrap