Pinze Yu

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EDUCATION

NEW YORK UNIVERSITY **New York, NY**
B.A. in Computer Science and Mathematics, Minor in Business Studies *Sep 2020 – May 2024*
Cumulative GPA:3.827/4.0, **Upper Division GPA**: 3.926/4.0, **Math Major GPA:** 4.0/4.0
Relevant Courses: Intro to Machine Learning (A), Linear and Nonlinear Optimization (A), Ordinary Differential Equations(A), Numerical Computing(A, Rank 1)
Graduate-Level Courses: Computer Vision, Deep Learning
Skills: Python, Java, C, React, MATLAB, Julia

INTERNSHIP

Courant Institute of Mathematical Sciences **New York, NY**
Teaching Assistant and Grader for Department of Mathematics *Sep 2023 – Now*
- Grade homework assignments and provide feedback.
- Discuss with the professor regarding the course's evaluation and learning progression.

Plaso Network Technology Co. Ltd. **Nanjing, Jiangsu, China**
Software Engineering Intern *Dec 2021 – Jan 2022*
- Develop and test software systems for an online educational platform to support local public schools during quarantine. Join weekly brainstorming sessions on software improvements, focusing on introducing valuable features for the online educational software.

RESEARCH EXPERIENCE

Nanjing University Natural Language Processing Research Group *Jun 2023 – Aug 2023*
Advisor: Yachong Guo *(Associate Professor, Nanjing University)*
- Implement classic local interpretability algorithms such as LIME, SHAP, Integrated Gradients, and LRP using Fairseq.
- Give a presentation on Integrated Gradients and its follow-up, XRAI.
- Evaluate Linear Decomposition, a novel local interpretability approach, by measuring the accuracy of each algorithm for specific sentences using RoBERTa on the SST-2 dataset.

Courant Institute of Mathematical Sciences, New York University *Apr 2023 – Now*
Advisor: Michael L. Overton *(Silver Professor of Computer Science & Mathematics, Deputy Chair of Computer Science Department)*
- Implement QR factorization using the Householder transformation with the appropriate sign and show the robustness of Householder transformation method across different datasets.
- Observe unforeseen residual norm error when tested with an incorrect sign for the Householder reflector, attributed to the computed norm falling below the machine epsilon's square root.
- Analyze the stability and error of Householder computations, aiming to mathematically establish the connection between the unexpected residual norm error and the square root of machine epsilon.

PUBLICATIONS

[1] Michael L. Overton and **Pinze Yu. On the Choice of Sign Defining Householder Transformations. Numerical Algebra, Control and Optimization**

PROJECTS

Small Object Detection with Advanced YOLOv8 Modifications *Oct 2023 – Now*
- Modify the structure in YOLOv8 by applying techniques including multi-head detectors, Wasserstein distance loss, BiFormer, and Deformable Convolutional Network (DCNv3).
- Compared with the baselineYOLOv8 structure, achieve a remarkable 12% enhancement in mean average precision with an IoU threshold of 0.5 (mAP50) while maintaining a comparable number of parameters.
- Compose a CVPR-style project report and prepare a brief presentation to introduce the core idea of the project.

Semantic Segmentation Masks Prediction with Limited Labeled Data *Oct 2023 – Now*
- Apply Convolutional LSTM, SimVP, and gated spatial-temporal attention(gSTA) on a restricted quantity of labeled training data for the purpose of predicting semantic segmentation masks. Design a novel model based on the idea from simple Siamese networks and joint-embedding predictive architecture(JEPA) to perform self-supervised learning on unlabeled training data.
- Compose a NeurIPS-style project report focusing on the visualization of the features that the novel model learns and the strengths and possible future improvements.

German Traffic Sign Recognition Benchmark Challenge *Sep 2023 – Oct 2023*
- Implement an innovative model that improves upon the baseline performance of recognizing German traffic signs. Participate in the Kaggle competition alongside graduate-level computer vision students, with a focus on improving accuracy scores on the test dataset.
- Apply techniques including data augmentation, spatial transformer network(STN), dropout, weight decay, and learning rate scheduler to improve the accuracy. Achieve a final leaderboard score of 0.9802 **(rank 1st of 112)**.