

KAIWEN ZHOU

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EDUCATION

Zhejiang University (ZJU)

Sep 2017 – Present

B.S. in Statistics GPA: 3.89/4.00, 88.07/100

- Main courses: *Fundamentals of Data Structure, Natural Language Processing, Object-Oriented Programming, Advanced Algebra, Mathematical Analysis, Probability Theory, Mathematical Statistics, Multi-Variable Statistical Analysis, etc.*

RESEARCH EXPERIENCES

Dialogue summarization with sentence weight evaluation and completeness judgement

Sep 2020 – Present

Research Assistant Advisor: Prof. Lifu Huang, Virginia Tech

■ Summary generation model

- Predicting weights of each sentence in dialogue using BERT with a linear layer and a softmax layer, then combining sentence weights into BART encoder by multiply the sentence weights with self-attention weights in the last encoder layer.
- Pretraining a completeness discriminator for generated summary using customized training data by randomly deleting sentences from the reference summary.
- Training the BART module with generation loss, the weight evaluation module with the sum of completeness score and evaluation metric score using Reinforce Learning training.

■ Evaluation metric design for factual consistency

- Ran OpenIE tool on the generated summary and the reference summary to get the subject-predicate-object tuple set.
- Computed Rouge score or BERTScore of each tuple in the generated tuple set and reference tuple set and averaged the generated tuple scores and reference tuple scores to get precision score and recall score.

Differential privacy version of GCN

July 2020 – Aug 2020

Research Assistant Advisor: Prof. Bo Li, University of Illinois at Urbana-Champaign

- Proved that using exponential or Laplacian mechanism directly on adjacency matrix will result in data inefficiency.
- Generated adjacency matrix from a differential private Hierarchical Agglomerative graph Clustering dendrogram based on MCMC sampling with further reduction of noise scale and edge reconstruction error.
- Improved accuracy by 1.5% on the Cora dataset applying the newly designed utility function for MCMC dendrogram sampling.

Pressure control mechanism design for pressure tubing system

Sep 2019

Research Leader Advisor: Prof. Zhiyi Tan, Zhejiang University

■ Establishment of mathematical models

- Fitted the functional relationship between variables using polynomial fitting, trigonometric function fitting and spline interpolation.
- Constructed a set of partial differential equations to describe the relationship between multiple variables in tubing operation under different settings.
- Designed the work mode of two nozzles and pressure reducing value to help increase the time overlap of oil pumping and spraying to the most extent and successfully reduced the variance of the oil pressure

■ Simulation and conclusion

- Simulated the operation of the system using Euler method and modified Euler method.
- Computed the parameters by dichotomy using the monotone correlation between the parameters and indexes.
- Successfully controlled the pressure in the tubing at any level and significantly reduced the variance of the pressure from 0.53 to 0.026.

PDE-based image denoising

Jul 2019 – Aug 2019

Research Leader Advisor: Prof. Xiaoliang Cheng, Zhejiang University

- Summarized PDE denoising algorithms, and created several new combinations of them.
- Effectively prevented over-diffusion and edge blurring in image denoising by stopping denoising when SNR start falling.
- Improved the results of selected algorithms on several types of pictures by automatic stop denoising.

ACADEMIC AWARDS

•Hailiang Group First Class Scholarship (2%)	Oct 2020
•Zhejiang University Second-class Scholarship (8%)	Sep 2020
•Honorable Mention in Mathematical Contest In Modeling	Mar 2020
•First Prize in China Undergraduate Mathematical Contest in Modeling (0.75%)	Sep 2019
•Zhejiang Provincial Government Scholarship	Oct 2019
•Zhejiang University Second-class Scholarship (8%)	Sep 2019
•Third Prize in Zhejiang Undergraduate Advanced Mathematics (Calculus) Competition	May 2018

SKILLS & LANGUAGES

Computer skills: Python, C/C++, Matlab, R, Stata, SQL

Languages: Chinese (Native), English (Proficient)