Tianjun Ke

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Education

Renmin University of China *Sept 2020 - Current*

BS in Applied Statistics

- Overall GPA: 3.95/4.0
- Ranking: 1/61
- Research Interest: learning theory

Research Experience

Research on multi-task learning in RKHS *July 2022 - Current*

Core group member, supervised by Prof. Junwei Lu, Harvard University

- Objective: Provide theoretical analysis on CLIP(Contrastive Language–Image Pre-training) with RKHS in a multi-task setting.
- Prove that CLIP could be reduced to learning a multi-task multi-kernel classifier f.
- Develop theoretical analysis on the convergence rate of the proposed multi-task multi-kernel estimator and obtain a sharp bound for generalization error.
- Implement the model in PyTorch and accelerate optimization by block coordinate gradient descent with closed-form updates.
- Conduct extensive simulation experiments for empirical investigation and verification of theoretical properties.
- Paper to be submitted to NeurIPS 23, co-first author.

Research on drug-target interaction and cell classification *Sep 2022 - Mar 2023*

Group member, supervised by Prof. Rui Yan, Renmin University of China

- Objective (of research on drug-target interaction): Introduce a new deep learning architecture that automatically selects critical residues and performs noise reduction via conservation score in drug-target interaction.
- Conducted experiments on PDBbind v2020 refined set and empirically verified that residues in the binding pocket are more conservative than that in the non-pocket area.
- Co-authoered a paper "MIN: Multi-channel Interaction Network for Drug-Target Interaction with Protein Distillation", to be submitted to NeurIPS 23.
- Investigated prospective deep learning methods for cell classification in scRNA-sequencing data and proposed several ideas.
- Conducted simulation experiments for finding biomarkers in scRNA-sequencing data via sparse GNN.

Research on automatic literature screening for clinical practice guidelines *June 2022 - July 2022*

Group member, supervised by Prof. Yucong Lin and Prof. Feifei Wang, Beijing Institute of Technology and Renmin University of China

- Objective: Build a general framework for automatic medical literature screening, including data collection, feature extraction, modeling building and performance evaluation.
- Curated a condensed dataset of citations related to neck pain from PubMed, a large-scale database of over 35 million citations.
- Extracted word embeddings for titles and abstracts with SciBERT.

Skills

Computer skills C/C++, R, Python(DL Framework: Pytorch, Keras)

Math skills Probability Theory, Statistics, Mathematics Analysis, Linear Algebra, Measure Theory, Real analysis, Empirical Process, Learning Theory

Awards

2020, 2023 **Bronze Prize in Programming Contest of RUC**, Renmin University of China

2022 **National Scholarship (awarded to 3 out of 179 candidates)**, China

2021 **Academic Excellence Award (sponsored by JD Group for Top 3% GPA)**, Renmin University of China

Publications

Conference Proceedings

TO BE FILLED

Languages

English **GRE** 331+4, **Toefl** 111

Japanese **N2**