

Kai Zhang

 [Leadlegend](#) |  +1 (661) 381 6888 |  kzhan118@jhu.edu

Education



Bachelors of Science in Computer Science and Technology

Peking University

2018 - 2023

Beijing, China

- Thesis: Exploring Few-Shot Learning of Large Language Models on Document-level Relation Extraction
- Course: Machine Learning | Computer Architecture | Database | Operating System
- Honor:
 - The Third Prize of Peking University Scholarship
 - summa cum laude



Master of Science and Engineering in Computer Science

Johns Hopkins University

2024 - Now

Baltimore, MD

- Research Interest: Large Language Models | BioNLP | Knowledge Graph
- Course: Convex Optimization | Natural Language Processing

Professional Experience



Research Intern

Tencent Ai Lab

2021 - 2022

Beijing, China

- Participated in construction and maintenance of multi-lingual universal-domain knowledge graph [Topbase](#)
- Implemented and optimized an entity linking model based on knowledge graph Topbase via distributed parallel development on multi-GPU, using data parallel and gradient parallel to improve contrastive learning effectiveness and inference accuracy.
- Designed a domain-specific semi-supervised named-entity recognition model based on contrastive learning paradigm Self-Tuning, introduced training signal annealing and self-distillation for better performance and achieved around 0.70 F1-score in sports and education domains with very low demand for annotated data.
- Implemented a controlled text generation model based on Chinese GPT-2 and UER-py, which takes keyword as input and outputs descriptive advertising text; Optimized model's keyword generation coverage and output diversity through in-domain pretraining and Mention Flags. The project received "Tencent Monthly Innovation Award" and has been applied to Tencent advertisement business of online reading platform.

Knowledge Graph Information Extraction Pre-training

Research Experience

Exploring Few-Shot Learning of Large LMs on Document-level Relation Extraction

2023

Supervisor: Associate Prof. Yansong Feng, Wangxuan Institute of Computer Technology, Peking University

Beijing, China

- Reviewed the few-shot learning (FSL) performance of large language models (LLMs) on mainstream NLP tasks, and investigated key factors contributing to models' generalization ability, especially their pre-training phases such as instruction tuning and prompt learning.
- Studied the limitations of document-level relation extraction (DocRE) on supervised learning settings, and explored the challenges and benefits of conducting DocRE task on FSL setting.
- Explored the influences of LLMs' DocRE generalization ability by FSL ablation experiments on scientific LLMs suite Pythia, especially the number of samples and model parameter amount.
- Validated the facilitating effect of positive correlation between pre-training corpus and inference data on DocRE task, and conducted experiments to check the correlation saliency for different models.

Interpretable Neural Network for Drug Response Prediction

2022

Supervisor: Assistant Prof. Sheng Wang, Paul G. Allen School of CSE, University of Washington

Seattle, WA

- Investigated the interpretability of neural networks, a critical problem in BioNLP, especially the way of encoding feature and information among neurons in models and how to comprehend it.
- Reproduced DrugCell, a canonical interpretable model for drug response prediction on cancer cell-line and optimized the model's inference efficiency and prediction accuracy.
- Designed a new interpretable model architecture for drug response prediction: Readable Neural Networks, which extracted contextual text embeddings of Gene Ontology terms from PubMed literatures through distant supervision.

Development of Commonsense-based Question Generation Models

2020

Supervisor: Associate Prof. Yunfang Wu, Institute of Computational Linguistics, PKU

Beijing, China

- Independently designed and implemented a seq-to-seq question generation model, leveraging prior knowledge from knowledge graph to enhance model performance and the quality of generated output.
- Reviewed development of pre-trained NLG methods (BERTsum, BART, ProphetNet, etc.), especially focusing on text summarization, and designed feasible ways to introduce pretraining paradigm into question generation task.

Skills

Languages Python | C/C++ | Java | HTML/CSS | Bash | SQL
Developer Tools Docker | Git | Google Cloud Platform | $L^A T_E X$