HAIKANG DENG

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EDUCATION

University of North Carolina, Chapel Hill Aug 2019 - May 2023
4th Year, B.S. in Computer Science & Statistics. Overall GPA: 3.96/4.0

WORK EXPERIENCE

Amazon May 2022 - Aug 2022
Software Engineer Intern Bellevue, WA
- Built a Horizonte Service for Local Landing Page which displays local products available for pick up
- Deployed the service to production and verified its reliability with production data
- Onboarded downstream dependencies to fetch data and extended JSP to render user interface
- Configured shopping portal page type and added routing rules from amazon.com

Lenovo May 2021 - Aug 2021
Software Engineer Intern Beijing, China
- Trained Encoder-Decoder LSTM for anomaly detection on time series data
- Participated in the design of Control Chart and Anomaly Detection Module
- Performed model tuning and data grouping which improved f1 score from 0.41 to 0.48

Zhongchao Credit Card Industry Development Co., Ltd Jun 2020 - Aug 2020
Software Engineer Intern Hangzhou, Zhejiang, China
- Built an Ethereum smart contract for medical data management with user interface
- Deployed the smart contract to private chain network and explored various data structures

RESEARCH EXPERIENCE

University of North Carolina, Chapel Hill Aug 2022 - Present
Undergraduate Research Assistant Advised by Prof. Colin Raffel
- Explored the knowledge-learning process of Large Language Models during pre-training
- Trained decoders on toxicity datasets, used them for controllable decoding to reduce toxicity in LM generation
- Implemented batched weighted decoding by using past_key_values and position_ids, reduced computation cost

PROJECTS

Knowledge Memorization of Large Language Models Aug 2022 - Jan 2023
- Demonstrated correlational and causal relationships between the number of relevant documents during pre-training and a model's question-answering accuracy
- Created a parallelized pipeline for entity linking and relevant document counting
- Showed that model scaling alone is inefficient and explored retrieval augmentation as an alternative
- Paper: Large Language Models Struggle to Learn Long-Tail Knowledge
  Nikhil Kandpal, **Haikang Deng**, Adam Roberts, Eric Wallace, and Colin Raffel
  40th International Conference on Machine Learning (ICML), 2023

Neural Methods of Image Captioning Jun 2021 - Dec 2021
- Compared Vanilla-LSTM, LSTM with attention, and Transformer on Image Captioning
- Achieved BLEU-1, BLEU-2 score of 67.1, 44.3 with LSTM with attention on MS COCO

TECH SKILLS

Programming Skills: Python (PyTorch, TensorFlow), Java, MySQL, R, Matlab, HTML
Models and Algorithms: Transformers, RNN/LSTM, CNN, MLP, SVM, KNN
Topics and Concepts: Regression, Time Series, Multimodality (Vision-Language), Prompt Engineering, RL

ACADEMIC ACHIEVEMENTS

Successful Participant, MCM 2021 Feb 2021
UNC Dean's List 19FA, 21FA, 22SP, 22FA
9th Place in China/27th Place Worldwide in AAPT Physics Bowl Apr 2018
Top 5% of AMC 12, AIME Qualifier Feb 2018