Yifan Qiao

yifanqiao@cs.ucsb.edu | +1 (805) 455-1182

EDUCATION

- **University of California, Santa Barbara, USA** 8/2019 - Present

  Ph.D. candidate, Computer Science. **GPA**: 3.96/4.00.

  - **Graduation:** June 2024.
  - **Research Interest:** Information Retrieval, Personalized Search.
  - **Related Courses:** Information Retrieval, Distributed Systems, Computing on Encrypted Data, Quantum Cryptography, Operating Systems, Adversarial Machine Learning.

- **Tsinghua University, Beijing, China** 8/2015 - 7/2019

  B.E., Computer Science and Technology. **GPA & Ranking**: 3.79/4.00, 20/140.

  - **Related Courses:** Artificial Neural Networks (ANN), Human-Computer Interaction (HCI), Computer Networking, Computer Organization, Software Engineering, Operating Systems.

RESEARCH AND INTERN EXPERIENCES

- **UC Santa Barbara, Santa Barbara, USA** 9/2019 - Present

  Dept. of Computer Science | *Advisor: Prof. Tao Yang* Information Retrieval

  - Designed and implemented an approximate search scheme based on clustering and bound estimation. The system can retrieve top-1k documents with 7.43ms latency from 8M documents from MS MARCO dev dataset encoded with the SPLADE retrieval model. A paper is submitted to SIGIR 2024.
  - Proposed a hybrid thresholding scheme which sparsifies the state-of-the-art sparse retrieval model SPLADE by 2-3x with minimal relevance trade-off. [1]
  - Developed a retrieval algorithm that uses traditional ranking feature BM25 to guide the retrieval on learned sparse scores. Optimized the BM25 guided index traversal with a two-level pruning control scheme which achieves up-to 6.5x speedup for SPLADE sparse retrieval. [4]
  - Built a privacy-aware query processing scheme that matches documents with the encrypted index and gathers document features safely. Designed and implemented leakage-abuse attacks against the above scheme with different design options. [6]

- **Apple Inc, Seattle, USA** Summer Intern in 2021, 2022 and 2023

  Search Quality Team | *Manager: Dr. Hua Ouyang* Information Retrieval

  - Prototyped a smart agent which answers users' questions based on their own on-device personalized data using Retrieval Augmented Generation (RAG) and Large Language Models (LLM). Trained an in-house on-device retrieval model with Low Rank Adaptors (LoRA) based on fixed backbones already available in iOS 17.
  - Designed a graph based algorithm for email classification based purely on on-device user signals, integrated the algorithm efficiently into Apple Mail using Swift and Objective-C.
  - Developed a prototype of on-device as-you-type free text suggestion system for mail search under low latency constraints, implemented and integrated to Apple Mail using Objective-C. [3]

- **Tsinghua University, Beijing, China** 9/2017 - 2/2019

  NLP Lab | *Advisor: Prof. Zhiyuan Liu & Dr. Chenyan Xiong* NLP, Information Retrieval

  - Studied the performance of BERT in terms of re-ranking on the MS-MARCO dataset. [7]

PUBLICATION

[1] Representation Sparsification with Hybrid Thresholding for Fast SPLADE-based Document Retrieval.
Yifan Qiao, *Yingrui Yang*, *Shanxiu He*, *Tao Yang*. SIGIR 2023.

[2] Balanced Knowledge Distillation with Contrastive Learning for Document Re-ranking.
Yingrui Yang, *Shanxiu He*, ***Yifan Qiao***, *Tao Yang*. ICTIR 2023.

[3] On-Device Query Auto-Completion for Email Search.
Yifan Qiao, *Otto Godwin*, *Hua Ouyang*. ECIR 2024.

[4] Optimizing Guided Traversal for Fast Learned Sparse Retrieval.
Yifan Qiao, *Yingrui Yang*, *Haixin Lin*, *Tao Yang*. WebConf 2023.

[5] Compact Token Representations with Contextual Quantization for Efficient Document Re-ranking.
Yingrui Yang, ***Yifan Qiao***, *Tao Yang*. ACL 2022.

[6] Privacy-aware Document Retrieval with Two-level Inverted Indexing.
Yifan Qiao, *Shiyu Ji*, *Changhai Wang*, *Jinjin Shao*, *Tao Yang*. Information Retrieval Journal, 2023.

[7] Lightweight Composite Re-Ranking for Efficient Keyword Search with BERT.
Yingrui Yang, ***Yifan Qiao***, *Jinjin Shao*, *Xifeng Yan*, *Tao Yang*. WSDM 2022.

[8] Window Navigation with Adaptive Probing for Executing BlockMax WAND.
Jinjin Shao, ***Yifan Qiao***, *Shiyu Ji*, *Tao Yang*. SIGIR 2021.

[9] Index Obfuscation for Oblivious Document Retrieval in a Trusted Execution Environment.
Jinjin Shao, *Shiyu Ji*, *Alvin Oliver Glova*, ***Yifan Qiao***, *Tao Yang*, *Tim Sherwood*. CIKM 2020.

[10] Understanding the Behaviors of BERT in Ranking.
Yifan Qiao, *Chenyan Xiong*, *Zhenghao Liu*, *Zhiyuan Liu*. arXiv:1904.07531, 2019.

ACADEMIC ACTIVITIES

- **Program Committee Member:** ECIR 2024.
- **Conference Reviewer**: KDD 2020, WSDM 2021, ECIR 2021, SIGIR 2021, SIGIR 2022, SIGIR 2023.
- **Teaching Experience as a Teaching Assistant:** Operating Systems, Parallel Computing, Distributed Systems.

HONORS & AWARDS

- Regents Fellowship, UC Santa Barbara. 9/2019
- Department of CS Outstanding Scholar Fellowship, UC Santa Barbara. ($16k) 9/2019
- Scholarship of Academic Excellence, Tsinghua University. 10/2016 & 10/2018
- First Prize in Jane Street Electronic Trading Competition. (¥6399RMB) 11/2016 & 11/2017
- Silver Medal in National Olympiad in Informatics (NOI) 2014. 7/2014
- **Rank #1** in both NOI in Provinces and Province Team Selection Competition in Shanxi Province. 2014

SKILLS

- **Programming Languages**: C/C++, Golang, Python, Rust, Java, Javascript, Swift, VHDL.
- **Frameworks**: PyTorch, TensorFlow, OpenCV, OpenGL, CUDA, React.