CHENCHEN YE

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EDUCATION

PhD student in Computer Science, University of California, Los Angeles (UCLA) Sep 2023 - Present
Advisor: Dr. Wei Wang, Leonard Kleinrock Professor, UCLA

Bachelor of Computer Science, National Unversity of Singapore (NUS) Aug 2018 - Jun 2022
1st Class Honors (Highest Distinction)
Advisor: Dr. Tat-Seng Chua, KITHCT Chair Professor, NUS

RESEARCH INTERESTS

I have broad interests in ML and NLP, particularly in understanding the mechanisms behind neural **language models** (LMs), developing **LLM agents** capable of solving complex problems, and enhancing **LLM reasoning** abilities. I also explore heterogeneous knowledge integration, leveraging knowledge graphs, text, code, and visual data to enhance model capabilities and interpretability.

INDUSTRY EXPERIENCE

Research Intern Jun 2024 - Sep 2024
Micrsoft Research, Mentor: Jonathan Larson, Darren Edge, Ha Trinh *Seattle, WA*

Project: Hierarchical Multi-Agent GraphRAG: Advancing Complex Query Answering through Dynamic Decomposition and Collaborative Planning

- Contributed to the maintenance of the GraphRAG repository, which currently receives over 20k stars.
- Extended GraphRAG to a hierarchical multi-agent framework, enabling dynamic question decomposition and collaborative information retrieval by agents for complex and global queries.
- Implemented a top-down multi-level query decomposition strategy and multi-agent planning mechanism, explored different agent assignment and communication patterns (e.g. Isolated, Sequential, DAG, Dynamic), improving the flexibility, accuracy, and adaptability of retrieval-augmented generation (RAG) systems.

RESEARCH EXPERIENCE

Graduate Student Researcher Sep 2023 - Present
Scalable Analytics Institute (ScAi), UCLA, Advisor: Wei Wang *Los Angeles, CA*

Research Assistant Aug 2022 - Aug 2023
NExT++ Research Center, NUS, Advisor: Tat-Seng Chua, Yunshan Ma *Singapore*
Project: Learning and Reasoning on Graphs for Knowledge-enhanced Information Retrieval

Undergraduate Student Researcher May 2021 - Jun 2022
NExT++ Research Center, NUS, Advisor: Tat-Seng Chua, Lizi Liao *Singapore*
Project: Textual and Multimodal Conversational Search and Response Generation

PUBLICATIONS

Preprints: (* denotes equal contribution.)

- **MIRAI: Evaluating LLM Agents for Event Forecasting**
  Chenchen Ye*, Ziniu Hu*, Yihe Deng*, Zijie Huang, Mingyu Derek Ma, Yanqiao Zhu, Wei Wang
  Preprint 2024, Submitted to ICLR 2025 [paper, homepage, code, data, demo]
  - Introduced a benchmark that systematically evaluates LLM agents as temporal forecasters, predicting real-world international events over varying horizons.
  - Provided an agentic environment enabling tool-use via APIs, integrating structured KG event databases and textual news for contamination-free, dynamic test splits beyond any model's knowledge cutoffs.
  - Demonstrated LLM agents' capabilities in planning and reasoning over historical data of diverse formats and timespans, highlighting key challenges and insights for advancing reliable, future-oriented inference.

- **CliBench: Multifaceted Evaluation of Large Language Models in Clinical Decisions on Diagnoses, Procedures, Lab Tests Orders and Prescriptions**
  Mingyu Derek Ma, **Chenchen Ye**, Yu Yan, Xiaoxuan Wang, Peipei Ping, Timothy S Chang, Wei Wang
  Preprint 2024, Submitted to ICLR 2025 [paper, homepage]
- **AgentGrow: LLMs as Scalable, Customizable General-Purpose Simulators For Language Agent Training**
  Yiming Wang, Yuedong Cui, Da Yin, Zongyu Lin, Di Wu, Xueqing Wu, **Chenchen Ye**, Kai-Wei Chang
  Preprint 2024, SoCal NLP Symposium 2024 [to be arXived]
  - Proposed AgentGrow, a training framework that uses LLM-based textual simulators to develop language agents without human-annotated datasets.
  - Implemented a virtual, text-based environment generator that simulates interactive states and trajectories, enabling agents to acquire and refine planning skills through exploration.
  - Introduced an iterative, dynamic trajectory synthesis process to continuously identify agent weaknesses, synthesize new targeted training data, and improve performance with minimal human intervention.

Conference Publications:

1. **GraphVis: Boosting LLMs with Visual Knowledge Graph Integration**
   Yihe Deng, **Chenchen Ye**, Zijie Huang, Mingyu Derek Ma, Yiwen Kou, Wei Wang
   Neurips 2024 [paper]
   - Introduced a novel approach to integrate knowledge graphs into LLMs by synthesizing graph-structured multimodal data, converting KGs into visualized diagrams rather than linearized triples.
   - Proposed a curriculum fine-tuning scheme on LVLMs: starting with basic graphical feature recognition, followed by complex reasoning tasks over the visualized KG-enhanced QA.
   - Enhanced zero-shot VQA performance by instruction augmentation from different modalities: combining textual data with synthetic graph images.

2. **TCELongBench: Analyzing Temporal Complex Events with Large Language Models? A Benchmark towards Temporal, Long Context Understanding**
   Zhihan Zhang, Yixin Cao, **Chenchen Ye**, Yunshan Ma, Lizi Liao, Tat-Seng Chua
   ACL 2024 [paper, code&data]
   - Established a large-scale benchmark for evaluating LLMs' temporal reasoning and long-context understanding. Designed a hierarchical summarization pipeline to extract chronological outlines. Introduced three tasks: detail QA, order QA, and forecast QA with a generate-then-verify data curation method. Evaluated the effectiveness of both retrieval-augmented generation (RAG) and long-context modeling.

3. **SeCoGD: Context-aware Event Forecasting via Graph Disentanglement**
   Yunshan Ma*, **Chenchen Ye***, Zijian Wu, Xiang Wang, Yixin Cao, Tat-Seng Chua
   SIGKDD 2023 [paper, code&data, poster, slides]
   - Proposed a novel task of context-aware event forecasting over temporal knowledge graphs and textual corpus. Constructed three large-scale event datasets. Developed a framework using graph disentanglement for context-specific temporal and relational modeling, and hypergraphs for cross-context modeling.

4. **RERG: Reflecting on Experiences for Response Generation**
   Chenchen Ye, Lizi Liao, Suyu Liu, Tat-Seng Chua
   ACMMM 2022 [paper, poster, slides]
   - Designed a neural case-based reasoning framework for multimodal task-oriented dialogues and enhanced its performance with contrastive learning for multi-modal retrieval and copying mechanism for effective and interpretable retrieval-augmented response generation (RAG).

5. **Co-Gen: Structured and Natural Responses Co-generation for Conversational Search**
   Chenchen Ye, Lizi Liao, Fuli Feng, Wei Ji, Tat-Seng Chua
   SIGIR 2022 (Oral) [paper, code, slides]
   - Incorporated supervised multitask learning and reinforcement learning (RL) finetuning in building a novel conversational search agent that co-generates structured search states for system optimization and natural language responses for answering user conversations.

Workshop Publications:

1. **Narrative Analysis of True Crime Podcasts With Knowledge Graph-Augmented Large Language Models**
   James Chapman, Xinyi Leng, Jason Liang, Jack Mauro, Xu Wang, Andrea Bertozzi, Junyuan Lin, Bohan Chen, **Chenchen Ye**, Temple Daniel and P. Jeffrey Brantingham
   CIKM 2024, The 8th Workshop on Graph Techniques for Adversarial Activity Analytics (GTA³ 2024) [paper]

AWARDS

Outstanding Undergraduate Researcher Prize, NUS [certificate] [news] Jun 2022
Deans' List Awards, NUS [certificate] AY2019-2020/ AY2021-2022
Distinction in the Multimedia Information Retrieval Focus Area, NUS [certificate] Aug 2021
Distinction in the Artificial Intelligence Focus Area, NUS [certificate] Apr 2021
Science & Technology Undergraduate Scholarship, NUS, Singapore 2018-2022
Senior Middle 2 Scholarship, Ministry of Education, Singapore 2018-2022

TEACHING

Teaching Assistant, UCLA Fall 2024

- COM SCI 245 Big Data Analytics, Lecturer: Prof. Wei Wang

Teaching Assistant, NUS Semester 1 AY2019/20

- CS2030 Programming Methodology II, Lecturer: Dr. Henry Chia
- CS2040 Data Structure and Algorithm, Lecturer: Dr. Chong Ket Fah

SERVICES

Invited Reviewer: ICLR 2024, Neurips 2024, ACL(+ARR) 2024, KDD 2024, CIKM 2024, ACMMM 2024/2023

SKILLS

Programming Languages: Expert in: Python. Familiar with: Java, C++, C, SQL, Matlab, JAX
Software & Other IT Skills: PyTorch, LangChain, AutoGen, vLLM, DeepSpeed