

Ye Chenchen

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Research Interest

My research interest covers **multimodal machine learning**, **natural language processing**, and **computer vision**. Specifically, I aim at developing models that can reason over multimodal knowledge (e.g. text, image, video, audio, knowledge graph...) and generate appropriate interpretations, predictions, and responses.

Current projects:

- Complex Event Forecasting with Heterogeneous/Multimodal Data
(textual, visual information, and temporal knowledge graph from news media)
- Multimodal Conversational Search and Response Generation

Education

Bachelor of Computing, Computer Science

Aug. 2018 – June 2022

National University of Singapore, Singapore

- **Specializations:** Artificial Intelligence [[certificate](#)]; Multimedia Information Retrieval [[certificate](#)]
- **CAP:** 4.71/5.00, **1st Class Honors (Highest Distinction)**
- **Bachelor Dissertation:** “Revisiting Response Generation for Task-oriented Multimodal Dialogue”
Supervisor: Dr. [Chua Tat Seng](#), KITHCT Chair, NUS; Director, NUS-Tsinghua Extreme Search Center (NExT)
Mentor: Dr. [Liao Lizi](#), Assistant Professor at Singapore Management University

Awards & Honors

[Outstanding Undergraduate Researcher Prize](#), NUS.

2022

- \$1000, Best undergraduate researcher (individual) in the **university-wide selection** [[certificate](#)].

[Deans' List Awards](#), NUS, School of Computing.

AY 2019 – 2020, AY 2021 – 2022

- **Top 5%** of the cohort [[certificate](#)].

[Science & Technology Undergraduate Scholarship](#), NUS.

2018 – 2022

[Senior Middle 2 Scholarship](#), Ministry of Education, Singapore.

2018 – 2022

- **Outstanding** Asian student, covers tuition fees and living allowance.

Research Experience

Research Assistant

Aug 2022 - Present

[NExT Research Center](#), *National University of Singapore*

- **Project:** Learning and Reasoning on Knowledge Graph-Enhanced Information Retrieval
- **Current Phase:** Enhance complex event forecasting by accounting for multilingual/multimodal context
- Propose to encode semantic and temporal information from the news figures and text descriptions into the event entities and relations to enhance the reasoning capability of the model.

Undergraduate Student Researcher

May 2021 – June 2022

[NExT Research Center](#), *National University of Singapore*

- Addressed a critical problem in conversational search systems in generating fluent and informative natural responses to the user while maintaining structured internal states such as dialogue acts for search optimization.
- Proposed and implemented a case-based reasoning model for task-oriented multimodal dialogues and enhanced the performance with contrastive learning for multi-modality retrieval and cross-copying from both contexts and similar cases for response rewrite.

Publications

1. Reflecting on Experiences for Response Generation. [\[PDF\]](#) [\[Slides\]](#) [\[Video\]](#)

Chenchen Ye, Lizi Liao, Suyu Liu, Tat-Seng Chua

In *Proceedings of the 30th ACM International Conference on Multimedia (MM '22)*, October 2022. (Full paper)

2. Structured and Natural Responses Co-generation for Conversational Search. [\[PDF\]](#) [\[Code\]](#) [\[Slides\]](#) [\[Video\]](#)

Chenchen Ye, Lizi Liao, Fuli Feng, Wei Ji, Tat-Seng Chua

In *Proceedings of the 45th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR '22)*, July 2022. (Full paper accepted for oral presentation)

Selected Projects

Towards Empathetic Music Generation System [\[Proposal\]](#) [\[PDF\]](#)

Jan. 2021 – Apr. 2021

Researcher (Conceptualization, Implementation, Investigation, Writing) (Kaldi & Pytorch, Media)

Supervisor: Dr. [Wang Ye](#), Associate Professor, NUS

- Proposed an emotion-controllable automatic music generation system using conditional variational autoencoder.
- Explored different musical-emotion classification models for evaluation, including SVM and MLP, LSTM, and GPT-2.

Deep Q-Learning Agent for Crossing Road

Oct. 2020 – Nov. 2020

Algorithm Programmer (Python, Reinforcement Learning)

- Implemented an AI agent using Deep Q-Learning (DQN) to handle large-scale non-deterministic planning problems, where an object needs to cross a busy multi-lane road with moving cars at different speeds.
- Improved the final accuracy by applying curriculum training and reward shaping to the convolutional DQN model.

Deepfake Video Detection Using Neural Networks [\[PDF\]](#) [\[Code\]](#)

Feb. 2020 – May 2020

Researcher (Conceptualization, Implementation, Investigation, Writing) (Keras, Computer Vision)

Supervisor: Dr. [Bryan Kian Hsiang Low](#), Associate Professor, NUS; Director of AI Research, AI Singapore

- Applied Xception Net with depthwise separable convolution layers to classify video streams into those with human-manipulation and those without.
- Compared with other implementations, including CNN-based Meso-4, MesoInception-4 model, and LSTM.

K-Puzzle & Sudoku Completion

Feb. 2020 – May 2020

Algorithm Programmer (Python)

- Implemented A* Graph Search Algorithm with different admissible and consistent heuristics for k-dimensional puzzles.
- Applied Constraint Satisfaction Problem (CSP) with backtracking to solve Sudoku puzzles, and investigated the efficiency of different heuristics, such as various variable & value selecting and domain reducing heuristics.

Industrial Experience

R&D Intern in NLP Team

June 2020 – Aug. 2020

[YITU Technology](#), Singapore

- Investigated algorithms for Knowledge-based Question Answering (KBQA), especially for multi-constraints questions.
- Constructed a QA dataset that simulates the company's business with richer expressions to enhance generalizability.
- Implemented a BERT-based Relation Extraction model that increases the accuracy and recall of the QA system.

Teaching Experience

Teaching Assistant

Jan. 2020 – May 2020

School of Computing, National University of Singapore

- [CS2030 Programming Methodology II](#), Lecturer: Dr. [Henry Chia Wai Kit](#)
- [CS2040 Data Structure and Algorithm](#), Lecturer: Dr. [Chong Ket Fah](#)

Leadership Experience

Inter-generational Learning Program (NUS & [Family Central](#))

Feb 2021 - April 2021

Team Leader, Event Organizer

- Responsible for liaison and coordination between the organization parties to conduct the program smoothly, which aims at encouraging seniors to maintain an active life and learn new skills through pair learning with student volunteers.
- Led a core team of 4 members, trained 20 volunteers, and was in charge of the timeline, contents, and sessions.

NUS Student Environmental Protection Organization

Aug 2017 - Aug 2018

President, Event Organizer

- Led a group of 11 core committee members organizing environmental protection awareness campaign which attracted 120 students from the National University of Singapore and the Nanyang Technological University to participate.
- Responsible for the campaign publicity and security issues, and adjusted volunteers' tasks according to emergencies.

Student Service-Learning Program (NUS & [Sunshine Welfare Action Mission](#))

Feb 2018 - May 2018

Event Organizer, CFO of the volunteer group

- Conceived and organized monthly volunteer sessions with SWAMI Home and successfully brought warm connections to the Dementia patients and needy elderly through well-prepared content.
- Kept tracks of finance to ensure the team works within the budget and prepared needed facilities and devices in advance.

Skills, Certifications & Others

- **Programming Languages:** Python, Java, C++, C, SQL (MySQL, PostgreSQL), R, Matlab
- **Software & Other IT Skills:** PyTorch, TensorFlow, Tableau, Kaldi, Git, Linux
- **Languages:** English (Proficient, TOEFL iBT Score: 112/120), Chinese (Native), Korean (Basic)
- **Co-curricular Activities:** Core member of the Activity Department in NUS Chinese Society, Member of the Data Science Workshop Team in NUS Statistics Society

References

- [Chua Tat-Seng](#) (bachelor dissertation advisor & research assistantship supervisor)
KITHCT Chair Professor
School of Computing, National University of Singapore
Director, NUS-Tsinghua Extreme Search Center (NExT)
dcscs@nus.edu.sg
- [Liao Lizi](#) (bachelor dissertation advisor)
Assistant Professor
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