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# Yingshan Chang

**Research Keywords:** Natural Language Processing, Reasoning, Multimodal Grounding, Knowledge Aggregation

Key to my research goal is answering the following questions:
1) **How to endow machines with reusable skills that can be compositionally built up to achieve systematic generalization?**
2) **What appropriate roles can language play in (1),** drawing inspiration from how humans use language as a medium to:
- Acquire knowledge (language as **instruction**, human–>computer);
- Externalize thoughts (language as **explanation**, computer–>human);
- Exchange information (language as **communication**, computer–>computer).

## EDUCATION

| | |
|---|---|
| **PhD in Language Technologies**, *Carnegie Mellon University* | 08/2022 — |
| **Master of Language Technologies**, *Carnegie Mellon University*  **GPA: 4.12/4.3** | 08/2020 — 05/2022 |
| **Bachelor of Science in Computer Science**, *Hong Kong University of Science and Technology*  **GPA: 4.038/4.3** | 09/2016 — 06/2020 |
| *First Class Honors, additional major in Mathematics* | |
| **Outbound Exchange**, *Georgia Institute of Technology*  **GPA: 4.0/4.0** | 01/2019 — 05/2019 |
| **AEARU STEM Summer Camp**, *Peking University*  **GPA: 93/100** | 07/2018 |

## RESEARCH

**Graduate Research Assistant / WebQA: Multihop and Multimodal QA**     09/2020 — **Present**
*Advised by Yonatan Bisk    Paper  Leaderboard  Website*     *CMU, PA*
- Crowdsourced a dataset with knowledge-seeking QA pairs and multimodal (image+snippets) knowledge sources.
- Mined hard negatives which have high lexical overlap with the question or positive sources, while lacking reference to the answer.
- Adversarially created the train/test split such that the majority answers concluded from the training set cannot carry over to testing, thus suppressing purely statistical approaches.
- Implemented baseline models for WebQA under both fine-tuning (finetune a vision-and-language Transformer) and few-shot (prompt GPT-3 with engineered prefixes) settings.
- Designed a metric for WebQA that measures both fluency and accuracy, and is hard to game by guessing a long list of entities.
- Accepted to NeurIPS 2021 Competition Track. Accepted to CVPR2022 Oral. (First Author)

**Undergrad Final Year Project / Low-Light Video Enhancement Using Deep Learning**     08/2019 — 05/2020
*Advised by Qifeng Chen    Thesis  Video*     *HKUST, HK*
- Designed a novel method for collecting dark and blurry video frames with corresponding bright and sharp ground-truth images.
- Proposed an end-to-end CNN pipeline with a fine-tuning strategy for low-light video enhancement.
- Evaluated end-to-end training on the collected dataset with both quantitative metrics and qualitative human evaluation.

**Visiting Research Assistant / Event-to-Sentence Using BERT in Automatic Story Generation**     05/2019 — 08/2019
*Advised by Mark Riedl*     *GaTech, GA*
- Implemented a Fill-in-the-Blank and an Editing-Writing network based on BERT, which is able to expand an event <sbj, pred, obj> tuple into a sentence.
- Investigated the contributions of pre-trained unsupervised models to story generation.

**Undergrad Research Project / Building a Blockchain and Smart Contract Application**     09/2018 — 12/2018
*Advised by Shing-Chi Cheung*     *HKUST, HK*
- Implemented a smart contract based on Ethereum framework.
- Developed a web interface for user interaction, supporting functions for transaction creation, manipulation and approval.

**Undergrad Research Project / Smart Home Solutions with Gesture Interaction**     06/2017 — 08/2017
*Advised by Xiaojuan Ma*     *HKUST, HK*
- Built a gesture-control light that works together with a gesture sensor and a PC in a local wifi network.

## INTERNSHIP

**Researcher @ Microsoft Research**     05/2022 — **Present**
- Build vision-and-language models for knowledge-aware reasoning with finer-grained multimodal alignment.     *MSR, US*

**HKUST Student Lab Helper / COMP2611**     09/2018 — 12/2018
- Assisted teaching and helped students complete programming assignments in lab sessions     *HKUST, HK*

**Summer Intern / Bank of China Software Center**     06/2018 — 06/2018
- Assisted in value analysis and revision of 46 innovation initiatives related to mobile banking service.     *Beijing, CN*
- Audited the Developers Conference and two cloud platform trainings directed by IBM and CloudWalk.

## SERVICE

**Conference Review Comittees**
- EMNLP 2022
- NeurIPS 2022

## SKILLS

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|---|---|
| **Tools and Programming** | Python, PyTorch, Git, LaTeX, MarkDown, Linux, HTML/CSS, JavaScript, Java, Matlab, R, d3 |
| **Communication** | Mandarin (native), English (proficient), French (beginner) |