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Yingshan Chang

Research Keywords: Natural Language Processing, Reasoning, Compositionality, Multimodal Knowledge Aggregation

Key to my research goal is 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

Master of Language Technologies, *Carnegie Mellon University* **GPA: 4.12/4.3** **08/2020 — 08/2022**
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. In submission to CVPR2022. (First Author)

Undergrad Final Year Project / Low-Light Video Enhancement Using Deep Learning **08/2019 — 05/2020**
Advised by Qifeng Chen *Thesis* *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.

Skills

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

Internship

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.