Hao ZHANG

Computer Science · Research Engineer · Ph.D. Candidate

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Summary

I am a research engineer at the Computing & Intelligence (C&I) department, Institute of High Performance Computing (IHPC), **Agency for Science, Technology and Research (A*STAR)**. I have involved in several industrial/research projects in different directions, including visual grounding, natural language processing, commonsense knowledge graph and reinforcement learning for robotics.

Meanwhile, I am a part-time Ph.D. candidate at Data Management and Analytics Lab (DMAL), School of Computer Science and Engineering (SCSE), **Nanyang Technological University (NTU)**. My supervisor is Assoc Prof. **Aixin SUN** (NTU) and co-supervisor is Dr. **Joey Tianyi Zhou** (A*STAR). My primary research interests are *Natural Language Processing (NLP)* and *Machine Learning*. Currently, my research focuses on visual reasoning (*e.g.* vision-language tasks) and transfer learning for NLP (*e.g.* knowledge transfer for low-resource language).

Google Scholar · **Personal Email**: hzhang26 AT outlook DOT com

Education

Nanyang Technological University (NTU) *50 Nanyang Avenue, SG 639798*

Ph.D. Candidate in Computer Science *Aug 2019 - Present*

Supervisor: Assoc Prof. **Aixin SUN (NTU)** · Co-supervisor: Dr. **Joey Tianyi ZHOU (A*STAR)**

Data Management and Analytics Lab (DMAL), School of Computer Science and Engineering (SCSE)

M.Sc. in Communications Engineering *Aug 2015 - Jul 2016*

School of Electrical and Electronic Engineering (EEE)

Dalian University of Technology (DUT) *Dalian City, P. R. China, 116024*

B.Eng. in Communications Engineering *Sep 2011 - Jul 2015*

School of Information and Communication Engineering (SICE)

Experience

Agency for Science, Technology and Research (A*STAR) *1 Fusionopolis Way, SG 138632*

Research Engineer @ Computing & Intelligence (C&I), IHPC *Aug 2020 - Present*

- **Safe & Robust AI, WP1: Poisoning & Backdoor in Model Training**. Deep learning requires large mounts of data for training. The absence of human supervision over the data collection process exposes organizations to security vulnerabilities. This project aims to explore data poisoning and backdoor attacks, and develop effective approaches to defence against poisoning & backdoor attacks.
- **Human-Robot Collaborate AI for Advanced Manufacturing Engineering (AME) Project, WP3: Human-like Concept and Task Learning**.

Research Engineer @ Artificial Intelligence Initiative (A*AI), IHPC *Jun 2018 - Jul 2020*

- **Human-Robot Collaborate AI for Advanced Manufacturing Engineering (AME) Project, WP3: Human-like Concept and Task Learning**. The objective is to use planning, reinforcement learning and implicit learning techniques for concept grounding and human-interactive task learning to achieve efficient and easy-to-use Automatic Robotic Programming and Human-Robot Collaboration. I am responsible for the concept grounding and learning, which includes object detection, event localization, knowledge graph and vision-language learning.

Research Engineer @ Social & Cognitive Computing (SCC), IHPC *Jul 2016 - May 2018*

- **PrimeNet Project: Human-inspired Framework for Commonsense Knowledge Representation and Reasoning**. The objective is to set out a framework for a commonsense knowledge base that allows for efficient processing, in order to meet the demands of commonsense reasoning and, hence, support intelligent machine performance in real-world tasks. At the same time, the PrimeNet still provide access to a vast knowledge resource of concepts involving specific object instances.
- **MARACANA Project: Behavioural Understanding and Narrative Descriptions from Videos**. The objective is to develop technology components that can analyze and narrate real world events captured in video, and provide the human user with a rapid understanding of the happenings in an environment. I am responsible for commonsense reasoning/learning, activity recognition in cognitive linguistic temporal-spatial representation and narrative scene description.

Selected Publications

First-Author Publication (* indicates equal contribution)

[9] Parallel Attention Network with Sequence Matching for Video Grounding

***Hao Zhang**, Aixin Sun, Wei Jing, Liangli Zhen, Joey Tianyi Zhou and Rick Siow Mong Goh*

The Findings of the 59th Annual Meeting of the Association for Computational Linguistics (**ACL Findings**), 2021.

[8] Video Corpus Moment Retrieval with Contrastive Learning

***Hao Zhang**, Aixin Sun, Wei Jing, Guoshun Nan, Liangli Zhen, Joey Tianyi Zhou and Rick Siow Mong Goh*

The 44th International ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**), 2021.

[7] Natural Language Video Localization: A Revisit in Span-based Question Answering Framework
***Hao Zhang**, Aixin Sun, Wei Jing, Liangli Zhen, Joey Tianyi Zhou and Rick Siow Mong Goh*
IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2021.

[6] Deep N-ary Error Correcting Output Codes
***Hao Zhang**, Joey Tianyi Zhou, Tianying Wang, Ivor W. Tsang and Rick Siow Mong Goh*
The 13th EAI International Conference on Mobile Multimedia Communications (**MobiMedia**), 2020. (**Best Paper Award**)

[5] Span-based Localizing Network for Natural Language Video Localization
***Hao Zhang**, Aixin Sun, Wei Jing and Joey Tianyi Zhou*
The 58th Annual Meeting of the Association for Computational Linguistics (**ACL**), 2020. (**Oral**)

[4] RoboCoDraw: Robotic Avatar Drawing with GAN-based Style Transfer and Time-efficient Path Optimization
Tianying Wang, Wei Qi Toh*, **Hao Zhang***, Xiuchao Sui, Shaohua Li, Yong Liu and Wei Jing*
Thirty-Forth AAAI Conference on Artificial Intelligence (**AAAI**), 2020.

[3] Dual Adversarial Transfer for Sequence Labeling
Joey Tianyi Zhou, **Hao Zhang***, Di Jing and Xi Peng*
IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2019.

[2] Dual Adversarial Neural Transfer for Low-resource Named Entity Recognition
Joey Tianyi Zhou, **Hao Zhang***, Di Jing, Hongyuan Zhu, Rick Siow Mong Goh and Kenneth Kwok*
The 57th Annual Meeting of the Association for Computational Linguistics (**ACL**), 2019. (**Oral**)

[1] RoSeq: Robust Sequence Labeling
Joey Tianyi Zhou, **Hao Zhang***, Di Jing, Xi Peng, Yang Xiao and Zhiguo Cao*
IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**), 2019.

Co-Author Publication

[6] COSY: COunterfactual SYntax for Cross-Lingual Understanding
*Sicheng Yu, **Hao Zhang**, Yulei Niu, Qianru Sun and Jing Jiang*
The 59th Annual Meeting of the Association for Computational Linguistics (**ACL**), 2021.

[5] Interventional Video Grounding with Dual Contrastive Learning
*Guoshun Nan, Rui Qiao, Yao Xiao, Jun Liu, Sicong Leng, **Hao Zhang** and Wei Lu*
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2021.

[4] GDPNet: Refining Latent Multi-View Graph for Relation Extraction
*Fuzhao Xue, Aixin Sun, **Hao Zhang** and Eng Siong Chng*
Thirty-Fifth AAAI Conference on Artificial Intelligence (**AAAI**), 2021.

[3] Multi-source Meta Transfer for Low Resource Multiple Choice Question Answering
*Ming Yan, **Hao Zhang**, Di Jin and Joey Tianyi Zhou*
The 58th Annual Meeting of the Association for Computational Linguistics (**ACL**), 2020.

[2] Efficient Robotic Task Generalization Using Deep Model Fusion Reinforcement Learning
*Tianying Wang, **Hao Zhang**, Wei Qi Toh, Hongyuan Zhu, Cheston Tan, Yan Wu, Yong Liu and Wei Jing*
The IEEE International Conference on Robotics and Biomimetics (**ROBIO**), 2019.

[1] Learning With Annotation of Various Degrees
*Joey Tianyi Zhou, Meng Fang, **Hao Zhang**, Chen Gong, Xi Peng, Zhiguo Cao and Rick Siow Mong Goh*
IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**), 2019.

Theses

Removing Backscatter to Enhance the Visibility of Underwater Object
Supervisor: **Lap Pui CHAU**
Master of Science (M.Sc.), School of Electrical and Electronic Engineering, Nanyang Technological University

Research on an Improved Method for Image Enhancement Based on the Retinex Theory
Supervisor: **Hongyu WANG**
Bachelor of Engineering (B.Eng.), School of Information and Communication Engineering, Dalian University of Technology

Professional Services

2020 **Program Committee (PC) Member**, The Association for Computational Linguistics (ACL)
2020 **Technical Program Committee (TPC) Member**, The EAI Mobile Multimedia Communications (MOBIMEDIA)
2019 **Program Committee (PC) Member**, The Association for Computational Linguistics (ACL)

Honors & Awards

2018 **1st Runner Up**, Artificial Intelligence (AI) Hackathon in Agency for Science, Technology and Research *Singapore*
2015 **Outstanding Graduates**, Dalian University of Technology *P. R. China*
2013 **Second Prize**, Higher Education Press Cup College Student Mathematical Modeling Contest (National Level) *P. R. China*
2013 **First Prize**, Higher Education Press Cup College Student Mathematical Modeling Contest (Provincial Level) *P. R. China*
2013 **Certificated**, Undergraduate Innovation and Entrepreneurship Training Program (National Level) *P. R. China*
2013 **Second Prize**, ACM/ICPC The Third Dalian City Programming Contest *P. R. China*
2012, 2014 **Learning Excellence Award (Second Prize)**, Dalian University of Technology *P. R. China*
2012, 2013 **Technological Innovation Award**, Dalian University of Technology *P. R. China*