Shengguang (Daniel) Wu

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EDUCATION

Peking University   Sept. 2021 - Jun. 2024
Institute of Applied Linguistics - Natural Language Processing   **Master**
▷ Key Courses: computational linguistics, data structures, data mining and analysis, corpus linguistics

School of Computer Science - Computer Intelligence   **Graduate-Level Curriculum**
▷ Key Courses: multimodal learning (language and vision), semantic computation, knowledge retrieval

LMU Munich   Sept. 2019 - Aug. 2020
School of Language and Literature - Linguistics   **Exchange Funded by National Scholarship**
▷ Key Courses: language and cognition, generative syntax, distributed morphology, lexicology

Nanjing University   Sept. 2017 - Jun. 2021
Department of German Studies - Germanic Linguistics   **Bachelor**
▷ Key Courses: syntactic parsing, pragmatics

RESEARCH INTERESTS

LLM&VLM: LLM/VLM pretraining & alignment-tuning, factual reasoning, lifelong learning
NLG&AIGC: creative text/visual generation (story, visual narrative), diffusion models
NLP+:   LM + linguistic insights, LM + cognition, applications for social good
Data-Centric: active learning, curriculum learning

PUBLICATIONS

Shengguang Wu, Mei Yuan, Qi Su. (⋆Accepted to *EMNLP-2023-Findings*). "DiffuVST: Narrating Fictional Scenes with Global-History-Guided Denoising Models." [PDF]

Shengguang Wu, Keming Lu, Benfeng Xu, Junyang Lin, Qi Su, Chang Zhou. (submitted to *NAACL-2024*, on *ArXiv-2023*). "DiverseEvol: Self-Evolved Diverse Sampling for Efficient Instruction Tuning." [PDF]

Shengguang Wu, Zhenglun Chen, Qi Su. (submitted to *AAAI-2024*, under review). "Knowledge-Aware Artifact Image Synthesis with LLM-Enhanced Prompting and Multi-Source Supervision." [PDF]

Jinze Bai, ..., **Shengguang Wu**, ..., Tianhang Zhu et al. (on *ArXiv-2023*). "Qwen Technical Report." [PDF]

Shengguang Wu, Lingling Chang. (in *Language, Technology and Culture, 2022*, pp. 241-256). "Complex PATH-Constructions in German and Chinese: An Investigation of Their Cognitive Basis and Derivation Structure from a Neo-Constructionist Grammar Perspective. [title translated from German]." [BOOK]

RESEARCH EXPERIENCE

Institute for Artificial Intelligence, Peking University   Nov. 2021 - present
Research Assistant in NLP and Multimodality   mentored by Prof. Qi Su

⊛ **Diffusion-Based Visual Storytelling with Global Guidance:** Proposed an extended DiffusionLM featuring bidirectional textual history guidance and multimodal adapters to generate a coherent story that narrates a sequence of images. ↦ Superior performance across NLG metrics at a massively faster inference speed compared to strong baselines. (PAPER, ⋆Accepted to *EMNLP-2023-Findings*).

⊛ **Knowledge-Aware Artifact Image Synthesis with LLM-Enhanced Prompting and Multi-Source Supervision:** Proposed an artifact image recovery system that accurately generates images of lost artifacts adhering to historical knowledge. ↦ Significant improvement across automatic metrics and in human evaluation. (PAPER, submitted to *AAAI-2024*, under review).

⊛ **Advancing Pragmatic Interactions with LLMs:** Introduced an in-depth analysis of conversational implicatures within LLMs, followed by strategic enhancements in alignment-tuning and inference to elevate their pragmatic understanding and response mechanisms. ↦ More human-like conversational interactions due to the model's refined grasp of pragmatics. (technical paper in progress).

⊛ **Enhancing Logic Puzzle Solving via Graph-Guided LLM Agent:** Proposed a graph-structured system to search for the optimal path linking diverse intermediate reasoning steps toward solving a logic puzzle. ↦ Substantial accuracy boost over baseline LLM on logic puzzle problems. (technical paper in progress).

DAMO Academy, Alibaba Inc.   Mar. 2023 - present
Research Intern in Foundation LLM - **Qwen Team**   mentored by Junyang Lin

⊛ **Self-Evolving Diverse Sampling for Efficient Instruction Tuning:** Proposed an iterative sampling system based on diversity measures to select the most effective instruction data that continuously improves model capability without any external supervision. ↦ Superior performance with **less than 8%** of the original data size across various source datasets and multiple benchmarks. (PAPER, submitted to *NAACL-2024*; on *ArXiv-2023*).

⊛ **Large-Scale Supervised Finetuning (SFT) with MoE for Human-Alignment:** Collaboratively applied large-scale SFT to cover highly diverse user queries. ↦ Routinely updated our foundation LLM's dialogue ability to meet user expectations and achieve superior performance across benchmarks. (PAPER, on *ArXiv-2023*, open-sourced version: *Qwen(-Chat)*).

AI-Lab NLP&Research, ByteDance (TikTok) Inc.   Jul. 2022 - Feb. 2023
Research&Development Intern in NLP   mentored by Runkai Yang and Dr. Yuan Lin

⊛ **Fine-Grained NLI System with Mixture of Experts (MoE):** Built a fine-grained rumor & harmful-message detection pipeline with a multi-level multi-label NLI model and mixture of problem-tag experts (MoE) deployed on multiple company apps (TikTok, Toutiao, etc.). ↦ Achieved a gain of **5%-20%** in precision rate.

⊛ **Deep Active Learning:** Proposed deep active learning strategies based on predictive uncertainty and clustering to iteratively reduce data-labeling labor for model update. ↦ Reduced training data size by **60%-70%** in NLI training for similar/better performance.

OTHER RESEARCH PROJECTS

⊛ **User-Controllable Diverse Image Captioning:** Proposed a user-controllable image captioner based on FasterRCNN&BottomTopLSTM by explicitly fusing encoded macro-textual attributes into the decoder. ↦ Better performance across metrics on COCO-Caption, while allowing diverse user-control of caption texts.   (Jan. 2022)

⊛ **Archaic↔Modern Chinese Unsupervised Machine Translation:** Proposed a fully unsupervised translation model between archaic and modern Chinese with a shared bilingual encoder and two language-specific decoders trained by denoising and backtranslation.   (Dec. 2021)

SKILLS

Languages

Mandarin Chinese:	native
English:	TOEFL-iBT: **118 (R30/L30/S30/W28)**; IELTS: **8.0 (S8.0)**
German:	TestDaf: **100% full marks (TDN5)**

Programming

Python, SQL, HTML.	Docker, Git, Linux, MacOS.
PyTorch, Megatron, Deepspeed.	Scikit-Learn, Numpy, SciPy, Pandas, NLTK, SpaCy.

AWARDS AND SCHOLARSHIPS

First Prize for Outstanding Bachelor Thesis Award, *Nanjing University*	Jun. 2021
Outstanding Student Leader Award, *Nanjing University*	Dec. 2018
National Scholarship for International Exchange, *CSC*	Sept. 2019 - Aug. 2020