Tianshuo Peng

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EDUCATION

Wuhan University B.S. **Wuhan, China**
School of Computer Science (Ranked 19th by US News) *September 2021- present*

- **GPA: 3.95**/4.00 **Rank: 1**/51
- **Core courses:** Advanced Mathematics, Linear Algebra, Optimality Method, Probability and Mathematical Statistics, Stochastic Processes, Machine Learning, Computer Vision, Intelligent Robots, Intelligent System Design and Implementation

RESEARCH INTEREST

- **Multi-Modal Understanding and Generating:** Multi-Modal Representation Learning, Visual-Language Pretraining, Image Generation, Video Generation
- **Multi-Modal Large Language Models (MLLMs):** Visual Question Answering, Visual-Language Chatbot, Multi-Modal Instruction Following Tuning
- **Natural Language Processing:** Large Language Models, Information extraction, Sentiment Analysis

PUBLICATION (*CORRESPONDING AUTHORS, †EQUAL CONTRIBUTION)

Multi-modal Auto-regressive Modeling via Visual Words **[MM2024]**
- ***Tianshuo Peng†**, Zuchao Li†*, Lefei Zhang, Hai Zhao, Ping Wang, Bo Du*

A Novel Energy Based Model Mechanism for Multi-Modal Aspect-Based Sentiment Analysis **[AAAI2024]**
- ***Tianshuo Peng†**, Zuchao Li†*, Ping Wang, Lefei Zhang, and Hai Zhao*

FSUIE: A Novel Fuzzy Span Mechanism for Universal Information Extraction **[ACL2023]**
- ***Tianshuo Peng†**, Zuchao Li†*, Lefei Zhang, Bo Du, Hai Zhao*

RESEARCH EXPERIENCE

Unified Multi-modal Auto-regressive Modeling Framework **Sept. 2023 - Apr. 2024**
Wuhan University, Sigma Lab *Advisor: Zuchao Li*

- We perform multi-modal auto-regressive modeling with a unified objective over multi-modal large language models for the first time.
- Our proposed model achieves superior visual-language understanding performance compared to the 13B model on five VQA datasets and four Benchmark Toolkits, using only 7B parameters. It even demonstrates competitive performance against larger-scale models like 33B.
- MM 2024 poster presentation (**first author**)

Energy Based Model for Multi-Modal Aspect-Based Sentiment Analysis **Mar. 2023 - Aug. 2023**
Wuhan University, Sigma Lab *Advisor: Zuchao Li*

- We proposed a Dual-Query Mechanism using the prompt as both visual query and language query to extract prompt-aware visual information. Additionally, we introduce an Energy-based Pairwise Expert that predicts aspect or sentiment span based on pairwise stability.
- Experiments on three widely used benchmarks demonstrate that our method outperforms previous approaches and achieves a new state-of-the-art performance.
- AAAI 2024 poster presentation (**first author**)

Fuzzy Span Mechanism for Universal Information Extraction **Spet. 2022 - Feb. 2023**
Wuhan University, Sigma Lab *Advisor: Zuchao Li*

- We proposed the Fuzzy Span Loss to alleviate the span-based model's excessive reliance on precise annotations. Additionally, we introduced Fuzzy Span Attention to adjust the model's focus on semantic information within limited spans in information extraction tasks.
- Our proposed method gets SOTA or competitive performance on a series of main IE tasks.
- ACL 2023 poster presentation (**first author**)

PROJECT EXPERIENCE

Computer Vision & Deep Learning Integrated Project (Course Project) **June. 2023**

- Perform image classification on the CIFAR-10 dataset using the classic LeNet model and further improve the model structure to enhance performance.
- Conduct medical image segmentation on the ISBI-2012 dataset using the Unet model and further enhance the model to improve performance.
- Fine-tune the pre-trained DeeplabV3 model on the PASCAL VOC 2012 dataset to achieve semantic segmentation.

Computer Vision Based Autonomous Driving Project (Course Project) **July. 2023**

- Learn to use digital image processing techniques to identify and label lane lines in video frames.
- Implement vehicle object detection using MobileNets for low computational cost.

SCHOLARSHIPS AND AWARDS

- **China National Scholarship** (Top 2% nationwide) *Oct. 2023*
- **First-class Scholarship** (Top 5% schoolwide) *Oct. 2023*
- **Merit Student** (Top 5% schoolwide) *Oct. 2023*
- **Second-class Scholarship** (Top 10% schoolwide) *Oct. 2022*
- **Merit Student** (Top 5% schoolwide) *Oct. 2022*