Yuchen **Shen**

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Education

Carnegie Mellon University (CMU) *Pittsburgh, PA*

Master of Science in Intelligent Information Systems, Language Technologies Institute *May 2025 (Expected)*

Courses: Probabilistic Graphical Models, Multimodal Machine Learning, Introduction to Question Answering

University of Electronic Science and Technology of China (UESTC) *Chengdu, China*

Bachelor of Engineering in Software Engineering, School of Information and Software Engineering *Jul. 2023*

Courses: Program Design and Algorithm Foundation, Probability and Mathematical Statistics, Calculus, Introduction to Neural Networks

Publication

- **Yuchen Shen**, Xiaojun Wan. OpinSummEval: Revisiting Automated Evaluation for Opinion Summarization, *Arxiv*:2310.18122.
- Fei Zhao*, **Yuchen Shen***, Zhen Wu, and Xinyu Dai. Label-driven denoising framework for multi-label few-shot aspect category detection, In *Findings of the Association for Computational Linguistics: EMNLP 2022*. Association for Computational Linguistics.
- Mengjuan Liu, Xiaoming Bao, Jiang Liu, Pei Zhao, and **Yuchen Shen**. Generating emotional response by conditional variational auto-encoder in open-domain dialogue system. *Neurocomputing*, 460:106–116, 2021.

Research Experience

Controllable Toxicity Generation for Plant Molecules, Carnegie Mellon University *Sep. 2023 - present*

Advisor: Barnabás Póczos, Associate Professor, Machine Learning Department, School of Computer Science

- Gathered a dataset consisting of 1535 toxic and 39576 non-toxic plant molecules and achieved a classification accuracy of 0.76
- Proposed to achieve controllable toxicity generation via diffusion model with contrastive learning at both instance-level and model-level

Convergence of Decentralized Machine Learning Algorithms, North Carolina State University *Feb. 2023 - present*

Advisor: Xiaorui Liu, Assistant Professor, Department of Computer Science

- Analyzed convergence rates for different decentralized algorithms under a convex setting

Automated Metric Evaluation for Opinion Summarization, Peking University *Dec. 2022 - May. 2023*

Advisor: Xiaojun Wan, Professor, Wangxuan Institute of Computer Technology

- Proposed to evaluate metrics based on aspect-relevance, self-coherence, sentiment-consistency, and readability for opinion summarization
- Constructed a dataset with annotated outputs from 14 popularly used models in opinion summarization based on the aforementioned 4 dimensions
- Analyzed 26 popularly used automatic metrics, with the conclusion that neural-based metrics showed better correlations with annotation scores

Zero-Shot Learning for Unsupervised Opinion Summarization with Prefix-Tuning, Peking University *Feb. 2022 - Dec. 2022*

Advisor: Xiaojun Wan, Professor, Wangxuan Institute of Computer Technology

- Constructed a zero-shot scenario where the summarizer is trained and tested on different aspects for unsupervised opinion summarization
- Proposed a novel framework that produces two kinds of prefixes to control the number of aspects and sentiment coherency in the summary
- Improved the zero-shot performance on SPACE dataset compared with strong baselines (e.g., on the "service" aspect, ROUGE-1 score raised from 33.56 to 35.94 compared with previous fine-tuned SOTA model ACESUM)

Label-enhanced Few-shot Learning for Multi-label Aspect Category Detection, Nanjing University *Aug. 2021 - Jan. 2022*

Advisor: Xinyu Dai, Professor, Department of Computer Science and Technology

- Identified the generic and noisy features that confuse the classifier as the bottleneck for multi-label few-shot aspect category detection (FS-ACD)
- Introduced label texts to denoise the feature of each category and designed a flexible framework with a label-guided attention module and a label-weighted contrastive loss for FS-ACD to respectively learn representative features and to distinguish semantically-close categories
- Improved the performance of current state-of-the-art models on FS-ACD (e.g., F1 score for 5-way 5-shot setting raised from 75.37 to 78.27 on FewAsp dataset for model Proto-AWATT), with a paper accepted by *Findings of EMNLP 2022* as the co-first author

Project

Edge Weighting Algorithm with Ollivier-Ricci Curvature for Graph Classification *Sep. 2023 - Dec. 2023*

Carnegie Mellon University

- Proposed to weight edges based on Ollivier-Ricci curvature to overcome over-smoothing and over-squashing instead of graph rewiring.
- Proposed to optimize the idleness in the computation of the Ollivier-Ricci curvature and achieved a classification accuracy of 70.90 ± 0.047 (with a baseline accuracy of 69.59 ± 0.048) on the Proteins dataset

Deep Neural Models in Aspect-Based Sentiment Analysis *Jul. 2021 - Aug. 2021*

2021 Nanjing University NLP Summer Camp

- Implemented sentiment analysis models such as interactive attention network (IAN) and aspect-specific graph convolutional network (ASGCN)
- Improved the accuracy by 14.86% and 7.37% on SemEval 2014 laptop and restaurant datasets respectively with IAN augmented with pre-trained BERT model, and validated the effectiveness of graph information in ASGCN with 2.8% accuracy improvement over IAN on laptop dataset

Skill

Languages Chinese (native), English (TOEFL: 112, GRE: 160+168+4)

Programming Python (proficient), C, Java, LaTeX

Tools **Machine Learning**: PyTorch, TensorFlow, Keras **Visualization**: Matplotlib, scikit-learn, seaborn