MATTHEW RAFFEL

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EDUCATION

Ph.D. in Computer Science, Outstanding Scholars Program — **Expected June 2027**
Oregon State University, Corvallis OR
Cumulative GPA: 3.95/4.0

Honors B.Sc in Electrical and Computer Engineering — **September 2019 - June 2023**
Oregon State University, Corvallis OR
Cumulative GPA: 4.0/4.0, Summa Cum Laude

RESEARCH EXPERIENCE

Graduate Research Assistant — **September 2023 - Present**
STAR Lab at Oregon State University, Advisor: Dr. Lizhong Chen

- Conducted research applying LLMs to simultaneous speech translation by modifying Huggingface Transformers
- Reported on progress in weekly meetings with research advisor and other graduate research assistants
- First-authored and co-authored papers accepted at EMNLP 2024 and ACL 2024

Undergraduate Research Assistant — **February 2020 - June 2023**
STAR Lab at Oregon State University, Advisor: Dr. Lizhong Chen

Honors College Thesis: Leveraging Transformer Encoder Output for Effective Token Summarization in Simultaneous Translation

- Adapted a Transformer encoder in Fairseq to improve its ability to perform simultaneous speech translation
- Trained and evaluated hundreds of Transformer models on the OSU high performance computing cluster
- Created and defended a thesis document with a thesis committee
- Formed the foundation for two first-authored papers accepted at ICML 2023 and Findings of ACL 2023

Project: CTC-based Compression for a Simultaneous Speech Transformer

- Implemented CTC loss in Fairseq and edited a Transformer encoder to perform CTC-based compression for simultaneous speech-to-text translation

PUBLICATIONS

[1] M. Raffel, D. Penney, and L. Chen, "Shiftable context: Addressing training-inference context mismatch in simultaneous speech translation," in *Proceedings of the 40th International Conference on Machine Learning*, 2023.

[2] M. Raffel and L. Chen, "Implicit memory transformer for computationally efficient simultaneous speech translation," in *Findings of the Association for Computational Linguistics: ACL 2023*, July 2023.

[3] V. Agostinelli, M. Wild, M. Raffel, K. Fuad, and L. Chen, "Simul-LLM: A framework for exploring high-quality simultaneous translation with large language models," in *Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics*, Aug. 2024.

[4] M. Raffel, V. Agostinelli, and L. Chen, "Simultaneous masking, not prompting optimization: A paradigm shift in fine-tuning LLMs for simultaneous translation," in *Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing*, Nov. 2024.

ACADEMIC PROJECTS

Compute-efficient Real-time Voice Cloning (Senior Capstone Project)

- Guided a 3-person team to perform adversarial training for a voice cloning conditional variational autoencoder from the ESPnet toolkit, followed by converting it to an ONNX format and applying quantization

SKILLS

Computer Programming	Python, C, C++, CUDA, LaTeX
Machine Learning	PyTorch, Pandas, NumPy, Scikit-learn, Fairseq, ESPnet, Huggingface Transformers
Software	Linux, Slurm, Kubernetes, Docker, ModelSim, LTspice, Ngspice, KiCad
Tools and Hardware	SystemVerilog, Soldering, PCB Design, Jetson Nano, FPGA, Arduino, ATmega128
Leadership	Eagle Scout