Aditya Parikh

Curriculum Vitae

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Experience

May 2021 – Present **PhD Candidate and ICT Developer**, *Radboud University*, Nijmegen.

- **PhD Candidate** | **Speech Assessment for L2 Speakers** (January 2024 – Present)
  - Designed and fine-tuned large language and speech models using supervised, multi-task, and preference-based training approaches.
  - Built retrieval-augmented generation (RAG) pipelines for a pedagogical feedback system, grounding LLM outputs with retrieved reference material.
  - Implemented confidence-based speech scoring components within a feedback-generation pipeline, comparing alignment-based and alignment-free methods and evaluating their system-level trade-offs.
  - Established evaluation and benchmarking frameworks to validate model improvements and guide deployment decisions.
  - Contributed peer-reviewed applied AI research to leading international conferences (Interspeech 2025, SLaTE 2025, LREC 2026).
- **ICT Developer** | **Audio Processing Pipeline (ATRIUM Project EU)** (September 2024 – Present)
  - Developed an automated multilingual audio processing pipeline for long-form customer conversations.
  - Integrated speaker diarization and LLM-based summarisation, delivering structured outputs via APIs for downstream analytics and decision-making.
  - Applied context-aware chunking techniques to reliably summarise long conversations beyond native LLM context limits.
- **Junior Researcher** | **Inclusive AI (SignOn Project EU)** (May 2021 – December 2023)
  - Designed and deployed automatic speech recognition (ASR) components for a multilingual, multi-modal mobile application supporting Deaf and Hard of Hearing (DHH) users.
  - Developed and optimised ASR models for multiple languages, including under-resourced languages, adapting systems to handle diverse and non-standard speech patterns.
  - Delivered low-latency ASR services via REST APIs on on-premises infrastructure, meeting real-time performance requirements for mobile applications.
  - Evolved ASR pipelines from traditional hybrid systems to modern self-supervised and end-to-end models, improving robustness and maintainability.
  - Applied data augmentation and ensemble techniques to enhance model performance and reliability in low-resource and noisy conditions.
  - Published applied research in peer-reviewed international venues (LREC-COLING 2024, ICNLSP 2023, CLIN 2023).

Sep 2020 – Mar 2021 **Master's Thesis**, *Otto-von-Guericke-University*, Magdeburg, Germany.

- Developed and evaluated neural network models for speech emotion recognition.
- Improved model robustness through data augmentation techniques, achieving measurable accuracy gains on benchmark datasets.
- Applied automated hyperparameter tuning to sequential CNN architectures, evaluating performance across multiple configurations.
- Explored audio compression and preprocessing with standard codecs (e.g., Opus, MP3) to assess model robustness across varying bitrates.

Mar 2020 – Jun 2020 **Internship**, *Fraunhofer IIS*, Erlangen, Germany.

- Developed and evaluated language modeling components for ASR systems using both neural and statistical approaches, integrating them with decoding and search strategies.
- Implemented greedy and beam search decoding for CTC-based models to improve keyword spotting performance.
- Applied and compared smoothing techniques (e.g. Stupid Backoff, Kneser–Ney) to optimise language model performance.
- Achieved measurable reductions in word and character error rates through systematic model and decoding improvements.

Oct 2016 – Oct 2018 **System Engineer**, *Tata Consultancy Services*, Ahmedabad, India.

- Executed end-to-end performance and reliability testing for large-scale national tax portals within Agile/Scrum delivery cycles.
- Designed and maintained automated test suites using Selenium and Jenkins, improving release stability and reducing manual testing effort.
- Investigated system logs and performance metrics to identify recurring failure patterns and support preventive reliability improvements.

Teaching

Aug 2024 – Dec 2024 **Instructor, Research-Master Courses**, *Radboud University*, Nijmegen, The Netherlands.

- Introduction to Language and Speech Technology
- Transformer-Based Models
- Automatic Speech Recognition

Education

Oct 2018 – Mar 2021 **M.Sc. Electrical Engineering and Information Technology**,
Otto-von-Guericke-University,Magdeburg,Germany.

- Focus areas: Signal Processing, Speech Recognition, Natural Language Processing.

Jun 2012 – May 2016 **B.Eng. Electrical Engineering**,
Gujarat Technological University, Ahmedabad, India.

- Focus areas: Control Systems, Power Systems, Electrical Engineering fundamentals.

Technical Skills

- Programming: Python, Bash/Shell, SQL
- Machine Learning & Training: PyTorch, Hugging Face Transformers, PEFT/LoRA, Scikit-learn, TensorFlow/Keras, NumPy, Pandas
- LLM Techniques (NLP): Instruction tuning, embeddings, retrieval-augmented generation (RAG), prompt design
- Speech & Audio Processing: Librosa, TorchAudio, NVIDIA NeMo, Kaldi
- APIs & Applications: FastAPI, Flask, Streamlit
- MLOps & Experimentation: Docker, Weights & Biases, TensorBoard, Jenkins
- Version Control & Collaboration: Git, Jira
- Cloud & Compute: Academic cloud and HPC environments (SURF), GPU-based model training

Publications (First Author)

- A. Parikh, C. Tejedor-García, C. Cucchiarini, H. Strik, **A Finetuned SpeechLLM for Joint Multi-Granular L2 Assessment and Natural-Language Rationales**,*Submitted to a conference*.
- A. Parikh, C. Tejedor-García, C. Cucchiarini, H. Strik, **Rubric-Guided Fine-tuning of SpeechLLMs for Multi-Aspect, Multi-Rater L2 Reading-Speech Assessment**,*LREC 2026 - Linguistics, Language Resources and Evaluation, Palma, Mallorca, Spain*.

- A. Parikh, C. Tejedor-García, C. Cucchiarini, H. Strik, **Evaluating Logit-Based GOP Scores for Mispronunciation Detection**, *Proc. Interspeech 2025*, Rotterdam, The Netherlands.
- A. Parikh, C. Tejedor-García, C. Cucchiarini, H. Strik, **Enhancing GOP in CTC-Based Mispronunciation Detection with Phonological Knowledge**, *Proc. Interspeech 2025*, Rotterdam, The Netherlands.
- A. Parikh, C. Tejedor Garcia, C. Cucchiarini, H. Strik, (2025) **Zero-Shot Speech LLMs for Multi-Aspect Evaluation of L2 Speech: Challenges and Opportunities**. Proc. 10th Workshop on Speech and Language Technology in Education (SLaTE), Nijmegen, The Netherlands
- A. Parikh, L. ten Bosch, H. van den Heuvel, **Ensembles of Hybrid and End-to-End Speech Recognition**, *LREC-COLING 2024 - The 2024 Joint International Conference on Computational Linguistics, Language Resources and Evaluation*, Torino, Italy.
- A. Parikh, L. ten Bosch, H. van den Heuvel, C. Tejedor-García, **Comparing Modular and End-To-End Approaches in ASR for Well-Resourced and Low-Resourced Languages**, *ICNLSP – 6th International Conference on Natural Language and Speech Processing*, Trento, Italy.
- A. Parikh, L. ten Bosch, H. van den Heuvel, C. Tejedor-García, **Design principles of an Automatic Speech Recognition functionality in a user-centric signed and spoken language translation system**, *CLIN32 - The 32nd Meeting of Computational Linguistics in The Netherlands*, Tilburg, The Netherlands.