

Sashank Gondala

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ABOUT ME

I'm a Language Modeling Scientist (Research Engineer) at Apple, where I build Language Models for Speech Recognition. I spend most of my time on various aspects of language modeling such as data selection, modeling architecture, scaling the training, and evaluating approaches to improve Word Error Rate on rare words. Before this, I was a Master's student at Georgia Tech at [Prof. Devi Parikh](#)'s lab where I worked on problems in Language Grounding such as [Image Captioning](#), [Vision and Language Navigation](#). I also love systems engineering. Before my Masters, I was a senior C++ engineer working on areas such as profiling, caching, and optimizing low-level mechanisms such as pointer retrieval to improve wall time.

ACADEMIC BACKGROUND

Georgia Tech, Atlanta, USA Aug 2019 - May 2021
Master of Science, Computer Science

- Worked with Prof. Devi Parikh on Language Grounding tasks
- Teaching Assistant for Deep Learning (2x) and Machine Learning
- Co-organized the [VQA workshop](#) at CVPR 2021

IIT Bombay, Mumbai, India Aug 2012 - May 2016
Bachelor of Technology, Computer Science and Engineering

- IIT-JEE 2012 **All India Rank 14** out of 500k candidates
- All India Rank 8 in Nationwide Education and Scholarship Test 2014.

PUBLICATIONS

[Error-driven Pruning of Language Models for Virtual Assistants](#) **ICASSP 2021**
Sashank Gondala*, Lyan Verwimp*, Ernest Pusateri, Manos Tsagkias, C Van Gysel

Explored ways to maximize accuracy of an English speech recognition model while keeping the size of it's language model small. Obtained a 10% reduction in language model size with negligible increase in Word Error Rate (3x better than random)

EMPLOYMENT HISTORY

Language Modeling Scientist June 2021 - Present
Apple, Cupertino, CA

- Working on Language Models for Siri Speech Recognition systems
- Prototyped and implemented clever data selection techniques using **contrastive learning** to reduce data annotation costs and improve the model's performance on rare words. Improved WER by ~8% compared to random selections
- Replaced word level recurrent models with **subword transformer models**. Resulted in a ~7% improvement in WER for the same model size on disk
- Experimented with various **subword tokenization** and data selection techniques and obtained a ~1.5% improvement in WER on the rare word recognition with no increase in model's size or latency
- Prototype and ship ideas from the **latest language modeling and speech recognition literature** to both improve the accuracy and reduce the memory footprint
- Scaled training to ~**hundred GPUs** and **billions of rows of data**
- Worked across classical language models (NGram), autoregressive models (LSTMs), and attention-based models (GPT style transformers)

Senior Member Technical Staff
Oracle, Redwood City, CA

June 2016 - June 2019

- Worked on performance optimizations for Oracle BI, a data analytics product
- **Improved sorting time** of a C++ in-memory query engine **by 15%** by identifying bottlenecks and enhancing the code to use compile time code generation techniques (C++11 Variadic templates).
- **Improved query run time** of benchmark set **by 20%** by enhancing caching algorithm logic modifying cache seed logic to cache the data post relevant processing rather than raw data.
- Introduced a new query syntax to enable auto discovery of backend tables bypassing the current requirement of manual import. **Reduced each ongoing release time by a few weeks.** Used YACC, LEX, and C++.
- Improved cache hit rate by changing the internal load balancer logic to create a deterministic server-user mapping instead of a session based allocation.

PROJECTS

Vision and Language Navigation

Sep 2020 - Mar 2021

Research exploration with [Prof. Devi Parikh](#)

- Built an agent for the task of following English language navigation instructions in a simulated house environment ([VLN-CE](#))
- Built a hierarchical planner + controller architecture - planner predicts an intermediate waypoint and controller navigates to the waypoint. This improved sample complexity and overcame problems with long-range planning
- Incorporated semantic maps of the environment for better grounding and trained via both Imitation Learning and Reinforcement Learning
- Obtained a Success Rate of 24.6%, compared to the baseline of 23%

Test-time training for novel-object image captioning

Jan 2020 - May 2020

Research exploration with [Prof. Devi Parikh](#)

- Built a model to generate captions for images containing novel objects (objects not mentioned in train data) using non-paired data
- Trained a multi-modal transformer model (ViLBERT) to predict the CIDEr score (measures image-text match) without needing access to reference captions
- Using VIFIDEL, SLOR, and predicted CIDEr values as rewards, trained a captioning model to optimize for these metrics using policy-gradient methods

Large Language Model (LLM) Explorations

Aug 2022 - Present

- Interested in the large language model space and keep myself upto date by reading the latest literature and building prototypes for self-learning
- One such prototype is a [semantic search engine for Startup advice](#) where users can ask questions on starting up - 'How much ESOP pool to allocate', etc
- Built it by first creating paragraph-level embeddings (using OpenAI's embedding APIs) on YCombinator's startup library, and then retrieving the closest k paragraphs + summarizing using OpenAI's completions endpoint.

SELECTED COURSEWORK

- Deep Learning • Deep Learning for Text • Reinforcement Learning
- Machine Learning • Machine Learning for Trading
- Computation and Brain • Graduate Algorithms