Shankar **Kumar**

✉ shankar.kumar@gmail.com Google Research Profile *Semantic scholar profile*

EXPERTISE

My primary focus has been the application of machine learning to solve problems in speech and language processing. I have worked on a number of problems in this including grammatical error correction, tone and style modeling, automatic text formatting, text normalization for text-to-speech, language modeling for automatic speech recognition and machine translation. I am especially interested in approaches for training models in low resource settings.

EDUCATION

JOHNS HOPKINS UNIVERSITY

Ph.D., Electrical and Computer Engineering
June 2005 | Baltimore, MD
Dissertation: Minimum Bayes-Risk Techniques in Automatic Speech Recognition and Statistical Machine Translation

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE

B. E. (Honors), Electrical and Electronics Engineering
June 1998 | Pilani, India

EXPERIENCE

GOOGLE RESEARCH | Senior Staff Research Scientist & Manager

October 2020 -- Present

- Managing a 5-person team working on neural approaches for speech and language problems
- Approaches for stylistic rewriting
- Methods to quantify and tackle uncertainty in natural language processing
- Models for restoring capitalization and punctuation in ASR transcripts
- Methods to learn optimizer hyperparameters

| Staff Research Scientist & Manager

July 2018 -- September 2020

- Managed a 4-person team working on neural models for speech and language
- Grammatical error correction
- Text normalization for Text-to-Speech

| Staff Research Scientist

October 2009 -- June 2018

- Neural Language modeling for automatic speech recognition
- Efficient lattice rescoring with neural language models
- Paraphrasing models for question answering
- Models of trustworthiness for the web
- Various problems in statistical machine translation

| Senior Research Scientist

July 2005 -- July 2009

- Various problems in statistical machine translation including Minimum Bayes Risk decoding, system combination, word alignment

JOHNS HOPKINS UNIVERSITY & CAMBRIDGE UNIVERSITY |

Postdoctoral Fellow
Nov 2004 -- June 2005

- Phrasal reordering model with EM style re-estimation for statistical machine translation.
- Machine Translation systems for the NIST MT evaluation 2005

JOHNS HOPKINS UNIVERSITY | Graduate Research Assistant

September 2000 -- Oct 2004

- Minimum Bayes-Risk decoders for Statistical Machine Translation and Word Alignment
- Weighted finite state transducer phrase-based model for Statistical Machine Translation
- Method for segmenting ASR word lattices for efficient Minimum Bayes-Risk Training and Decoding
- Chinese-to-English and Arabic-to-English translation systems for NIST MT evaluations 2002-2004 and Speech Recognition systems for DARPA EARS 2001-2002

HONORS

ICASSP 2023
Outstanding reviewer

NAACL 2015
Outstanding reviewer

REVIEWING

Associate Editor	ACL TALLIP (2016-2017)
Peer Reviewer	Journals: TACL, CL, IEEE TASLP, Conferences: ICASSP, Interspeech, ASRU, Neurips, ICLR, ICML, NAACL, ACL, EMNLP, IJCNLP, AACL, WMT, EACL, AMTA, MT Summit

SELECTED PUBLICATIONS

- Arya McCarthy, Hao Zhang, Shankar Kumar, Felix Stahlberg, Ke Wu. Improving Long-form Speech Translation through Segmentation with Large Language Models and Finite State Decoding Constraints, Findings of EMNLP 2023
- Hao Zhang, Ronny Huang, Shankar Kumar, Shuo-yiin Chang, Tara Sainath. Semantic segmentation with language models improves long-form ASR. Interspeech 2023.
- Aashish Kumar, Chris Alberti, Felix Stahlberg, Shankar Kumar. Conciseness: An Overlooked Language Task, EMNLP Workshop on Text Simplification, Accessibility, and Readability 2022.
- Jared Lichtarge, Chris Alberti, Shankar Kumar, Simple and Effective Gradient-Based Tuning of Sequence-to-Sequence Models, , AutoML Conference 2022 - workshop track.
- Hao Zhang, You-Chi Cheng, Shankar Kumar, W. Ronny Huang, Mingqing Chen, Rajiv Mathews, Capitalization Normalization for Language Modeling with an Accurate and Efficient Hierarchical RNN Model. ICASSP 2022
- Felix Stahlberg and Shankar Kumar, Jam or Cream First? Modeling Ambiguity in Neural Machine Translation with SCONES, NAACL 2022.
- W. Ronny Huang, Cal Peyser, Tara N Sainath, Ruoming Pang, Trevor Strohman, Shankar Kumar. Sentence-Select: Large-scale language model data selection for rare-word speech recognition. Interspeech 2022.

- Felix Stahlberg, Ilia Kulikov, Shankar Kumar, Uncertainty Determines the Adequacy of the Mode and the Tractability of Decoding in Sequence-to-Sequence Models. ACL 2022.
- W. Ronny Huang, Tara N Sainath, Cal Peyser, Shankar Kumar, David Rybach, Trevor Strohman, Lookup-Table Recurrent Language Models for Long Tail Speech Recognition, Interspeech 2021.
- Felix Stahlberg and Shankar Kumar, Sequence Transduction Using Span-level Edit Operations, EMNLP 2020.
- Jared Lichtarge, Chris Alberti, Shankar Kumar, Training Strategies for Grammatical Error Correction, Transactions of ACL 2020.
- Cal Peyser, Sepand Mavandadi, Tara Sainath, James Apfel, Ruoming Pang and Shankar Kumar. Improving Tail Performance of a Deliberation E2E ASR Model Using a Large Text Corpus. Interspeech 2020.
- Qian Zhang, Han Lu, Hasim Sak, Anshuman Tripathi, Erik McDermott, Stephen Koo, Shankar Kumar Transformer Transducer: A Streamable Speech Recognition Model with Transformer Encoders and RNN-T Loss, ICASSP 2020.
- Jared Lichtarge, Chris Alberti, Shankar Kumar, Noam Shazeer, Niki Parmar, and Simon Tong. 2019. Corpora generation for grammatical error correction. NAACL 2019.
- Kazuki Irie, Shankar Kumar, Michael Nirschl, Hank Liao, RADMM: Recurrent Adaptive Mixture Model with Applications to Domain Robust Language Modeling, ICASSP 2018.
- Min Ma, Shankar Kumar, Fadi Biadsy, Michael Nirschl, Tomas Vykruta, Pedro Moreno, Modeling Non-Linguistics Contextual Signals in LSTM language models via domain adaptation. ICASSP 2018.
- Eunjoon Cho, Shankar Kumar, A conversational neural language model for speech recognition in digital assistants. ICASSP 2018.
- Shankar Kumar, Michael Alexander Nirschl, Dan Holtmann-Rice, Hank Liao, Ananda Theertha Suresh, Felix Yu, Lattice Rescoring Strategies for Long Short Term Memory Language Models in Speech Recognition, ASRU 2017.
- Babak Damavandi, Shankar Kumar, Noam Shazeer, Antoine Bruguier, NN-grams: Unifying neural network and n-gram language models for Speech Recognition, Interspeech 2016.
- Manaal Faruqui, Shankar Kumar, Multilingual Open Relation Extraction Using Cross-lingual Projection, NAACL 2015.
- John Denero, Shankar Kumar, Ciprian Chelba and Franz Och, Model Combination for Machine Translation, NAACL 2010.
- Cyril Allauzen, Shankar Kumar, Wolfgang Macherey, Mehryar Mohri and Michael Riley, Expected Sequence Similarity Maximization, NAACL 2010.
- Shankar Kumar, Wolfgang Macherey, Chris Dyer and Franz Och, Efficient Minimum Error Rate Training and Minimum Bayes-Risk Decoding for Translation Hypergraphs and Lattices, ACL 2009
- Roy Tromble, Shankar Kumar, Franz Och and Wolfgang Macherey, Lattice Minimum Bayes-Risk Decoding for Statistical Machine Translation, EMNLP 2008.
- Shumeet Baluja, Rohan Seth, D. Sivakumar, Yushi Jing, Jay Yagnik, Shankar Kumar, Deepak Ravichandran and Mohamed Aly, Video Suggestion and Discovery for YouTube: Taking Random Walks Through the View Graph , WWW 2008.
- Shankar Kumar, Franz Och and Wolfgang Macherey, Improving Word Alignments Using Bridge Languages, EMNLP 2007.
- Shankar Kumar, Yonggang Deng and William Byrne, A Weighted Finite State Transducer Translation Template Model for Statistical Machine Translation. Journal of Natural Language Engineering, Vol 12(1), March 2006, pp 35-75.
- Shankar Kumar and Willam Byrne, Local Phrase Reordering Models for Statistical Machine Translation. NAACL 2005.
- Vaibhava Goel, Shankar Kumar and William Byrne, Segmental Minimum Bayes-Risk Decoding for Automatic Speech Recognition." In IEEE Transactions on Speech and Audio Processing. 2004.
- Shankar Kumar and William Byrne, Minimum Bayes-Risk Decoding for Statistical Machine Translation. NAACL 2004.
- F. Och, D. Gildea, S. Khudanpur, A. Sarkar, K. Yamada, A. Fraser, S. Kumar, L. Shen, D. Smith, K. Eng, V. Jain, Z. Jim, D. Radev, A Smorgasbord of Features for Statistical Machine Translation. NAACL 2004.
- Shankar Kumar and William Byrne, A Weighted Finite State Transducer Implementation of the Alignment Template Model for Statistical Machine Translation. NAACL 2003.
- Shankar Kumar and Willam Byrne, Risk Based Lattice Cutting for Segmental Minimum Bayes-Risk Decoding. ICSLP 2002.