

# Tushaar Gangavarapu

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## A. Education

2022–2024	Master of Science in Computer Science. Project (2023-24): <i>Structured state space models for language modeling</i> . Committee: Alexander Sasha Rush (chair) and David Bindel. Project (2022-23): <i>Predictive modeling to identify conversational trajectories</i> . Advisors: Cristian Danescu-Niculescu-Mizil and Lillian Lee.
2015–2019	Undergraduate study in Information Technology with specialization in Artificial Intelligence (rank: 3/104), National Institute of Technology Karnataka. Thesis: <i>Psychological aspects and behavioral traits in social media language</i> . Committee: Ram Mohana Reddy Guddeti (advisor/chair), Sowmya Kamath S., Nagamma Patil, Biju R. Mohan.

## Scholarships and honors

Bower’s CIS best TA award, 2022–2023, 2023–2024.  
Huawei national scholarship for academic excellence, 2018–2019.  
National higher secondary education scholarship for excellence (national rank: 10), 2013–2015.  
South Indian Mathematics Olympiad medal of excellence (rank: 32), 2012.

## B. Employment

01/2024–05/2024	Head Graduate Teaching Assistant, Language and Information (CS/INFO4300), Cornell University.
08/2023–01/2024	Head Graduate Teaching Assistant, Natural Language Processing (LING4744; COGSTAT4740; CS4/5740), Cornell University.
01/2023–05/2023	Graduate Teaching Assistant, Language and Information (CS/INFO4300), Cornell University.
08/2022–01/2023	Graduate Teaching Assistant, Natural Language Processing (LING4744; COGSTAT4740; CS4/5740), Cornell University.
09/2021–08/2022	Applied Scientist, Kindle Content Quality Algorithms, Amazon.com, Inc.
01/2020–08/2021	Research Engineer (natural language processing), Kindle, Amazon.com, Inc.
06/2019–12/2019	Software Development Engineer, Consumer Engagement, Amazon.com, Inc.
2018–2019	Scientific researcher, Healthcare Analytics and Language Engineering lab, National Institute of Technology Karnataka.
05/2018–07/2018	Software Development Intern, Kindle Create, Amazon.com, Inc.
2017–2019	Research candidate, Human Centered Computing Group, National Institute of Technology Karnataka.

## C. Publications

Scholar: [https://scholar.google.com/citations?user=C7v\\_cA8AAAAJ](https://scholar.google.com/citations?user=C7v_cA8AAAAJ).

**Research interests.** Natural language processing and understanding → large language models → alternate-attention models → efficiency (hardware-aware: e.g., Triton; compute-optimal: e.g., Mamba), interpretability (sparse autoencoders).

## Conference proceedings

Junxiong Wang, Tushaar Gangavarapu, Jing Nathan Yan, and Alexander M Rush. Mambabyte: Token-free selective state space model. *arXiv preprint arXiv:2401.13660*, 2024. To appear at the Conference on Language Modeling (COLM 2024).

Yann Hicke, Abhishek Masand, Wentao Guo, and Tushaar Gangavarapu. Assessing the efficacy of large language models in generating accurate teacher responses. In *Proceedings of the 18th Workshop on Innovative Use of NLP for Building Educational Applications (BEA 2023)*. Association for Computational Linguistics, 2023. to appear.

Tushaar Gangavarapu and Sriraghavendra Ramaswamy. Alexa, stop reading the references: Enhancing the reading experience in Kindle eBooks. In *Amazon Machine Learning Conference – AMLC 2022*. Amazon, 2022a.

Tushaar Gangavarapu and Sriraghavendra Ramaswamy. A figure is worth a thousand words, but where are the words?: Enhancing image experience in Kindle eBooks. In *Amazon Machine Learning Conference – AMLC 2022*. Amazon, 2022b.

Aditya Jayasimha, Tushaar Gangavarapu, Sowmya Kamath S., and Gokul S. Krishnan. Deep Neural Learning for Automated Diagnostic Code Group Prediction Using Unstructured Nursing Notes. In *Proceedings of the 7th ACM IKDD CoDS and 25th COMAD*, CoDS COMAD 2020, pages 152–160. Association for Computing Machinery, 2020. doi: 10.1145/3371158.3371176.

Tushaar Gangavarapu, Gokul S. Krishnan, and Sowmya Kamath S. Coherence-based Modeling of Clinical Concepts Inferred from Heterogeneous Clinical Notes for ICU Patient Risk Stratification. In *Proceedings of the 23rd Conference on Computational Natural Language Learning (CoNLL)*, pages 1012–1022, 2019. doi: 10.18653/v1/K19-1095.

## Journal articles

Tushaar Gangavarapu, Gokul S. Krishnan, Sowmya Kamath S., and Jayakumar Jeganathan. FarSight: Long-Term Disease Prediction Using Unstructured Clinical Nursing Notes. *IEEE Transactions on Emerging Topics in Computing*, 9(3):1151–1169, 2021. doi: 10.1109/TETC.2020.2975251.

Mayya V., Sowmya Kamath S., Gokul S. Krishnan, and Tushaar Gangavarapu. Multi-channel, convolutional attention based neural model for automated diagnostic coding of unstructured patient discharge summaries. *Future Generation Computer Systems*, 118:374–391, 2021. doi: 10.1016/j.future.2021.01.013.

Tushaar Gangavarapu, C. D. Jaidhar, and Bhabesh Chanduka. Applicability of machine learning in spam and phishing email filtering: review and approaches. *Artificial Intelligence Review*, 53(7):5019–5081, 2020a. doi: 10.1007/s10462-020-09814-9. [Review article].

Tushaar Gangavarapu, Aditya Jayasimha, Gokul S. Krishnan, and Sowmya Kamath S. Predicting ICD-9 code groups with fuzzy similarity based supervised multi-label classification of unstructured clinical nursing notes. *Knowledge-Based Systems*, 190:105321, 2020b. doi: 10.1016/j.knosys.2019.105321.

Tushaar Gangavarapu and Nagamma Patil. A novel filter–wrapper hybrid greedy ensemble approach optimized using the genetic algorithm to reduce the dimensionality of high-dimensional biomedical datasets. *Applied Soft Computing*, 81: 105538, 2019. doi: 10.1016/j.asoc.2019.105538.

## D. Professional service

### Recent invited talks

Tension with a chance of personal attack! Guest lecture for UNILWYL 1405, Cornell University, 2024.

Learning to Predict: Tree-based Classification. Guest lecture at the Machine Learning University, Amazon.com, Inc., 2020.

Cognitive and Affective Assessments in Game-based Simulated Environments. Invited talk at the Department of Information Technology, National Institute of Technology Karnataka, 2020.

Greedy Evolutionary Feature Selection for Biomedical Data. Invited talk at the Department of Information Technology, National Institute of Technology Karnataka, 2020.

On the Convergence of High Performance Computing and Machine Intelligence. Invited talk at the National Workshop on High Performance Computing and Applications (HPCA 2019), National Institute of Technology Karnataka.

Exploring Latent Human Traits Through Social Media Modeling. Guest lecture at the Department of Information Technology, National Institute of Technology Karnataka, 2019.

Game-based Learning and Assessment: A Case Study of a Mobile-VR Game. Guest lecture at the Department of Information Technology, National Institute of Technology Karnataka, 2019.

Building Predictive Applications Using Social Media Digital Footprints. Invited talk at the National Workshop on Predictive Analytics and Applications (PAA 2019), National Institute of Technology Karnataka.

### Refereeing

2022	Amazon Machine Learning Conference (AMLC) 2022: Healthcare Informatics and Natural Language Processing track.
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