Tejas Srinivasan

Curriculum Vitae

Experience and Education

Fall 2021- **University of Southern California**
Ph.D. in Computer Science — Advisor: Prof. Jesse Thomason

Summer 2021 **Microsoft Research (MSR)**
NLP Research Intern

2020-21 **A.I. Foundation**
NLP Research Scientist

2018-20 **Carnegie Mellon University** — GPA: 3.87/4.0
Master of Language Technologies (M.L.T.) — Advisors: Prof. Florian Metze, Prof. Yonatan Bisk

2014-18 **Indian Institute of Technology, Bombay** — CPI: 9.15/10
Bachelor of Technology in Mechanical Engineering
Minor in Computer Science and Engineering

Publications

2021 **Worst of Both Worlds: Biases Compound in Pre-trained Vision-and-Language Models**
Tejas Srinivasan, Yonatan Bisk
4th Workshop on Gender Bias in Natural Language Processing, NAACL — Link

2020 **Fine-Grained Grounding for Multimodal Speech Recognition**
Tejas Srinivasan, Ramon Sanabria, Florian Metze, Desmond Elliott
Findings of Emperical Methods in Natural Language Processing (EMNLP) — Link

2020 **Multimodal Speech Recognition with Unstructured Audio Masking**
Tejas Srinivasan, Ramon Sanabria, Florian Metze, Desmond Elliott
Workshop on Natural Language Processing Beyond Text (NLPBT), EMNLP — Link

2020 **Reasoning Over History: Context-Aware Visual Dialog**
Muhammad Shah, Shikib Mehri, Tejas Srinivasan
Workshop on Natural Language Processing Beyond Text (NLPBT), EMNLP — Link

2020 **Looking Enhances Listening: Recovering Missing Speech Using Images**
Tejas Srinivasan, Ramon Sanabria, Florian Metze
International Conference on Acoustics, Speech and Signal Processing (ICASSP) — Link

2019 **Multitask Learning For Different Subword Segmentations In Neural Machine Translation**
Tejas Srinivasan, Ramon Sanabria, Florian Metze
International Workshop on Spoken Language Translation (IWSLT) — Link

2019 **Structured Fusion Networks for Dialog**
Shikib Mehri, Tejas Srinivasan*, Maxine Eskenazi*
Special Interest Group on Discourse and Dialog (SIGDIAL) — Link
Best Paper Award

2019 **Analyzing Utility of Visual Context in Multimodal Speech Recognition Under Noisy Conditions**
Tejas Srinivasan, Ramon Sanabria, Florian Metze
ICML Workshop on The How2 Challenge: New Tasks for Vision and Language — Link

* - Equal contribution

Research Projects

Aug 2021 - Present **Aligning Language and Vision Representations**
Advisor: Prof. Jesse Thomason

- Developed a framework to measure relational knowledge in visual-linguistic pre-trained models like VL-BERT
- Defined different sources of relational knowledge in multimodal input spaces, and formulated methods to isolate and measure each one individually

June 2020 - May 2021 **Measuring Biases in Multimodal Language Models**
Advisor: Prof. Yonatan Bisk

- Developed a framework to measure relational knowledge in visual-linguistic pre-trained models like VL-BERT
- Defined different sources of relational knowledge in multimodal input spaces, and formulated methods to isolate and measure each one individually
- Utilized this framework to measure gender bias for entities in different input sources

Aug. 2019 - Present **Multimodal Co-Learning for Robustness to Missing Modalities**
Advisor: Prof. Louis-Phillipe Morency *Independent Study*

- Investigated co-learning methods to train models on multimodal data but infer on unimodal data
- Utilized co-learning to regenerate missing modalities during inference time, experimenting with a multitask generative loss term

Apr. 2019 - June 2020 **Multimodal Speech Recognition Under Noisy Conditions**
Advisor: Prof. Florian Metze, Prof. Desmond Elliott

- Analyzed the robustness of multimodal Automatic Speech Recognition (ASR) models to noise in the input speech signal
- Injected silence/white noise into the audio signals to mask a predetermined set of words, and observed if the visual modality can be leveraged to recover them

Aug. 2019 - Dec. 2019 **Unsupervised and Distantly Supervised Frame Discovery**
Advisor: Prof. Yulia Tsvetkov *Independent Study*

- Incomplete class knowledge in a dataset can lead to semantic drift of known classes
- Graph Clique Discovery (GCD) algorithm uses distant/zero supervision to extract new classes from data points that do not belong to any known class
- GCD outperforms topic models in the discovery of held-out frames from the Media Frames Corpus

Jan. 2019 - Jan. 2020 **Time-Series Networks for Credit Card Default Prediction**
Advisor: Prof. Florian Metze *Funded by PNC Bank*

- Designed a variety of neural models (including recurrent and convolutional architectures, and their variants) to handle time-series data for predicting credit card defaults
- Explored several existing interpretability techniques to explain default predictions, such as SHAP and Learning to Explain
- Developed interpretability methods to resolve contradictions between global and local explanations

Feb.2019 - May 2019 **Structured Fusion Networks for Dialog**
Collaborator: Shikib Mehri *11-747: Course Project*

- Explored several methods of incorporating structure of traditional dialog systems into end-to-end neural dialog models
- Introduced Structured Fusion Networks (SFNs), which incorporate pre-trained neural dialog modules that perform specific tasks in the traditional dialog pipeline, into a larger neural dialog model trained end-to-end

Oct.2018 - Dec.2018 **Multitask Learning for Different Subword Segmentations in Machine Translation**
Advisor: Prof. Florian Metze; Collaborator: Ramon Sanabria

- Proposed Block Multitask Learning (BMTL), a novel NMT architecture that predicts multiple targets of different granularities simultaneously
- Achieved improvements of upto 1.7 BLEU points over single-task baselines on three language pairs from IWSLT15

Jul. 2017 - **End-to-End Speech-to-Text Machine Translation**

- Developed a Recurrent Neural Network (RNN) encoder-decoder model
- Implemented modifications to the standard Seq2Seq architecture, such as pyramidal encoder (for long speech signal inputs) and beam search decoding
- ‹Update with results later›

Professional Service

Conference Reviewer	ACL Rolling Review, EMNLP 2021, ACL 2021, NAACL 2021, EACL 2021, EMNLP 2020, Interspeech 2020, ACL 2020
Workshop Reviewer	ACL Student Research Workshop 2022, NLP Beyond Text 2020, ACL SRW 2020, ACL Challenge-HML 2020

Courses Undertaken

Language Technologies	Grounded Natural Language, Representation Learning in NLP, Algorithms for NLP, Computational Semantics for NLP, Neural Networks for NLP, Multimodal Machine Learning, Computational Ethics for NLP
Machine Learning	Introduction to Machine Learning, Topics in Deep Learning, Probabilistic Graphical Models
Relevant Undergraduate	Calculus, Linear Algebra, Differential Equations, Data Structures and Algorithms, Foundations of Machine Learning, Advanced Machine Learning, Introduction to Study of Languages

Technical Skills

Programming	Python, C, C++, MATLAB
Tools and Packages	pyTorch, Keras, TensorFlow, NumPy, SciPy, Pandas, scikit-learn, git, LaTeX

Academic Achievements

- Secured an All India Rank 634 in IIT Joint Entrance Examination (JEE) Advanced 2014, among 0.15 million students
- Attained a 99.94 percentile in JEE Main 2014, among 1.4 million students
- Cleared the Zonal Informatics Olympiad in 2011, 2012 and 2013, placing in the top 250 out of more than 5000 participating students each year