

EDUCATION

Rice University

PhD Student, Computer Science (Advisor: Prof. Vaibhav Unhelkar)

2024 - 2028 (expected)

GPA: 3.90/4

University of Washington, Seattle

MS, Electrical & Computer Engineering (Advisor: Prof. Jeff Bilmes)

2022 - 2024

GPA: 3.78/4

National Institute of Technology, Karnataka

B.Tech, Electrical & Electronics Engineering (Advisor: Prof. Krishnan CMC)

2016 - 2020

GPA: 9.5/10

PROGRAMMING

Python, PyTorch, Tensorflow, OpenCV, MATLAB, Java, C/C++, Git, Bash, LT-Spice, L^AT_EX

PUBLICATIONS

8. **Megh Bhalerao**, Jeffrey Bilmes. *Transductive CoreSets: On Test-Targeted Optimal k-Subset Selection of Training Data*. Under Review.
7. Arnav Das*, Gantavya Bhatt*, **Megh Bhalerao**, Vianne Gao, Rui Yang, Jeffrey Bilmes. *Accelerating Batch Active Learning using Continual Learning Techniques*. *Transactions on Machine Learning Research (TMLR)*, and *ICML workshop on Data-Centric Machine Learning*, 2023.
6. Hanwen Xu*, Jiayou Zhang*, Zhirui Wang*, Shizhuo Zhang, **Megh Bhalerao**, Yucong Liu, Dawei Zhu, Sheng Wang. *GraphPrompt: Graph-based Prompt Templates For Biomedical Synonym Prediction*. *Association for Advancement of Artificial Intelligence (AAAI)*, 2023.
5. **Megh Bhalerao***, Anurag Singh*, and Soma Biswas. *Pred&Guide: Labeled Target Prediction for Guiding Semi-Supervised Domain Adaptation*. *arXiv 2023*.
4. Sarthak Pati, Siddhesh Thakur, Ibrahim Ethem Hamamci, Ujjwal Baid, Bhakti Baheti, **Megh Bhalerao**, (+ other authors), Christos Davatzikos and Spyridon Bakas. *GaNDLF: A Generally Nuanced Deep Learning Framework for Scalable End-to-End Clinical Workflows in Medical Imaging*. *Nature Communications Engineering*, 2023.
3. Rhea Chitalia*, Sarthak Pati*, **Megh Bhalerao**, Siddhesh Thakur, Despina Kontos and Spyridon Bakas. *Expert Tumor Annotations and Radiomic Features for the iSPY data*. *Nature Scientific Data*, 2022.
2. Anurag Singh*, Naren Doraiswamy*, Sawa Takamuku, **Megh Bhalerao**, Titir Dutta, Soma Biswas, Aditya Chepuri, Balasubramanian Vengatesan, Naotake Natori. *Improving Semi-Supervised Domain Adaptation Using Effective Target Selection and Semantics*. *CVPR workshop on Learning from Limited and Imperfect Data*, 2021.
1. **Megh Bhalerao** and Siddhesh Thakur. *Brain Tumor Segmentation Based on 3D Residual U-Net*. *Medical Image Computing & Computer Assisted Intervention (MICCAI), Brainlesion Workshop, 2019*. Book Chapter In: Crimi A., Bakas S., Kuijff H., Menze B., Reyes M., *Lecture Notes in Computer Science (LNCS)*.

WORK EXPERIENCE

Computer Science, Rice University

March 2022 - Present

Research Assistant in HCAIR Lab. Advisor: Prof. Vaibhav Unhelkar

- Working on **human-robot interaction**, with goal of improving human modeling data efficiency using imitation learning inspired **data augmentation** techniques.

Advanced Micro Devices (AMD) Inc.

Feb 2024 - June 2024

Foundry Technology Intern, Austin, TX.

- Modeling & Analysis of Foundry **Manufacturing Data**.
- Building GUI tools for **Fabrication Technology Nodes** team for easier data extraction and downstream analysis.

Electrical & Computer Engineering, University of Washington

March 2022 - Jan 2024

Research Assistant in Melodi Lab. Advisor: Prof. Jeff Bilmes

- Implemented Submodular selection based algorithms for coresets problems, and achieved consistent $\approx 3\%$ accuracy improvement over baselines. *Manuscript under review*.
- Investigating improving efficiency of **data distillation** by using diversity-inspired traditional clustering techniques.
- Accelerated active learning on medical imaging datasets using continual learning inspired ideas and achieved **3-4 \times training speedup** with less than 1% accuracy drops.

Paul Allen School of Computer Science & Engineering, University of Washington

August 2021 - March 2022

Research Student in Wang Group

Advisor: Prof. Sheng Wang

- Implemented various versions of **biomedical entity normalization** baselines on an unexplored graph-based biomedical entity ontology.
- Achieved 30% improvement over SOTA biomedical entity normalization algorithms by integrating graph structure of entity normalization datasets into natural language **prompt templates**.

Indian Institute of Science, Bangalore

May 2020 - July 2021

Project Assistant at Image Analysis & Computer Vision Lab, Electrical Engineering Dept.

(funded by AISIN Seiki, Japan)

Advisor: Prof. Soma Biswas

- Developed **Graph Convolutional Networks** based algorithm for cross-domain facial expression recognition using previously unexplored semi-supervised domain adaptation (SSDA) algorithms.
- 4 – 5% accuracy improvement over previous SSDA algorithms by integrating weakly-supervised learning (**Self-Training/Consistency Regularization etc.**) with DA.
- Worked on the **Class Imbalance** Problem for **Domain Adaptation** for Image Classification. Implemented Class Balanced Focal Loss, Semantic Initialization & Regularization, and a **Novel Uncertainty Loss** on target domain for Handling Class Imbalance resulting in 2 – 3% accuracy improvement.

University of Pennsylvania, USA

Research Intern at Center for Biomedical Image Computing & Analytics

Advisor: Prof. Spyridon Bakas

May - December, 2019

Part-time, June 2020 - March 2021

- Implemented **end-to-end training** pipelines for Automatic MRI (Brain & Breast) **Semantic Segmentation** using 3D - Residual U-Net, Vanilla U-Net, Inception U-Net, Fully Convolutional Net.
- Contributed in integrating the pipelines, **iterative label fusion** approaches & few BraTS methods (from dockerhub) into an open source platforms **Federated Tumor Segmentation** (FeTS) and **GaNDLF**. FeTS will be used for training models on **multi-institutional data**, subsequently assisting **radiologists** for segmenting anomalies from MRI scans.

Indian Institute of Technology, Bombay

Research Fellow at Vision & Image Processing Lab, Electrical Engineering Dept.

Advisor: Prof. Subhasis Chaudhuri

May - July, 2018

- Implemented **Mahalanobis Distance Metric Learning** (ML preprocessing) on two **Haptic** datasets - **Braille Character Dataset** & **Haptic Acceleration Response Dataset** (confusion matrix provided, feature vectors extracted for both).
- Metric Learning formulated as **Constrained Convex Optimization** problems and solved using **CVX package** on MATLAB. Data Clustered by projecting datapoints into a new vector space defined using the **learned distance metric**. In case of the braille character dataset the confusion matrix was re-estimated using the learned distance metric along with corresponding feature vectors.

SELECTED RESEARCH PROJECTS

Submodular Summarization

Oct 2022 - Nov 2022

Advisor: Prof. Jeff Bilmes - ECE Dept, UW

- Achieved 84% and 85% diversity scores on AirBNB Image and 20Newsgroups text datasets on a summarization task.
- Applied various submodular functions for the summarization task with wide range of feature extraction methods.

Efficient DNNs via Pruning and Quantization

Mar 2022 - Jun 2022

Advisor: Prof. Eli Shlizerman - ECE Dept, UW

- Achieved **3×** and **8×** reduction in memory requirements (by pruning) and inference time (by quantization) respectively for Resnet-50 with minimal drop in classification accuracy.
- Implemented magnitude pruning and **FP32 to INT8** quantization on PyTorch.

Lip Reading using Cross Audio-Visual Recognition

Aug 2018 - Apr 2019

Advisor: Prof. Krishnan CMC - EE Dept, NITK

- Developed **Audio (Spectrogram) & Video (Histogram of Gradients)** processing methods for classifying lip-movements into a word based on consecutive video frames coupled with the audio signal corresponding to the word.
- Two separate 3D CNNs were trained on the processed audio and video (one each audio and video), with a **common contrastive loss function** with gradients back-propagated individually through the networks.

ACADEMICS

Graduate Coursework: Reinforcement Learning, Statistical Machine Learning, Deep Learning, Learning Theory, Algorithms & Complexity, Submodular Functions & Optimization. *Seminar:* Information Theory, Theoretical Deep Learning, Differential Geometry.

Undergraduate Coursework: Neural Networks, Probability Theory, Linear Algebra, Digital Signal Processing, **Operating Systems**, Advanced Control Systems, Network Analysis & Synthesis, Digital System Design.

Teaching Assistantships (TA): COMP 557 Artificial Intelligence (*Prof. Vaibhav Unhelkar, Rice, Spring 2025*), CSE 417 Algorithms & Complexity (*Prof. Richard Anderson, UW, Fall 2023*), EE 233 Circuit Theory (*Prof. Mahmood Hameed, UW, Spring 2023*), EEP 563 Analog Circuits for Sensor Systems (*Prof. Mahmood Hameed, UW, Winter 2023*), EE 215 Fundamentals of Electrical Engineering (*Prof. Georg Seelig, Spring 2022; Prof. Mahmood Hameed, Fall 2022; UW*).

TA duties included: conducting weekly office hours, preparing & grading assignments, holding recitation sections, leading electronic lab sections.

Scholastic Achievements:

- University of Southern California Dean Merit Scholarship (\$10000) and Information Sciences Institute 2-year Rising Star Internship (Declined).
- **Summer Research Fellowship** 2018 for Research Internship at IIT-Bombay from the **Indian Academy of Sciences**.
- **Japanese Government JASSO Scholarship** to present Summer-2018 research at Kumamoto University, Japan.
- Top 5.6% amongst 150,000+ in JEE-Advanced 2016, 0.5% amongst 1,250,000+ in JEE-Main 2016, 0.14% amongst 170,000+ in K-CET 2016.

Reviewer: AAAI (2026), WACV (2021, 2024)