Tejas Gokhale

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RESEARCH INTERESTS

My mission is to research and develop robust and reliable AI systems by leveraging the complex interactions between vision and language. I work broadly in the areas of machine learning, computer vision, and natural language processing. My domain expertise lies in devising adversarial machine learning algorithms, semantic data engineering techniques, and evaluation protocols for out-of-distribution environments.

EDUCATION

Doctor of Philosophy, Arizona State University　　　　　　　　　　　2018–2023
School of Computing and Augmented Intelligence
Advisors: Yezhou Yang, Chitta Baral

Master of Science, Carnegie Mellon University　　　　　　　　　　　2017
Department of Electrical and Computer Engineering
Advisor: Aswin Sankaranarayanan

Bachelor of Engineering (Honours), Birla Institute of Technology and Science　　2015
Department of Electrical and Electronics Engineering

RESEARCH EMPLOYMENT

Microsoft Research　　　　　　　　　　　　　　　　　　　　Summer 2022
Research Intern, Adaptive Systems and Interaction Group
Mentors: Hamid Palangi (+Besa Nushi, Vibhav Vineet, Eric Horvitz)

Lawrence Livermore National Laboratory　　　　　　　　　　　　Summer 2021
Research Scholar, Machine Intelligence Group
Mentor: Rushil Anirudh (+Jay Thiagarajan, Bhavya Kailkhura)

Lawrence Livermore National Laboratory　　　　　　　　　　　　Summer 2020
Research Scholar, Machine Intelligence Group
Mentor: Rushil Anirudh (+Jay Thiagarajan, Bhavya Kailkhura)

Arizona State University　　　　　　　　　　　　　　　　　2018–2023
Graduate Research Associate, School of Computing and AI
Yezhou Yang + Chitta Baral

Snapchat Research　　　　　　　　　　　　　　　　　　　Summer 2018
Research Intern, Computational Imaging Group
Mentors: Guru Krishnan + Shree Nayar

Carnegie Mellon University　　　　　　　　　　　　　　　　2017–2018
Graduate Student Researcher, Image Science Lab
Advisor: Aswin Sankaranarayanan

ST Microelectronics India　　　　　　　　　　　　　　　　Fall 2014
Intern, High Speed Links Group

My work has been published at AAAI (h5-index: 180); computer vision venues: ICCV (h5-index: 239), ECCV (h5-index: 186), WACV (h5-index: 76); NLP venues: ACL (h5-index: 169), EMNLP (h5-index: 154), NAACL (h5-index: 105).

⊙ Conference Proceedings

[C1] *Improving Diversity with Adversarially Learned Transformations for Domain Generalization*
T. Gokhale, R. Anirudh, J. Thiagarajan, B. Kailkhura, C. Baral, Y. Yang
https://arxiv.org/abs/2206.07736   WACV 2023

[C2] *CRIPP-VQA: Counterfactual Reasoning about Implicit Physical Properties via Video Question Answering*
M. Patel, **T. Gokhale**, C. Baral, Y. Yang
https://arxiv.org/abs/2211.03779   EMNLP 2022

[C3] *Semantically Distributed Robust Optimization for Vision-and-Language Inference*
T. Gokhale, A. Chaudhary, P. Banerjee, C. Baral, Y. Yang
https://arxiv.org/abs/2110.07165   ACL Findings 2022

[C4] *Generalized but not Robust? Comparing the Effects of Data Modification Methods on Out-of-Domain Generalization and Adversarial Robustness*
T. Gokhale, S. Mishra, M. Luo, B. Sachdeva, C. Baral
https://arxiv.org/abs/2203.07653   ACL Findings 2022

[C5] *Unsupervised Natural Language Inference Using PHL Triplet Generation*
N. Varshney, P. Banerjee, **T. Gokhale**, C. Baral
https://arxiv.org/abs/2110.08438   ACL Findings 2022

[C6] *To Find Waldo You Need Contextual Cues: Debiasing Who's Waldo*
Y. Luo, P. Banerjee, **T. Gokhale**, Y. Yang, C. Baral
https://arxiv.org/abs/2203.16682   ACL 2022

[C7] *Improving Biomedical Information Retrieval with Neural Retrievers*
M. Luo, A. Mitra, **T. Gokhale**, C. Baral
https://arxiv.org/abs/2201.07745   AAAI 2022

[C8] *Weakly Supervised Relative Spatial Reasoning for Visual Question Answering*
P. Banerjee, **T. Gokhale**, Y. Yang, C. Baral
https://arxiv.org/abs/2109.01934   ICCV 2021

[C9] *WeaQA: Weak Supervision via Captions for Visual Question Answering*
P. Banerjee, **T. Gokhale**, Y. Yang, C. Baral
https://arxiv.org/abs/2012.02356   ACL Findings 2021

[C10] *Self-Supervised Test-Time Learning for Reading Comprehension*
P. Banerjee, **T. Gokhale**, C. Baral
https://arxiv.org/abs/2103.11263   NAACL 2021

[C11] *Attribute-Guided Adversarial Training for Robustness to Natural Perturbations*
T. Gokhale, R. Anirudh, B. Kailkhura, J. Thiagarajan, C. Baral, Y. Yang
https://arxiv.org/abs/2012.01806   AAAI 2021

[C12] *Mutant: A Training Paradigm for Out-of-Distribution Generalization in Visual Question Answering*
T. Gokhale, P. Banerjee, C. Baral, Y. Yang
https://arxiv.org/abs/2009.08566   EMNLP 2020

[C13] *Video2commonsense: Generating commonsense descriptions to enrich video captioning*
Z. Fang*, **T. Gokhale***, P. Banerjee, C. Baral, Y. Yang
https://arxiv.org/abs/2003.05162   EMNLP 2020

[C14] *VQA-LOL: Visual question answering under the lens of logic*
T. Gokhale, P. Banerjee, C. Baral, Y. Yang
https://arxiv.org/abs/2002.08325   ECCV 2020

⊙ Workshop Proceedings   *(2 CVPR, 1 NeurIPS)*

[W1] *Covariate Shift Detection via Domain Interpolation Sensitivity*
T. Gokhale, J. Feinglass, Y. Yang
https://openreview.net/pdf?id=YkPjTHZDdm   [SPOTLIGHT] NeurIPS 2022 Interpolate Workshop

[W2] *Halluci-Net: Scene Completion by Exploiting Object Co-occurrence Relationships*
K. Kulkarni, **T. Gokhale**, R. Singh, P. Turaga, A. Sankaranarayanan
https://arxiv.org/abs/2004.08614   AI for Content Creation @ CVPR 2021

[W3] *Cooking With Blocks: A Recipe for Visual Reasoning on Image-Pairs*
T. Gokhale, S. Sampat, Z. Fang, Y. Yang, C. Baral
Long version: https://arxiv.org/abs/1905.12042   Vision Meets Cognition @ CVPR'19

⊙ Preprints

[P1] *Adversarial Bayesian Augmentation for Single-Source Domain Generalization*
S. Cheng, **T. Gokhale**, Y. Yang   in review

[P2] *Benchmarking Spatial Relationships in Text-to-Image Generation*
T. Gokhale, H. Palangi, B. Nushi, V. Vineet, E. Horvitz, E. Kamar, C. Baral, Y. Yang
https://arxiv.org/abs/2212.10015   in review

[P3] *Poisoning of Image Classifiers via Selective Batch Sampling*
E. Wisdom, **T. Gokhale**, Y. Yang   in review

[P4] *SuperMarioDomains: Generalizing to Domains with Evolving Graphics*
Y. Luo, J. Feinglass, **T. Gokhale**, C. Baral, Y. Yang   in review

[P5] *End-to-end Knowledge Retrieval for Multi-modal Queries*
M. Luo, Z. Fang, **T. Gokhale**, Y.Yang, C. Baral   in review

⊙ Book Manuscript

[B1] *Advances in Multi-Modal Information Retrieval*
      *(*In Preparation*)*   Springer Synthesis Lectures

⊙ Grant Writing

I am actively involved in conceptualizing and writing grant proposals with my advisors. This proposed work builds upon contributions made by my PhD thesis. Note: I am not a PI on these grants.

[1] *Environment-driven Conceptual Learning*
   PI: Chitta Baral   *Submitted to DARPA, 2022*

[2] *Decentralized Authorship Attribution*
   PI: Chitta Baral   *Submitted to IARPA, 2022*

[3] *An Active Approach for Data Engineering to Improve Vision-Language Tasks*
   PI: Yezhou Yang, Co-PI: Chitta Baral   *Funded by NSF, 2021*

INVITED TALKS

Apr'23, *(Invited Talk)* "Towards Reliable Semantic Vision"   Temple University, PA
Mar'23, *(Invited Talk)* "Towards Reliable Semantic Vision"   Colorado School of Mines, CO
Mar'23, *(Invited Talk)* "Towards Reliable Semantic Vision"   Case Western Reserve Univesity, OH
Mar'23, *(Invited Talk)* "Towards Reliable Semantic Vision"   University of Maryland Baltimore County, MD
Mar'23, *(Invited Talk)* "Towards Reliable Semantic Vision"   Indiana University, IN
Mar'23, *(Invited Talk)* "Towards Reliable Semantic Vision"   Binghamton University, NY
Feb'23, *(Invited Talk)* "Towards Reliable Semantic Vision"   Rochester Institute of Technology, NY
Jan'23, *(Tutorial)* "Semantic Data Engineering for Robustness Under Multimodal Settings" WACV 2023, Hawaii
Oct'22, *(Invited Talk)* "Robust Semantic Vision"   University of Illinois at Chicago
Oct'22, *(Invited Talk)* "Benchmarking Spatial Relationships in Text-to-Image Generation" Microsoft Research
Mar'22, *(Guest Lecture)* "Introduction to Generalization in Semantic Vision"   ASU CSE 598
Sep'21, *(Invited)* "Robust Visual Understanding",   ASU ML Club
Aug'19, "Vision Beyond Pixels", IJCAI Doctoral Consortium,   IJCAI 2019, Macao
Jul'19, "Reasoning about Objects and Actions via Block-Play",   Telluride 2019
Apr'18, *(Invited)* "Deep Learning Methods in Imaging and Computer Vision",   BITS Goa

TEACHING

Tutorial
   SERUM: Semantic Data Engineering for Robustness Under Multimodal Settings   WACV 2023, Hawaii

Teaching Assistant, Arizona State University
   CSE310: Data Structures & Algorithms   Spring 2020, ASU
   CSE408: Multimedia Information Systems,   Spring 2019, ASU
   CSE110: Introduction to Programming,   Fall 2018, ASU

Guest Lecturer
   CSE598, Perception in Robotics   Spring 2022, ASU
   CSE408, Multimedia Information Systems   Spring 2019, ASU

Course Development
   CSE591: Frontier Topics in Vision & Language   [YouTube] [website] Spring 2021, ASU
   CTE: Advanced Image Processing,   Spring 2015, BITS Pilani

STUDENTS MENTORED

PhD Students
   Ethan Wisdom (see publication [P3])   Ph.D. CS [current]
   Maitreya Patel (see publication [C2])   Ph.D. CS [current]
   Agneet Chatterjee   Ph.D. CS [current]

MS (Thesis) Students
Maitreya Patel (see publication [C2])   M.S. CS 2022 [thesis]
Abhishek Chaudhary (see publication [C3])   M.S. CS 2021 [thesis]

Capstone Mentor, mentored five students in projects on visual reasoning   AY 2019-20
UG research mentor (FURI @ ASU), Mertay Dayanc   BS CS, 2020
Project Mentor, CSE598 - Perception in Robotics, ASU   Spring 2022
Project Mentor, CSE576 - Natural Language Processing, ASU   Fall 2018

SERVICE / LEADERSHIP

Program Committee / Conference Reviewer
CVPR: IEEE/CVF Conference on Computer Vision and Pattern Recognition   2023
ICML: International Conference on Machine Learning   2023
NeurIPS: Advances in Neural Information Processing Systems   2022
ICLR: International Conference on Learning Representations   2022
AAAI: AAAI Conference on Artificial Intelligence   2021–2023
ECCV: European Conference on Computer Vision   2022
ACL: Annual Meeting of the Association for Computational Linguistics   2021–2023
EMNLP: Conference on Empirical Methods in Natural Language Processing   2021–2022
NAACL: North American Chapter of the Association for Computational Linguistics   2021–2022
WACV: IEEE Winter Conference on Applications of Computer Vision   2021–2023
ICRA: International Conference on Robotics and Automation   2019–2023
IROS: IEEE/RSJ International Conference on Intelligent Robots and Systems   2022

Journal Reviewer
RA-L: IEEE Robotics and Automation Letter   2020
MVAP: Springer Machine Vision and Applications   2020

Workshop / Tutorial Organizer
2nd ODRUM: Workshop on Open-Domain Reasoning under Multi-Modal Settings,   [Website] CVPR'23
SERUM: Tutorial on Semantic Data Engineering under Multimodal Settings,   [Website] WACV'23
1st ODRUM Workshop on Open-Domain Retrieval under Multi-Modal Settings, [Website] [YouTube] CVPR'22

Organizer, 2021 Frontiers of V&L Seminar Series,   [Website], [YouTube] ASU
Founder, Summer Vision Reading Group,   [Website], multi-university initiative

Volunteer, 2019 Southwest Robotics Symposium,   Tempe AZ
Volunteer, International Conference on Machine Learning 2020,   Virtual
Advisor, ASU Machine Learning Club,   ASU
Award Reviewer, GPSA Teaching Award Reviewer   ASU
Mentor, Graduate Student Mentorship Program,   ASU
Student Mentor, Peer Mentorship Program   BITS Pilani

AWARDS AND RECOGNITION

Research Excellence Award, ASU GPSA   2022
Outstanding Mentor Award, ASU GPSA   2022
NeurIPS Top Reviewer   NeurIPS 2022
CVPR 2022 Doctoral Consortium   CVPR 2022
ICLR Best Reviewer   ICLR 2022
SCAI Doctoral Fellowship (ASU),   2020-2022

Engineering Graduate Fellowship, (ASU Engineering),			2020
ASU GPSA Travel Award			for WACV 2023
Graduate College Travel Award,		WACV'23 (declined), CVPR'22 (declined), ICCV'21, EMNLP'20, ECCV'20	
IJCAI 2019 Doctoral Consortium,			IJCAI 2019
Inducted, IEEE Eta Kappa Nu, Sigma Chapter,			CMU, 2017
National Talent Scholarship (Govt. of India),			2007–2015

REFERENCES

Yezhou Yang	Associate Professor	Arizona State University	yz.yang@asu.edu
Chitta Baral	Professor	Arizona State University	chitta@asu.edu
Rushil Anirudh	Research Scientist	Lawrence Livermore National Lab	anirudh1@llnl.gov
Eric Horvitz	Chief Scientific Officer	Microsoft	horvitz@microsoft.com
Heni Ben Amor	Associate Professor	Arizona State University	hbenamor@asu.edu