Viraj Prabhu

e-mail: virajp@gatech.edu
webpage: virajprabhu.github.io

Interests

Computer vision with a focus on label-efficiency, transfer learning, and robustness.

Education

Georgia Tech 2019-2023 (expected)
Ph.D. in Computer Science, advised by Judy Hoffman
Thesis: "Visual Domain Adaptation with Flexible Data Assumptions"
Committee: Judy Hoffman, Dhruv Batra, Sanja Fidler, Zsolt Kira, James Hays

Georgia Tech 2017-2019
M.S. in Computer Science, advised by Devi Parikh
GPA: 4.0, Awarded M.S. Research Award

BITS Pilani 2011-2015
B.Eng. (with honors) in Computer Science

Selected Work Experience

Georgia Tech, Atlanta Fall 2019-present
Graduate Research Assistant, with Judy Hoffman
Data-efficient and resilient computer vision systems that can be deployed in the real world. Published at top-tier venues including ICCV, NeurIPS, and BMVC.

NVIDIA Research, Toronto Summer 2022
Research Intern, with Sanja Fidler, James Lucas, and David Acuna
Sim-to-real adaptation of object detection models for self-driving.

Salesforce Research, Palo Alto Summer 2021
Research Intern, with Nikhil Naik and Ramprasaath Selvaraju
Adapting visual classifiers to new geographies (published at L3D-IVU, CVPR 2022).

Curai, Palo Alto Summer 2018, 2019
Research Intern, with Anitha Kannan, David Sontag, and Xavier Amatriain
Few-shot learning for dermatological diagnosis (published at MLHC 2019). Open-set machine learning algorithms for diagnosis (published at ML4H at NeurIPS 2019).

Georgia Tech, Atlanta Fall 2017-Spring 2019
Graduate Research Assistant, with Devi Parikh
Human-in-the-loop evaluation of visual conversational agents, and of interpretability mechanisms proposed for such agents (published at HCOMP 2017, EMNLP 2018).

Virginia Tech, Blacksburg Fall 2016-Spring 2017
Visiting Scholar, with Dhruv Batra
Equipping VQA models with mechanisms for detecting the relevance of questions, and with better compositional reasoning (published at EMNLP 2017).

Adobe, Bangalore Summer 2014, Fall 2016-Spring 2017
Member of Technical Staff
Owner of the Android app for Adobe Captivate Prime through two release cycles. Developed and tech-transferred real-time background substitution algorithm for video.

Tonbo Imaging, Bangalore Spring 2015
Research Intern, with Vishal Dugar
Automated camera calibration using a collimator and AprilTag targets (6% error reduction). Implemented boresighting algorithm to align muzzle and sighting systems.

Awards

Outstanding reviewer, NeurIPS 2021	2021
Outstanding reviewer, CVPR 2021	2021
M.S. Research Award, Georgia Tech Computing (1 student annually)	2018
Among top-30% reviewers, NeurIPS 2018	2018
Subfinalist, LDV Entrepreneurial Computer Vision Challenge	2017
Travel Scholarship, for Google Summer of Code Mentor summit	2016, 2017
1st, VTHacks, Virginia Tech's annual hackathon, (> 75 teams)	2017
1st, Google Hackathon at APOGEE 2014, (> 25 teams)	2014
2nd, Technical Project Competition at APOGEE	2013
Top-200 rank, BITSAT 2011 (>120k applicants)	2011
Amul Vidya Shree, awarded to top-100 in ICSE 2009 (>150k applicants)	2009

Publications

Preprints

18. **Bridging the Sim2Real gap with CARE: Supervised Detection Adaptation with Conditional Alignment and Reweighting**
V. Prabhu, D. Acuna, A. Liao, R. Mahmood, M. Law, J. Hoffman, S. Fidler, J. Lucas, 2023 [Paper]

Book Chapters

17. **Few-Shot Learning for Dermatological Disease Diagnosis**
V. Prabhu, A. Kannan, M. Ravuri, M. Chablani, D. Sontag, X. Amatriain
Meta Learning With Medical Imaging and Health Informatics Applications, Elsevier 2022 [Link]

Conference Publications

16. **Adapting Self-Supervised Vision Transformers by Probing Attention-Conditioned Masking Consistency**
V. Prabhu*, S. Yenamandra*, A. Singh, J. Hoffman
Neural Information Processing Systems (NeurIPS) 2022. [Paper]
15. **Mitigating Bias in Visual Transformers via Targeted Alignment**
S. Sudhakar, V. Prabhu, A. Krishnakumar, J. Hoffman
British Machine Vision Conference (BMVC) 2021. [Paper]
14. **Unsupervised Discovery of Bias in Deep Visual Recognition Models**
A. Krishnakumar, V. Prabhu, S. Sudhakar, J. Hoffman
British Machine Vision Conference (BMVC) 2021 [Paper]
13. **SENTRY: Selective Entropy Optimization via Committee Consistency for Unsupervised Domain Adaptation**
V. Prabhu, S. Khare, D. Kartik, J. Hoffman
International Conference on Computer Vision (ICCV) 2021 [Project Page]
12. **Active Domain Adaptation via Clustering Uncertainty-weighted Embeddings**
V. Prabhu, A. Chandrasekaran, K. Saenko, J. Hoffman
International Conference on Computer Vision (ICCV) 2021 [Project Page]
11. **Few-Shot Learning for Dermatological Disease Diagnosis**
V. Prabhu, A. Kannan, M. Ravuri, M. Chablani, D. Sontag, X. Amatriain
*Machine Learning and Healthcare Conference, 2019 (**Spotlight**)*
10. **Do Explanations make VQA Models more Predictable to a Human?**
A. Chandrasekaran*, V. Prabhu*, D. Yadav*, P. Chattopadhyay*, D. Parikh
Conference on Empirical Methods in Natural Language Processing (EMNLP) 2018 [Paper]

9. **The Promise of Premise: Harnessing Question Premises in VQA**
   A. Mahendru*, V. Prabhu*, A. Mohapatra*, D. Batra, S. Lee
   Conference on Empirical Methods in Natural Language Processing (EMNLP) 2017 [Paper]
8. **Evaluating Visual Conversational Agents via Cooperative Human-AI Games**
   P. Chattopadhyay*, D. Yadav*, V. Prabhu, A. Chandrasekaran, A. Das, S. Lee, D. Batra, D. Parikh
   AAAI Conference on Human Computation and Crowdsourcing (HCOMP) 2017 [Paper]

Workshop Publications

7. **AUGCO: Augmentation Consistency-guided Self-training for Source-free Domain Adaptive Semantic Segmentation**
   V. Prabhu*, S. Khare*, D. Kartik, J. Hoffman
   Workshop on Distribution Shifts (DistShift), NeurIPS 2022. [Paper]
6. **Can domain adaptation make object recognition work for everyone?**
   V. Prabhu, R. Selvaraju, J. Hoffman, N. Naik
   Workshop on Learning with Limited Labeled Data, CVPR 2022 [Paper]
5. **Open Set Medical Diagnosis**
   V. Prabhu, A. Kannan, G. Tso, N. Katariya, M. Chablani, D. Sontag, X. Amatriain
   ML for Health Workshop, NeurIPS 2019 [Paper]
4. **Fabrik: An Online Collaborative Neural Network Editor**
   U. Garg, V. Prabhu, D. Yadav, R. Ramrakhya, H. Agarwal, D. Batra
   Workshop on AI Systems, SOSP 2019 [Paper]
3. **Few-Shot Learning for Dermatological Disease Diagnosis**
   V. Prabhu, A. Kannan, M. Ravuri, M. Chablani, D. Sontag, X. Amatriain
   ML for Health Workshop, NeurIPS 2018
2. **It Takes Two to Tango: Towards Theory of AI's Mind** [Paper]
   A. Chandrasekaran*, D. Yadav*, P. Chattopadhyay*, V. Prabhu*, D. Parikh
   *Chalearn Looking at People Workshop, CVPR 2017 (**Oral**)*

Patents

1. **Systems and methods for responding to healthcare inquiries**
   A. Kannan, M. Ravuri, V. Rodrigues, V. Venkataraman, T. Geoffrey, N. Khosla, N. Hunt, X. Amatriain, M. Chablani, D. Sontag, V. Prabhu
   US Patent 10,847,265 [Paper]

Talks

Reliable Computer Vision for a Changing World 2023
Google Research Zurich, with Judy Hoffman and Prithivijit Chattopadhyay

Responsible CV: How do models fail and what can we do about it? 2022
Human-Centered AI tutorial at CVPR 2022, with Judy Hoffman [Website]

Introduction to Reinforcement Learning Fall 2019
Guest lecturer for Deep Learning (Course instructor: Dhruv Batra) [Slides]

Professional Activities

Reviewing

Neural Information Processing Systems (NeurIPS)	2018-2021
Conference on Computer Vision and Pattern Recognition (CVPR)	2018, 2021-2022
International Conference on Learning Representations (ICLR)	2018, 2020
European Conference on Computer Vision and Pattern Recognition (ECCV)	2018
Association for Computational Liguistics (ACL)	2019
Winter Conference on Applications of Computer Vision (WACV)	2022

Mentoring

Gaurav Gupta, Bachelor's student, IIT BHU (Google Summer of Code 2016)	2016
Utsav Garg, Bachelor's student, NUS (Google Summer of Code 2017)	2017
Shivam Khare, Master's student, Georgia Tech	2021
Deeksha Kartik, Master's student, Georgia Tech	2021
Sruthi Sudhakar, Bachelor's student, Georgia Tech	2021
Arvind Krishnakumar, Master's student, Georgia Tech	2021
Sriram Yenamandra, Master's student, Georgia Tech	2022
Aaditya Singh, Master's student, Georgia Tech	2022

Workshop Organization

Learning from Limited and Imperfect Data (L2ID), ECCV 2022	2022

Other Projects

Fabrik, an Online Collaborative Neural Network Editor Summer 2016-2017
Lead mentor and maintainer of Fabrik, an open-source web platform to collaboratively build, visualize, and design neural networks in the browser (1000+ GitHub stars).

Learning Cooperative Visual Dialog Agents via Deep RL Fall 2017
PyTorch code for Das & Kottur *et al.*, ICCV '17. Used for the 2018 Visual Dialog challenge. [Code] (160+ GitHub stars)

Learning Active Learning Policies for Visual Recognition Spring 2019
Learning active learning policies for visual recognition via RL. [Report]

Cooperative Visual Dialog Models with Mental Models Fall 2017
Explored self-play strategies based on dialog rollouts to develop cooperative visual dialog agents.[Poster]

Exploring Generative Models for Semantic Segmentation Spring 2018
Semantic segmentation via deep probabilistic generative models. [Report]

Relevant Coursework

Machine Learning, Deep Learning, Computer Vision, Advanced ML
Adaptive Control and Reinforcement Learning, Probabilistic Graphical Models
Computability & Algorithms, High-dimensional Data Analytics
Information Retrieval, Parallel Computing, Advanced Algorithms

Teaching Experience

Introduction to Computer Vision, Georgia Tech Spring 2021
Head teaching assistant with Judy Hoffman

Deep Learning, Georgia Tech Fall 2019
Teaching assistant with Dhruv Batra

Introduction to Machine Learning, Virginia Tech Fall 2016
Teaching assistant with Stefan Lee