

# Viraj Prabhu

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## RESEARCH INTERESTS

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Transfer learning, Learning with limited supervision, Uncertainty Estimation, Vision & Language

## EDUCATION

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### Georgia Institute of Technology, Atlanta

2019 - present

Ph.D. in Computer Science, advised by Prof. Judy Hoffman

### Georgia Institute of Technology, Atlanta

2017 - 2019

Master of Science in Computer Science, advised by Prof. Devi Parikh

GPA: 4.0, Awarded M.S. Research Award

### Birla Institute of Technology and Science, Pilani

2011 - 2015

Bachelor of Engineering (with honors) in Computer Science

## RESEARCH EXPERIENCE

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### Adaptive Learning Lab, Georgia Tech

Fall 2019 - Present

*Graduate Research Assistant, advised by Prof. Judy Hoffman*

*Atlanta, GA*

Developing data-efficient and reliable computer vision systems that can be deployed in the real world.

### Curai

Summer 2018, 2019

*Research Intern, mentored by Dr. Anitha Kannan*

*Palo Alto, CA*

– Developed open-set machine learning algorithms for disease diagnosis from clinical case data. To appear at ML4H at NeurIPS '19.

– Developed few-shot learning approach for dermatological diagnosis. Published at MLHC '19.

### Visual Intelligence Lab, Georgia Tech

Fall 2017 - Spring 2019

*Graduate Research Assistant, advised by Prof. Devi Parikh*

*Atlanta, GA*

Worked on human-in-the-loop evaluation of visual conversational agents, and of “interpretability” modalities proposed for such agents. Published work at HCOMP '17 and EMNLP '18.

### Machine Learning and Perception Lab, Virginia Tech

Fall 2016 - Spring 2017

*Research Assistant, advised by Prof. Dhruv Batra*

*Blacksburg, VA*

Worked on equipping VQA models with mechanisms for detecting the relevance of questions, and with better compositional reasoning. Published at EMNLP '17.

### Adobe

Summer 2014

*Research Intern, Adobe Presenter Video Express (PVX)*

*Bangalore, KA*

Designed and implemented fast graphcut-based segmentation algorithm for real-time background substitution in video. Transferred into *Magic Green Screen*, the marquee feature of PVX 11.

## AWARDS & SERVICE

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Outstanding reviewer, CVPR 2021.

*M.S. Research Award*, awarded by Georgia Tech's College of Computing (1 student annually).

Among *Top-30%* reviewers, NeurIPS 2018.

*Reviewer*, NeurIPS '18,'19,'20, ICLR '18,'20, ECCV '18, ACL '19, CVPR '18.

*1st*, VTHacks 2017, Virginia Tech's annual hackathon. [Project].

*1st*, Google Hackathon, APOGEE 2014, for Snapify, an image-sharing app (from > 25 teams).

*Subfinalist*, LDV Entrepreneurial Computer Vision Challenge 2017, representing CloudCV.

2nd, Project Presentation, APOGEE 2013, for Try-On, a Kinect-based virtual dressing room app.  
Awarded *Travel Scholarship*, for Google Summer of Code Mentor summit 2016, 2017.  
*Top-200 rank*, BITSAT 2011, (from >120k applicants).  
Awarded *Amul Vidya Shree* for *Top-100 rank* in ICSE 2009 (from >150k applicants).

## PUBLICATIONS

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### Preprints

[11] **S4T: Source-free domain adaptation for semantic segmentation via self-supervised selective self-training** [Paper]

**V. Prabhu\***, S. Khare\*, D. Kartik, J. Hoffman. (2021) (\* = equal)

### Conference Papers

[10] **SENTRY: Selective Entropy Optimization via Committee Consistency for Unsupervised Domain Adaptation** [Project Page]

**V. Prabhu**, S. Khare, D. Kartik, J. Hoffman.

*International Conference on Computer Vision (ICCV) 2021.*

[9] **Active Domain Adaptation via Clustering Uncertainty-weighted Embeddings** [Project Page]

**V. Prabhu**, A. Chandrasekaran, K. Saenko, J. Hoffman.

*International Conference on Computer Vision (ICCV) 2021.*

[8] **Few-Shot Learning for Dermatological Disease Diagnosis.** [Paper][Poster]

**V. Prabhu**, A. Kannan, M. Ravuri, M. Chablani, D. Sontag, X. Amatriain.

*Machine Learning and Healthcare Conference, 2019 (Spotlight).*

[7] **Do Explanations make VQA Models more Predictable to a Human?** [Paper]

A. Chandrasekaran\*, **V. Prabhu\***, D. Yadav\*, P. Chattopadhyay\*, D. Parikh.

*Conference on Empirical Methods in Natural Language Processing (EMNLP) 2018.* (\* = equal)

[6] **The Promise of Premise: Harnessing Question Premises in Visual Question Answering.** [Paper]

A. Mahendru\*, **V. Prabhu\***, A. Mohapatra\*, D. Batra, S. Lee.

*Conference on Empirical Methods in Natural Language Processing (EMNLP) 2017.*

[5] **Evaluating Visual Conversational Agents via Cooperative Human-AI Games.** [Paper]

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.*

### Workshop Papers

[4] **Open Set Medical Diagnosis** [Paper]

**V. Prabhu**, A. Kannan, G. Tso, N. Katariya, M. Chablani, D. Sontag, X. Amatriain.

*ML for Health Workshop, NeurIPS 2019.*

[3] **Fabrik: An Online Collaborative Neural Network Editor.** [Paper]

U. Garg, **V. Prabhu**, D. Yadav, R. Ramrakhya, H. Agarwal, D. Batra.

*Workshop on AI Systems, SOSIP 2019.*

[2] **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.*

[1] **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).*

## PROGRAMMING EXPERIENCE

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**CloudCV** Summer 2016, 2017  
*Mentor, Google Summer of Code, Google Code-In* Blacksburg, VA  
Lead mentor for Fabrik ([github.com/Cloud-CV/Fabrik](https://github.com/Cloud-CV/Fabrik)), an open-source web platform to collaboratively build, visualize, and design neural networks in the browser. (**1000+ GitHub stars**)

**Adobe Systems** 2015 - 2016  
*Member of Technical Staff, Adobe Captivate Prime* Bangalore, KA  
Owner of Captivate Prime Android app for two release cycles. Developed features for offline playback, sync, and internationalization.

**Tonbo Imaging** Fall 2016 - Spring 2017  
*R&D Intern* Bangalore, KA

**Automated Calibration:** Developed algorithm for automated calibration of company cameras using a collimator and AprilTag target setup, reducing calibration error by 6%.

**Boresighting:** Developed a boresighting algorithm to precisely align a weapon's muzzle and sighting system with a target at 10m to 100m for TDS-BRS, Tonbo's video precision boresight tool.

**CEERI Pilani** Spring 2014  
*Project Assistant, advised by Prof. Jagdish Raheja* Pilani, RA  
Built Kinect-based teleconferencing app that detected and displayed the current speaker.

## TEACHING EXPERIENCE

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**Head Teaching Assistant, Intro to Computer Vision** Spring 2021  
*Course Instructor: Prof. Judy Hoffman* Georgia Tech  
Worked with instructor and team of 5 TA's to conduct the course. Also responsible for designing homeworks, weekly office hours, and grading.

**Teaching Assistant, Deep Learning** Fall 2019  
*Course Instructor: Prof. Dhruv Batra* Georgia Tech  
Taught lecture on Reinforcement Learning ([Slides](#)). Held weekly hours, and graded homeworks.

**Teaching Assistant, Intro to Machine Learning** Fall 2016  
*Course Instructor: Prof. Stefan Lee* Virginia Tech  
Created homework machine learning challenges on Kaggle, and graded homeworks.

## OTHER PROJECTS

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**Learning Cooperative Visual Dialog Agents via Deep Reinforcement Learning**  
PyTorch implementation (**130+ GitHub stars**) of Das & Kottur et al, ICCV '17. Used as starting point for starter code for 2018 Visual Dialog challenge. ([github.com/batra-mlp-lab/visdial-rl](https://github.com/batra-mlp-lab/visdial-rl))

**Learning Active Learning Policies for Visual Recognition** [Report]  
*Course Project, Adaptive Control and Reinforcement Learning* Spring 2019  
Explored strategies to learn active learning policies for visual recognition via reinforcement learning.

**Visual Dialog Models that Rollout a Mental Model of their Interlocutors** [Poster]  
*Course Project, Deep Learning* Fall 2017  
Explored self-play strategies based on dialog rollouts to develop cooperative visual dialog agents.

## Exploring Weak Supervision and Generative Models for Semantic Segmentation [Report]

*Course Project, Probabilistic Graphical Models*

*Spring 2018*

- Explored weakly supervised semantic segmentation using localization cues from GradCAM.
- Studied semantic segmentation via deep probabilistic generative models.

### SELECTED COURSEWORK

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**Graduate:** Adaptive Control and Reinforcement Learning, Probabilistic Graphical Models, Machine Learning, Deep Learning, Computer Vision, Computability & Algorithms, Information Visualization, High-dimensional Data Analytics

**Undergraduate:** Pattern Recognition, Information Retrieval, Parallel Computing, Operating Systems, Advanced Algorithms, Computer Architecture, Computer Networks

### PROGRAMMING SKILLS

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Languages: Python, Lua, C/C++, Java, JavaScript, MATLAB, Shell

Technologies: PyTorch, Keras, L<sup>A</sup>T<sub>E</sub>X, HTML/CSS, ReactJS, EmberJS, Android

### REFERENCES

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- Prof. Judy Hoffman, Georgia Tech (email: judy@gatech.edu)
- Prof. Devi Parikh, Georgia Tech (email: parikh@gatech.edu)
- Prof. Dhruv Batra, Georgia Tech (email: dbatra@gatech.edu)
- Dr. Anitha Kannan, Curai (email: anitha@curai.com)
- Prof. Stefan Lee, Oregon State University (email: leestef@oregonstate.edu)