

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

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

*Reviewer*, NeurIPS, ACL 2019, NeurIPS, CVPR, ICLR, ECCV 2018.

*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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### Conference Papers

- [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**

*Project Assistant, advised by Prof. Jagdish Raheja*

Spring 2014

*Pilani, RA*

Built Kinect-based teleconferencing app that detected and displayed the current speaker.

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**TEACHING EXPERIENCE**

**Teaching Assistant, Deep Learning**

*Course Instructor: Prof. Dhruv Batra*

Fall 2019

*Georgia Tech*

Taught lecture on Reinforcement Learning ([Slides](#)). Held weekly hours, and graded homeworks.

**Teaching Assistant, Intro to Machine Learning**

*Course Instructor: Prof. Stefan Lee*

Fall 2016

*Virginia Tech*

Created homework machine learning challenges on Kaggle, and graded homeworks.

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**OTHER PROJECTS**

**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.

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**SELECTED COURSEWORK**

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

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

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**PROGRAMMING SKILLS**

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

Technologies: PyTorch, Torch, Keras, TensorFlow,  $\text{\LaTeX}$ , ReactJS, EmberJS, Android

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**REFERENCES**

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