Prithvijit Chattopadhyay

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RESEARCH INTERESTS Vision & Language, Few-shot and Continual Learning, Reinforcement Learning

EDUCATION

School of Interactive Computing, Georgia Tech 2019-Present
Ph.D. in Computer Science
Advised by Prof. Judy Hoffman

College of Computing, Georgia Tech 2017-2019
M.S. in Computer Science
Advised by Prof. Devi Parikh
Thesis: Evaluating Visual Conversational Agents via Cooperative Human-AI Games
Awarded M.S. Research Award

Delhi Technological University (Formerly DCE) 2012-2016
B.Tech. in Electrical Engineering

EXPERIENCE

Deep Learning Group, Microsoft Research AI May 2018 - Aug 2018
Research Intern, mentored by Hamid Palangi
Improving goal-driven visually grounded dialog under the presence of an adversarial utterance evaluator

Visual Intelligence Lab, Georgia Tech Aug 2017 - Aug 2019
Research Assistant, mentored by Prof. Devi Parikh and Prof. Dhruv Batra
Worked on problems at the intersection of computer vision and natural language processing with a focus towards building intelligent and interpretable systems.

CVMLP Lab, Virginia Tech Jun 2015 - May 2017
Research Assistant, mentored by Prof. Devi Parikh and Prof. Dhruv Batra
Worked on scene-understanding problems such as object detection and counting in everyday scenes with a downstream focus towards visual question answering

Robotics Research Lab, IIIT Hyderabad Dec 2014 - Jan 2015
Research Intern, mentored by Prof. K Madhava Krishna
Implemented an efficient strategy for a robot to discover, recognize and navigate to a selected few objects among some scattered in an environment, based on a "guess from far and recognize from near" strategy.

IACS, Kolkata Jun 2014 - Aug 2014
Research Intern, mentored by Prof. Soumitra Sengupta
Worked on finding Charged Rotating Black Hole solutions in Einstein-Gauss-Bonnet dilaton coupled gravity and simulated the conditions for the existence of multiple horizons in constant scalar curvature f(R) gravity.

Autonomous Underwater Vehicle Team, DTU Aug 2012 - Aug 2016
Undergraduate Researcher, mentored by Prof. R K Sinha
Underwater Acoustics: Developed and implemented range estimation algorithms for Passive Source Localization from Time Difference of Arrival (TDOA) values in conjunction with machine vision techniques.
Control Systems: Designed control modules of the AUV. Implemented simultaneous PID loops to maintain the orientation of the AUV in motion.

AWARDS & RECOGNITION

Outstanding Reviewer for ICLR 2019
Recipient: IC Student Travel Grant to attend NeurIPS 2018
Among top 30% reviewers for NeurIPS 2018
Recipient: MS Research Award (Spring 2018) - College of Computing, Georgia Tech
Winner: VT-Hacks, 2017, a Major League Hacking event.
Semi-Finalists: ROBOSUB - AUVSI, 2013 out of 30 participating teams
Finalists: NIOT SAVe, 2013 out of 27 participating teams
Recipient: Merit Scholarships for Academic Performance (2012-2014)
Recipient: KVPY and INSPIRE Fellowships, 2012
National Top 1%: Indian National Physics Olympiad (InPhO), 2013

PUBLICATIONS & PRE-PRINTS

Unsupervised Discovery of Decision States for Transfer in Reinforcement Learning
arXiv 2019 **(Under Review)**
Task-Agnostic Reinforcement Learning (TARL) Workshop, ICLR 2019 **(Poster)**
N. Modhe, **P. Chattopadhyay**, M. Sharma, A. Das, D. Parikh, D. Batra, R. Vedantam

Improving Generative Visual Dialog by Answering Diverse Questions
Conference on Empirical Methods in Natural Language Processing (EMNLP) 2019
V. Murahari, **P. Chattopadhyay**, D. Batra, D. Parikh, A. Das

EvalAI: Towards Better Evaluation Systems for AI Agents
arXiv 2019 **(Technical Report)**
D. Yadav, R. Jain, H. Agrawal, **P. Chattopadhyay**, T. Singh, A. Jain, S. Singh, S. Lee, D. Batra

Choose Your Neuron: Incorporating Domain Knowledge Through Neuron-Importance
European Conference on Computer Vision (ECCV) 2018 **(Poster)**
Continual Learning Workshop, NeurIPS 2018 **(Poster)**
Visually Grounded Interaction and Language (ViGIL), NeurIPS 2018 **(Poster)**
R. Selvaraju*, **P. Chattopadhyay***, M. Elhoseiny, T. Sharma, D. Batra, D. Parikh, S. Lee

Do Explanations make VQA models more predictable to a human?
Conference on Empirical Methods in Natural Language Processing (EMNLP) 2018 (**Poster**)
A. Chandrasekaran*, V. Prabhu*, D.Yadav*, **P. Chattopadhyay***, D. Parikh

Evaluating Visual Conversational Agents via Cooperative Human-AI Games
AAAI Conference on Human Computation and Crowdsourcing (HCOMP) 2017 (**Oral**)
P.Chattopadhyay*, D.Yadav*, V. Prabhu, A. Chandrasekaran, A. Das, S. Lee, D. Batra, D. Parikh

It Takes Two to Tango: Towards Theory of AIs Mind
Chalearn Looking at People Workshop, CVPR 2017 **(Oral)**
A. Chandrasekaran*, D.Yadav*, **P. Chattopadhyay***, V. Prabhu*, D. Parikh

Counting Everyday Objects in Everyday Scenes
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2017 (**Spotlight**)
P.Chattopadhyay*, R.Vedantam*, R. Selvaraju, D. Batra, D. Parikh

Delhi Technological University: Design and Development of the Littoral AUV Zyra 2.0
AUVSI RoboSub Journal 2014 (**Technical Report**)

PROFESSIONAL SERVICES

Reviewing

IEEE Conference on Computer Vision and Pattern Recognition (CVPR)	2018
Neural Information Processing Systems (NeurIPS)	2018, 2019
Association for Computational Linguistics (ACL)	2019
International Conference on Learning Representations (ICLR)	2019, 2020
International Conference on Machine Learning (ICML)	2019
European Conference on Computer Vision (ECCV)	2018

RELEVANT COURSEWORK

Graduate Coursework

• Deep Learning • Machine Learning • Probabilistic Graphical Models in Machine Learning
• Machine Learning Theory • Computability and Algorithms
• Adaptive Control and Reinforcement Learning

Selected Undergraduate Coursework

• Control Systems • Pattern Recognition • Advanced Analog Circuit Design
• Network Analysis and Circuit Theory • Microprocessors • Electromagnetic Field Theory
• Digital Electronics

SELECTED PROJECTS

Incorporating Domain Knowledge in Neurons

We propose a simple, efficient, interpretable zero-shot learning approach. By explicitly grounding intermediate concepts captured by neurons in human-interpretable domains, our approach – Neuron-Importance Aware Weight Transfer (NIWT) – not only allows learning deep classifiers for novel classes but also helps in explaining the decisions made by such classifiers at a fine-grained level of neurons.

Evaluating Visual Conversational Agents

We designed a cooperative 'image-guessing' game - GuessWhich - to evaluate the utility of state-of-the-art visual dialog agents by pairing them with humans. While AI literature suggests agents (chatbots) trained in such a collaborative self-play setting via RL perform better than their SL counterparts – our human studies suggest this improvement in performance does not translate to human-AI teams.

Exploring Weak Supervision and Generative Models for Semantic Segmentation

Course Project, Probabilistic Graphical Models

We explored weakly supervised semantic segmentation using localization cues obtained from GradCAM – a post-hoc saliency map generation approach for deep networks. We further studied semantic segmentation via deep probabilistic generative models. Specifically, we used joint VAE models with retrofitted unimodal inference networks to model the joint distribution of image, attributes and segmentation maps.

REFERENCES

• Prof. Devi Parikh, *Georgia Tech* (email: parikh@gatech.edu)
• Prof. Dhruv Batra, *Georgia Tech* (email: dbatra@gatech.edu)
• Prof. Stefan Lee, *Oregon State University* (email: steflee@gatech.edu)
• Prof. Mohamed H. Elhoseiny, *KAUST* (email: mohamed.elhoseiny@kaust.edu.sa)