Ramprasaath R. Selvaraju

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PROFESSIONAL SUMMARY

Research Scientist with 5 years of industry experience working on topics related to Explainable-AI, Foundation Models and Robustness. Previously Senior Research Scientist at Salesforce Research and Ph.D from Georgia Tech.

RESEARCH INTERESTS

Computer Vision, Explainable-AI, LLMs, Vision and Language

EMPLOYMENT

Apple, Sunnyvale 2023 - now
Senior Research Scientist
Machine Learning for Apple Vision Pro

Artera AI, Los Altos 2022 - 2023
Senior Machine Learning Scientist
Precision Medicine through Computer Vision

Salesforce Research, Palo Alto 2020 - 2022
Senior Research Scientist
Open ended research at the intersection of Explainable-AI, Robustness, and Large Scale Vision and Language Pretraining

EDUCATION

Georgia Institute of Technology, Atlanta
Ph.D in Computer Science
Dissertation Title: Explaining Model Decisions and Correcting them via Human Feedback

Birla Institute of Technology & Science (BITS)-Pilani
Bachelor of Engineering (Honor) in Electrical and Electronics
Master of Science (Honor) in Physics

AWARDS

Recognized among the **Top-100 scholars** in the AMinor 2022 AI 2000 Most influential scholars in Computer Vision between 2012-2021.

INTERNSHIPS

Microsoft Research, Seattle Summer 2019
With Ece Kamar, Besmira Nushi and Eric Horvitz
Towards evaluating and encouraging human-like reasoning abilities in deep models.

Tesla Autopilot, Palo Alto Spring 2019
With Andrej Karpathy
Preventing failures of autonomous systems in case of rarely occurring scenarios.

Samsung Research America, Mountain View Summer 2018
With Yilin Shen and Hongxia Jia
Developing algorithms for grounding and unbiasing deep vision and language models.

Facebook, Menlo Park Spring 2017
With Peter Vajda and Devi Parikh
Developing a framework for interpreting and visualizing Facebook's deep models.

Virginia Tech, Blacksburg Spring 2015
With Devi Parikh
Building curious systems that ask natural language questions about an image.

Oxford University, Oxford Fall 2014
With Philip H.S Torr and Stephen Hicks
Developing interactive augmented reality system for visually impaired users.

Brown University, Providence Summer 2013
With Benjamin Kimia
Designing a vision-based navigation system to help visually impaired people navigate indoor environments.

PATENTS

Systems and methods for contrastive pretraining with video tracking supervision
B. Chen, R.R. Selvaraju and N. Naik
US Patent App. 12/106,541.

Systems and methods for contrastive attention-supervised tuning
R.R. Selvaraju and N. Naik
US Patent App. 17/209,011 and 17/209,013.

JOURNAL ARTICLES

Grad-CAM: Visual Explanations from Deep Networks via Gradient-based Localization
R.R. Selvaraju, M. Cogswell, A. Das, R. Vedantam, D. Parikh, and D. Batra
International Journal of Computer Vision (IJCV), 2019.

Reframing Explanation as an Interactive Medium: The EQUAS (Explainable QUestion Answering System) Project
D. Batra, W. Ferguson, R. Mooney, D. Parikh, A. Torralba, D. Bau, D. Diller, J. Fasching, J. Kaufman, Y. Goyal, J. Miller, K. Moffitt, A. Oca, **R.R. Selvaraju**, A. Shrivastava, J. Wu
Applied AI Letters, 2021.

CONFERENCE PAPERS

Development and validation of an AI-derived digital pathology-based biomarker ...
Andrew Armstrong, Vinnie Liu, **R.R. Selvaraju**, Emmalyn Chen, *et al.*
American Society of Clinical Oncology (ASCO), 2023.

CLIP-Lite: Information Efficient Visual Representation Learning from Textual Annotations
A. Srivastava, **R.R. Selvaraju**, N. Naik, V. Ordonez
AISTATS, 2023.

PreViTS: Contrastive Pretraining with Video Tracking Supervision
B. Chen, **R.R. Selvaraju**, S. Chang, J. Niebles, N. Naik
WACV, 2023.

TAG: Boosting Text-VQA via Text-aware Visual Question-answer Generation
J. Wang, M. Gao, Y. Hu, **R.R. Selvaraju**, C. Ramaiah, R. Xu, J. Jaja, L. Davis
BMVC, 2022.

Align before Fuse: Vision and Language Representation Learning with Momentum Distillation
J. Li, **R.R. Selvaraju**, A. Gotmare, S. Joty, C. Xiong, S. Hoi
NeurIPS, 2021.

SOrT-ing VQA Models : Contrastive Gradient Learning for Improved Consistency
S. Dharur, P. Tendulkar, D. Batra, D. Parikh, **R.R. Selvaraju**
NAACL, 2021.

CASTing Your Model: Learning to Localize Improves Self-Supervised Representations
R.R. Selvaraju*, K. Desai*, J. Johnson, N. Naik
CVPR, 2021.

SQuINTing at VQA Models: Interrogating VQA Models with Sub-Questions
R.R. Selvaraju, P. Tendulkar, D. Parikh, E. Horvitz, M. Ribeiro, B. Nushi, E. Kamar
CVPR, 2020.

Taking a HINT: Leveraging Explanations to Make Vision & Language Models More Grounded
R.R. Selvaraju, S. Lee, Y. Shen, H. Jia, S. Ghosh, L. Heck, D. Batra, D. Parikh
ICCV, 2019.

Trick or TReAT: Thematic Reinforcement for Artistic Typography
P. Tendulkar, K. Krishna, **R.R. Selvaraju**, D. Parikh
ICCC, 2019.

Choose Your Neuron: Incorporating Domain Knowledge into Deep Networks via Neuron Importance
R.R. Selvaraju*, P. Chattopadhyay*, M. Elhoseini, T. Sharma, D. Batra, D. Parikh, S. Lee
ECCV, 2018.

Diverse Beam Search: Decoding Diverse Solutions from Neural Sequence Models
A. Vijayakumar, M. Cogswell, **R.R. Selvaraju**, Q. Sun, S. Lee, D. Crandall, D. Batra
AAAI, 2018.

Grad-CAM: Visual Explanations from Deep Networks via Gradient-based Localization
R.R. Selvaraju, M. Cogswell, A. Das, R. Vedantam, D. Parikh, D. Batra
ICCV, 2017.

Counting Everyday Objects in Everyday Scenes
P. Chattopadhyay, R. Vedantam, **R.R. Selvaraju**, D. Batra, D. Parikh
CVPR, 2017.

The Semantic Paintbrush: Interactive 3D Mapping and Recognition in Large Outdoor Spaces
M. Ondrej, V. Vineet, M. Lidegaard, **R.R. Selvaraju**, M. Niener, S. Golodetz, S.

Hicks, P. Prez, S. Izadi, P. Torr
CHI, 2015.

Automated Colorimetric Analysis in Paper-based Sensors
S. Garg, **R.R. Selvaraju**, S. Kapur, K. Rao
ICIP, 2014.

WORKSHOP PAPERS

Can domain adaptation make object recognition work for everyone?
V. Prabhu, **R.R. Selvaraju**, J. Hoffman, N. Naik
CVPR'22 Workshop on Learning with Limited Labelled Data.

SOrT-ing VQA Models : Contrastive Gradient Learning for Improved Consistency
S. Dharur, P. Tendulkar, D. Batra, D. Parikh, **R.R. Selvaraju**
NeurIPS'20 Workshop on Interpretable Inductive Biases.

Taking a HINT: Leveraging Explanations to Make Vision & Language Models More Grounded
R.R. Selvaraju, S. Lee, Y. Shen, H. Jia, S. Ghosh, D. Batra, D. Parikh
ICLR'19 Workshop on Debug ML.

Choose Your Neuron: Incorporating Domain Knowledge into Deep Networks via Neuron Importance
R.R. Selvaraju*, P. Chattopadhyay*, M. Elhoseini, T. Sharma, D. Batra, D. Parikh, S. Lee
NeurIPS'18 Workshop on Continual Learning, NeurIPS'18 VIGIL Workshop.

Grad-CAM: Why did you say that?
R.R. Selvaraju, M. Cogswell, A. Das, R. Vedantam, D. Parikh, D. Batra
NeurIPS'16 Workshop on Interpretable ML, CVPR'17 Workshop on Explainable CV.

INVITED TALKS

Explaining Model Decisions and Fixing them via Human Feedback
Stanford Medical AI Seminar, Fall 22

Explaining Model Decisions and Correcting them through Focused Feedback
Towards Robust, Trustworthy, and Explainable Computer Vision (ICCV'21 Tutorial)

Visualizing and Understanding CNNs
Deep Learning Lecture at Georgia Tech (Fall 19, 20, 21)

Towards Interpretable, Transparent and Unbiased AI
Microsoft AI Breakthroughs, Fall 18

TEACHING

Data Structures and Algorithms Fall 15 - Spring 16
Teaching Assistant

Towards Robust, Transparent and Explainable Computer Vision (ICCV'21)
Tutorial Organizer

TECHNICAL SKILLS

Languages: Python, MATLAB, C++, HTML
Deep Learning Frameworks: PyTorch, Tensorflow, Caffe, Torch

SIDE PROJECTS

Interpreting decisions from Deep RL agents trained for navigation — Fall 2020
Weak supervision and Generative models for semantic segmentation — Spring 2018
Exploring Curriculum Learning for deep models — Spring 2015

RELEVANT COURSES

- Math Foundations of ML
- Deep Learning
- Prob. and Statistics
- Adv. Computer Vision
- Optim. in High-dim
- Human Robot Interaction
- Adv. Machine Learning
- Bayesian Statistics
- Linear Algebra

REVIEWING

IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) 2018
British Machine Vision Conference (BMVC) 2022
Computer Vision and Image Understanding (CVIU) Journal 2019
Computer Vision and Pattern Recognition (CVPR) 2017 - 2022
Neural Information Processing Systems (NeurIPS) 2016, 2017
European Conference on Computer Vision (ECCV) 2018, 2020
IEEE International Conference on Computer Vision (ICCV) 2017, 2019, 2021
International Conference on Robotics and Automation (ICRA) 2021

EXTRA CURRICULAR

First Place, Divisionals and Second, Mid-Atlantic Table-Tennis Championship 2016
Represented Virginia Tech, US-Canada National Table-Tennis Championship 2016

REFERENCES

Dr. Devi Parikh, Associate Professor, Georgia Tech deviparikh.dp@gmail.com
Dr. Dhruv Batra, Associate Professor, Georgia Tech batradhruv@gmail.com
Dr. Nikhil Naik, Lead Research Scientist, Salesforce Research nnaik@salesforce.com
Dr. Ece Kamar, Managing Director @ AI Frontiers Lab, Microsoft Research eckamar@microsoft.com
Dr. Stefan Lee, Assistant Professor, Oregon State University leestef@oregonstate.edu
Dr. Mohamed Elhoseiny, Assistant Professor, KAUST mohamed.elhoseiny@kaust.edu.sa