Chirag Agarwal

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EDUCATION

University of Illinois at Chicago   Chicago, IL
Ph.D. in Electrical and Computer Engineering   2020

- Committee: Dr. Dan Schonfeld, Dr. Bharati Prasad, Dr. Mojtaba Soltanalian,
  Dr. Piotr Gmytrasiewicz, Dr. Anh Nguyen
- Thesis: "Robustness and Explainability of Deep Neural Networks"

University of Illinois at Chicago   Chicago, IL
M.S. in Electrical and Computer Engineering   2018

- Project: Fall detection in elderly patients

Future Institure of Engineering and Management   Kolkata, India
B.Tech in Electronics and Communication Engineering   2012

- Project: Finger-print Recognition using Fourier Transform

EXPERIENCE

Harvard University   Boston, MA
Postdoctoral Fellow in Harvard Medical School   2020 –Current
Advisor: Dr. Marinka Zitnik and Dr. Hima Lakkaraju

Auburn University   Auburn, AL
Research Assistant   Summer 2019
Advisor: Dr. Anh Nguyen

Robert Bosch LLC   Sunnyvale, CA
Computer Vision/Augmented Reality Intern   Summer 2018

Tempus labs Inc.   Chicago, IL
Imaging Science Intern   Spring 2018

Kitware Inc.   Clifton Park, NY
Research and Development Intern   Summer 2017

Geisinger Health Systems   Danville, PA
Research Intern   Summer 2016

PUBLICATIONS

Articles in peer-reviewed Journals

1. B. Prasad*, **C. Agarwal***, E. Schonfeld, D. Schonfeld, B. Mokhlesi: Deep learning applied to polysomnography to predict blood pressure in obstructive sleep apnea and obesity hypoventilation: A proof-of-concept study, *Journal of Clinical Sleep Medicine (JCSM), 2020*

2. **C. Agarwal**, J. Klobusicky, D. Schonfeld: Convergence of backpropagation with momentum for network architectures with skip connections, *Journal of Computational Mathematics (JCM), 2019*

3. E. Cha, Y. Veturi, **C. Agarwal**, M. Arbabshirani, S. Pendergrass: Using Adipose Measures from Electronic Health Record Imaging Based Data for Discovery, *Journal of Obesity, 2018*

Articles in peer-reviewed conference proceedings

1. **C. Agarwal**, H. Lakkaraju, M. Zitnik: Towards a Unified Framework for Fair and Stable Graph Representation Learning, *Conference on Uncertainty in Artificial Intelligence (UAI), 2021*

2. S. Agarwal, S. Jabbari, **C. Agarwal**, S. Upadhyay, Z. S. Wu, H. Lakkaraju: Towards the Unification and Robustness of Perturbation and Gradient Based Explanations, *International Conference on Machine Learning (ICML), 2021*

3. **C. Agarwal***, S. Khobahi*, D. Schonfeld, M. Soltanalian: CoroNet: A Deep Network Architecture for Semi-Supervised Task-Based Identification of COVID-19 from Chest X-ray Images, *SPIE Medical Imaging, 2021*

4. **C. Agarwal**, A. Nguyen: Explaining image classifiers by removing input features using generative models , *Asian Conference on Computer Vision (ACCV), 2020* – Acceptance rate ($\sim 33\%$)

5. N. Bansal*, **C. Agarwal***, A. Nguyen*: SAM: The Sensitivity of Interpretability Methods to Hyperparameters, *Conference on Computer Vision and Pattern Recognition (CVPR), 2020* – Oral presentation ($\sim 5\%$)

6. **C. Agarwal**, S. Khobahi, A. Bose, M. Soltanalian, D. Schonfeld: Deep-URL: A Model-Aware Approach To Blind Deconvolution Based On Deep Unfolded Richardson-Lucy Network, *IEEE Conference on Image Processing (ICIP), 2020* – Acceptance rate ($\sim 42\%$)

7. **C. Agarwal**, A. Nguyen, D. Schonfeld: Improving Robustness to Adversarial Examples by Encouraging Discriminative Features, *IEEE Conference on Image Processing (ICIP), 2019* – Spotlight (top $\sim 10\%$)

8. M. Aloraini, M. Sharifzadeh, **C. Agarwal**, D. Schonfeld: Statistical Sequential Analysis for Object-based Video Forgery Detection, *Electronic Imaging, 2019*

9. N. Khobragade*, **C. Agarwal***: Multi-class segmentation of neuronal electron microscopy images using deep learning, *SPIE Medical Imaging, 2018*

10. **C. Agarwal**, M. Sharifzadeh, D. Schonfeld: CrossEncoders: A complex neural network compression framework, *IST International Symposium on Electronic Imaging, 2018*

11. M. Sharifzadeh, **C. Agarwal**, M. Aloraini, D. Schonfeld: Convolutional neural network steganalysis's application to steganography, *IEEE Visual Communications and Image Processing (VCIP), 2017*

12. **C. Agarwal**, A.H. Dallal, M.R. Arbabshirani, A. Patel, G. Moore: Unsupervised quantification of abdominal fat from CT images using Greedy Snakes, *SPIE Medical Imaging, 2017*

13. A.H. Dallal, **C. Agarwal**, M.R. Arbabshirani, A. Patel, G. Moore: Automatic estimation of heart boundaries and cardiothoracic ratio from chest X-ray images, *SPIE Medical Imaging, 2017*

14. M.R. Arbabshirani, A.H. Dallal, **C. Agarwal**, A. Patel, G. Moore: Accurate segmentation of lung fields on chest radiographs using deep convolutional networks, *SPIE Medical Imaging, 2017*

15. **C. Agarwal**, A. Bose, S. Maiti, N. Islam, S.K. Sarkar: Enhanced data hiding method using DWT based on Saliency model, *IEEE International Conference on Signal Processing, Computing and Control (ISPCC), 2013*

16. S. Maiti, **C. Agarwal**, A. Bose, S.K. Sarkar: Robust data hiding technique in wavelet domain using saliency map, *International Journal of Advances in Engineering and Technology, 2013*

17. N. Islam S. Maiti, A. Bose, **C. Agarwal**, S. K. Sarkar: An Improved Method of Pre-Filter Based Image Watermarking in DWT Domain, *International Journal of Computer Science and Technology, 2013*

Articles in peer-reviewed workshop proceedings

1. **C. Agarwal***, S. Hooker*: Estimating Example Difficulty using Variance of Gradients, *Workshop on Human Interpretability in Machine Learning (WHI), ICML, 2020* – Poster Presentation

2. **C. Agarwal***, P. Chen*, A. Nguyen: Intriguing generalization and simplicity of adversarially trained neural networks, *Workshop on Human Interpretability in Machine Learning (WHI), ICML, 2020* – Spotlight Presentation

Preprints

1. **C. Agarwal**, B. Dong, D. Schonfeld, A. Hoogs: An explainable adversarial robustness metric for deep learning neural networks, *arXiv, 2018*

2. M. Sharifzadeh, **C. Agarwal**, M. Salarian, D. Schonfeld: A new parallel message-distribution technique for cost-based steganography, *arXiv, 2017*

Teaching

- **Joint Instructor** at Harvard University   Spring 2021
  Course on Interpretability and Explainability in Machine Learning
- **Teaching Assistant** at University of Illinois at Chicago   Fall 2014 – Spring 2020
  Pattern Recognition (ECE 407), Image Analysis and Computer Vision I (ECE 415),
  Digital Signal Processing (ECE 417), Multimedia Systems (ECE 434),
  Image Analysis and Computer Vision II (ECE 515), Neural Networks (ECE 559)

Awards

- AI for Social Good Workshop, Google (US $10,000)   Jan, 2021
- Research Proposal accepted by Google Cloud Platform (US $1,000)   May, 2020
- Research Proposal accepted by Google Cloud Platform (US $1,000)   September, 2020
- Finalist for the Deans Scholarship Award at UIC   2018, 2019

Invited Talks

- Guest Lecture in Interpretability & Explainability course at Harvard   2021
- 2d3d.ai   2021
- Weights & Biases Salon   2020

Community Service

Organizer:
- Presented a tutorial at FAccT on "Limitations of Explainability Methods in ML"   2021
- Journal Club at University of Illinois at Chicago   2017–2018
- MATLAB workshop at University of Illinois at Chicago   2016

Program Committee:
- Workshop on Security and Safety in Machine Learning Systems, ICLR   2021
- Workshop on Adversarial Robustness in the Real World (AROW), ECCV   2020
- Workshop on Human Interpretability (WHI) in Machine Learning, ICML   2020

Reviewer:
- NeurIPS   2021
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)   2021
- International Conference on Machine Learning – ICML   2021
- SN Computer Science – Springer Nature   2020
- Entropy   2020