Aditya Chattopadhyay

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Education

Year	Degree	Institute	GPA/%
2024 (Expected)	Ph.D. in Computer Science; *Advisors: Prof. René Vidal & Prof. Donald Geman*	Johns Hopkins University	3.93/4.00
2018	B.Tech. in Computer Science & MS in Computational Natural Sciences	IIIT, Hyderabad	9.03/10.0

Areas of Interest

Explainable AI, *Computer Vision*, *Optimization Methods*, *Probabilistic Graphical Models*, *Information Theory*, *Generative Models*

Publications

Journals

1. Aditya Chattopadhyay, Stewart Slocum, Benjamin D. Haeffele, René Vidal, Donald Geman
Interpretable by design: Learning predictors by composing interpretable queries
In: *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022*
[Impact factor: 23.6]

2. Aditya Chattopadhyay, Min Zheng, Mark P Waller, U Deva Priyakumar
A probabilistic framework for constructing temporal relations in replica exchange molecular trajectories
In: *Journal of Chemical Theory and Computation (JCTC), 2018*
[Impact factor: 5.313]

3. Siddharth Goyal*, Aditya Chattopadhyay*, Koushik Kasavajhala, U Deva Priyakumar
Role of urea-aromatic stacking interactions in stabilizing the aromatic residues of the protein in urea-induced denatured state
In: *Journal of the American Chemical Society (JACS), 2017*
[Impact factor: 14.357]

Refereed Conferences

1. Aditya Chattopadhyay*, Ryan Pilgrim*, René Vidal
Information Maximization Perspective of Orthogonal Matching Pursuit with Applications to Explainable AI
In: *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS), 2023*
[Acceptance Rate: 26.07%][Accepted as a spotlight presentation: top 3% of all submissions]

2. Aditya Chattopadhyay, Kwan Ho Ryan Chan, Benjamin D. Haeffele, Donald Geman, René Vidal
Variational information pursuit for interpretable predictions
In: *The Eleventh International Conference on Learning Representations (ICLR), 2023.*
[Acceptance Rate: 31.8%]

3. Aditya Chattopadhyay, Xi Zhang, David Paul Wipf, Himanshu Arora, René Vidal
Learning graph variational autoencoders with constraints and structured priors for conditional indoor 3D scene generation
In: *IEEE Winter Conference on Applications of Computer Vision (WACV), 2023.*

4. Aditya Chattopadhyay, Piyushi Manupriya, Anirban Sarkar, Vineeth N. Balasubramanian.
Neural Network Attributions: A Causal Perspective
In: *Proceedings of the 36th International Conference on Machine Learning (ICML), 2019.*
[Acceptance Rate: 22.6%][Over 135 citations as of Jan 1, 2024]

5. Aditya Chattopadhyay*, Anirban Sarkar*, Prantik Howlader*, Vineeth N. Balasubramanian.
Grad-cam++: Generalized gradient-based visual explanations for deep convolutional networks
In: *IEEE Winter Conference on Applications of Computer Vision (WACV), 2018.*
[Over 2,260 citations as of Jan 1, 2024]

In Submission

1. Stefan Kolek, Aditya Chattopadhyay, Kwan Ho Ryan Chan, Hector Andrade-Loarca, Gitta Kutyniok, René Vidal
Learning Interpretable Queries for Explainable Image Classification with Information Pursuit
Submitted to: *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024.*

2. Aditya Chattopadhyay, Benjamin D. Haeffele, René Vidal, Donald Geman
Performance Bounds for Active Binary Testing with Information Maximization
Submitted to: *The Twelfth International Conference on Learning Representations (ICLR), 2024.*

3. Aditya Chattopadhyay*, Kwan Ho Ryan Chan*, René Vidal
   Bootstrapping Variational Information Pursuit with Foundation Models for Interpretable Image Classification
   Submitted to: *The Twelfth International Conference on Learning Representations (ICLR), 2024.*

*Equal Contribution

ACHIEVEMENTS

- Awarded the **MINDS Summer & Spring Fellowship** 2021.
- Awarded **Gold Medal** for outstanding academic achievement at IIIT, Hyderabad (given to students with the highest cumulative grade point average [CGPA] in graduating class of their respective programmes).
- **Consistently in Dean's List for all semesters in IIIT, Hyderabad** which is awarded to top 15% of students in each programme.
- **Qualified for ACM-ICPC Asia-Regionals** (Amritapuri) 2013, 2014 & 2015.

WORK EXPERIENCE

Applied Science Intern, Amazon *Jun'21 - Nov'21*
Summer internship at Amazon Visual Search. Published a conference paper based on internship work at WACV2023

Research Assistant, IIT Hyderabad, India *Aug'17 - Jun'18*
Group of Prof. Vineeth N Balasubramanian, Department of Computer Science and Engineering

Research Assistant, IIIT Hyderabad, India *Jan'17 - Jul'17*
Group of Prof. U. Deva Priyakumar, Centre for Computational Natural Sciences

Research Internship, Westfalische Wilhelms-Universitat, Muenster, Germany *Jun'15 - Aug'15*
Group of Prof. Mark Waller, Centre for MultiScale Theory & Computation

TEACHING EXPERIENCE

Guest Lecturer, University of Pennsylvania, USA *Fall 2023*
Course: Deep Generative Models (Invited by Prof. René Vidal)
Responsibilities: Gave a guest lecture on deep generative models for graphical data.

Teaching Assistant, Johns Hopkins, USA *Fall 2022*
Course: Machine Learning
Responsibilities: Conducted recitation sessions; designed homework assignments, exam papers, and grading rubrics; served as mentor for course projects and was responsible for their final evaluations; held weekly office hours.

Teaching Assistant, IIIT Hyderabad, India *Spring & Fall Semesters*
Courses: Graphics, Modeling & Simulations
Thermodynamics & Statistical Mechanics, Statistical Methods in AI
Responsibilities: Conducted recitation and lab sessions, designed homeworks with faculty and graded exams, held office hours.

MENTORING EXPERIENCE

1. **Kwan Ho Ryan Chan, graduate student in René Vidal's lab.** I have been mentoring Ryan since 2021. We worked together on developing algorithms for explainable AI. This work was published in ICLR 2023. He is now extending the work to other computer vision problems beyond image classification.
2. **Ryan Pilgrim, graduate student in René Vidal's lab.** I mentored Ryan in the Fall and Spring semesters of 2023. Worked with me on exploring connections between Information Pursuit (an algorithm for sequential decision making) and greedy sparse coding algorithms. This work was accepted as a spotlight paper in NeurIPS 2023.
3. **Armand Comas, graduate student in Octavia Camps' lab.** I am mentoring Armand since Spring 2023. He is working on extending the explainable AI algorithm I had developed as part of my PhD thesis for classification problems to generative modelling.
4. **Stefan Kolek, graduate student in Gitta Kutyniok's lab.** I am mentoring Stefan since Fall 2023. He is working on learning interpretable features from data that in turn can help in explaining the decisions made by a machine learning model. This work is currently under submission at CVPR 2024.

SERVICES

Conference Reviewer: International Conference on Machine Learning (ICML) 2021, 2023; International Conference on Learning Representations (ICLR) 2023, 2024; Neural Information Processing Systems (NeurIPS) 2023

Journal reviewer: Journal of Machine Learning Research (JMLR), Computer Vision and Image Understanding (CVIU), Transactions on Neural Networks and Learning Systems (TNNLS)

References

Prof. René Vidal

Rachleff University Professor

Radiology, Perelman School of Medicine; ESE, Penn Engineering,

University of Pennsylvania,

Ph.D. Advisor,

Email: vidalr@seas.upenn.edu

Website: `http://vision.jhu.edu/rvidal.html`

Dr. Benjamin D. Haeffele

Associate Research Scientist

Mathematical Institute for Data Science (MINDS),

Johns Hopkins University,

Collaborator,

Email: bhaeffele@jhu.edu

Website: `https://www.cis.jhu.edu/~haeffele/`

Prof. Alan L. Yuille,

Bloomberg Distinguished Professor

Department of Cognitive Science; Department of Computer Science

Johns Hopkins University,

Thesis Committee Member,

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Website: `https://www.cs.jhu.edu/~ayuille/`

Prof. Donald Geman,

Professor,

Department of Applied Mathematics and Statistics

Johns Hopkins University,

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Website: `https://www.cis.jhu.edu/people/faculty/geman/`

Prof. John Shawe-Taylor,

Professor,

Department of Computer Science,

University College London,

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Email: j.shawe-taylor@ucl.ac.uk

Website: `http://www0.cs.ucl.ac.uk/staff/j.shawe-taylor/`