Ian Connick Covert

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Current

Postdoctoral Researcher, **Stanford University** 2023 - Present
Advisors: James Zou, Tatsunori Hashimoto

Research Interests

Data attribution, multi-modal language models, amortization, explainable ML, information theory, game theory

Education

University of Washington, Seattle, WA USA
Ph.D. in Computer Science (Machine Learning) 2019 - 2023
M.S. in Computer Science 2017 - 2019
Advisor: Su-In Lee

Columbia University, New York, NY USA
B.A. in Computer Science, Math-Statistics 2013 - 2017
Summa Cum Laude, Phi Beta Kappa

Preprints

Covert, I., Sun, T., Zou, J., Hashimoto, T. *Locality Alignment Improves Vision-Language Models.* Preprint, 2024.

Thapa, R., Chen, K., **Covert, I.**, Chalamala, R., Athiwaratkun, B., Song., S.L., Zou, J. *Dragonfly: Multi-Resolution Zoom-In Encoding Enhances Vision-Language Models.* Preprint, 2024.

Publications

Covert, I.*, Kim, C.*, Lee, S., Zou, J., Hashimoto, T. *Stochastic Amortization: A Unified Approach to Accelerate Feature and Data Attribution.* Neural Information Processing Systems (NeurIPS), 2024.

Covert, I.*, Ji, W., Hashimoto, T., Zou, J. *Scaling Laws for the Value of Individual Data Points in Machine Learning.* International Conference on Machine Learning (ICML), 2024.

Gadgil, S.*, **Covert, I.***, Lee, S. *Estimating Conditional Mutual Information for Dynamic Feature Selection.* International Conference on Learning Representations (ICLR), 2024.

Lin, C.*, **Covert, I.***, Lee, S. *On the Robustness of Removal-Based Feature Attributions.* Neural Information Processing Systems (NeurIPS), 2023.

Weinberger, E., **Covert, I.**, Lee, S. *Feature Selection in the Contrastive Analysis Setting.* Neural Information Processing Systems (NeurIPS), 2023.

Pratt, S., **Covert, I.**, Liu, R., Farhadi, A. *What Does a Platypus Look Like? Generating Customized Prompts for Zero-Shot Image Classification.* International Conference on Computer Vision (ICCV), 2023.

Covert, I., Qiu, W., Lu, M., Kim, N., White, N., Lee, S. *Learning to Maximize Mutual Information for Dynamic Feature Selection.* International Conference on Machine Learning (ICML), 2023.

Covert, I.*, Kim, C.*, Lee, S. *Learning to Estimate Shapley Values with Vision Transformers.* International Conference on Learning Representations (ICLR), 2023. (**Spotlight Presentation**)

Chen, H.*, **Covert, I.***, Lundberg, S., Lee, S. *Algorithms to Estimate Shapley Value Feature Attributions.* Nature Machine Intelligence, 2023.

Covert, I., Gala, R., Wang, T., Svoboda, K., Sümbül, U., Lee, S. *Predictive and Robust Gene Selection for Spatial Transcriptomics.* Nature Communications, 2023.

Jethani, N.*, Sudarshan, M.*, **Covert, I.***, Lee, S., Ranganath, R. *FastSHAP: Real-Time Shapley Value Estimation.* International Conference on Learning Representations (ICLR), 2022.

Covert, I., Lundberg, S., Lee, S. *Explaining by Removing: A Unified Framework for Model Explanation.* Journal of Machine Learning Research (JMLR), 2021.

Evtimov, I., **Covert, I.**, Kusupati, A., Kohno, T. *Disrupting Model Training with Adversarial Shortcuts.* Adversarial ML Workshop, ICML 2021.

Covert, I., Lee, S.. *Improving KernelSHAP: Practical Shapley Value Estimation via Linear Regression.* Artificial Intelligence and Statistics (AISTATS), 2021.

Tank, A.*, **Covert, I.***, Foti, N., Shojaie, A., Fox, E. *Neural Granger Causality.* Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2021.

Covert, I., Lundberg, S., Lee, S. *Understanding Global Feature Contributions With Additive Importance Measures.* Neural Information Processing Systems (NeurIPS), 2020.

Covert, I., Lundberg, S., Lee, S.. *Feature Removal Is A Unifying Principle For Model Explanation Methods.* Machine Learning Retrospectives, Surveys & Meta-Analyses (ML-RSA) Workshop, NeurIPS 2020.

Covert, I., Lundberg, S., Lee, S. *Shapley Feature Utility.* Machine Learning in Computational Biology (MLCB), 2019.

Covert, I., Sümbül, U., Lee, S. *Principal Genes Selection.* Machine Learning in Computational Biology (MLCB), 2019.

Covert, I., Krishnan, B., Njam, I., Zhan, J., Shore, M., Hixson, J., Po, M.J. *Temporal Graph Convolutional Networks for Automatic Seizure Detection.* Machine Learning for Healthcare (MLHC), 2019. (**Spotlight Presentation**)

Zhan, J., Yee, H., **Covert, I.**, Wu, J., Ling, A., Shore, M., Teasley, E., Davies, R., Kung, T., Tansuwan, J., Hixson, J. and Po, M.J. *EEG Seizure Detection via Deep Neural Networks: Application and Interpretation.* Machine Learning for Health Workshop (ML4H), NeurIPS 2018.

Tank, A., **Covert, I.**, Foti, N., Shojaie, A., Fox, E. *An Interpretable and Sparse Neural Network Model for Nonlinear Granger Causality Discovery.* Time Series Workshop (TSW), NeurIPS 2017.

Academic Experience

Stanford University, Stanford, CA USA

Postdoctoral Researcher (advised by James Zou, Tatsunori Hashimoto) 2023 - Present
Data attribution, multi-modal language models.

University of Washington, Seattle, WA USA

Graduate Research Assistant (advised by Su-In Lee) 2019 - 2023
Transparent machine learning.

University of Washington, Seattle, WA USA

Graduate Research Assistant (advised by Emily Fox) 2017 - 2019
Interpretable deep learning for time series.

Columbia University, New York, NY USA

Undergraduate Research Assistant (advised by Uygar Sümbül, Liam Paninski) 2016 - 2017
Neuronal structure analysis from 3D calcium imaging videos.

Industry Experience

Citadel Securities, Chicago, IL USA

Quantitative Research Intern June 2022 - August 2022
Options alpha research.

Google Brain, Mountain View, CA USA

Student Researcher June 2018 - April 2019
Topologically aware deep learning for EEG seizure detection.

Goldman Sachs, New York, NY USA

Investment Banking Strategist Summer Analyst June 2016 - August 2016
Credit risk pricing for interest rate derivatives; equity capital markets.

Société Générale, New York, NY USA

Investment Banking Summer Analyst June 2015 - August 2015
Interest rate derivatives pricing.

Teaching Experience

Co-Instructor, CSEP 590 Explainable AI, University of Washington
Co-instructed with: Su-In Lee Spring 2022
Designed course contents (syllabus, slides, homeworks) and taught lectures.

Teaching Assistant, EE 578 Convex Optimization, University of Washington
Course instructor: Maryam Fazel Winter 2019
Taught review sessions, wrote exam questions, graded assignments.

Honors and Awards

Expert Reviewer, TMLR	2024
Top Reviewer Award, NeurIPS	2021, 2022, 2023
Top Reviewer Award, ICLR	2021, 2022
Top Reviewer Award, ICML	2020, 2021
Upton Fellowship, Princeton University	2017
Computer Science Excellence Fellowship, UIUC	2017
Computer Science Faculty First Year Fellowship, UMass Amherst	2017
Summa Cum Laude, Columbia University	2017
Phi Beta Kappa, Columbia University	2017
Computer Science Award for Academic Excellence, Columbia University	2017
Presidential Scholar Nominee	2013
President's Award for Academic Excellence	2013

Selected Talks	University of Wisconsin-Madison	April 2024
	Zillow Group	March 2024
	CSE 529 Computational Genomics Guest Lecture, University of Washington	April 2023
	CSE 599 Explainable AI Guest Lecture, University of Washington	April 2023
	Zou Lab, Stanford University	April 2023
	Hashimoto Lab, Stanford University	April 2023
	Ranganath Lab, New York University	February 2023
	Farhadi Lab, University of Washington	February 2023
	Morgan Stanley	October 2022
	Citadel Securities	June 2022
	NASA Ames Research Center	March 2022
	Digital Humanities Group, UT Austin	March 2022
	Arthur AI	December 2021
	University of Washington Colloquium	October 2021
	Data Science Alliance & San Diego Machine Learning	April 2021
	Zou Lab, Stanford University	April 2021
	BigInsight (Norwegian AI Research Center)	March 2021
	Kundaje Lab, Stanford University	March 2021
	Fiddler Labs	February 2021
Reviewer Service	NeurIPS	2018 - 2024
	ICML	2020 - 2023
	ICLR	2021 - 2025
	AISTATS	2021 - 2025
	MLHC	2020 - 2022
	TMLR	2023 - 2024
	Artificial Intelligence (Elsevier)	2022
	Machine Learning (Springer)	2022
	Patterns (Cell)	2021
Service	Graduate Applications Reader, University of Washington	2020 - 2021
	Computer Science Ph.D. Mentorship Program, University of Washington	2018 - 2019
	Visit Days Coordination, University of Washington	2018
	Undergraduate Admissions Interviewing, Columbia University	2018 - 2020
	Computer Science Undergraduate Mentorship Program, Columbia University	2016 - 2017