Ivan Brugere

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Research Summary

I focus machine learning applications for social good. Particularly, I am interested in applications in AI For Earth related to conservation, and AI in low-resource environments such as mobile devices.

My current ML methods research interests focus on graph representation learning, and explainable AI.

My PhD research focused on data science methodologies for inferring and validating graphs constructed from underlying data, with applications in interdisciplinary computational ecology, privacy and human mobile networks, and large-scale recommendation and search. My work develops model selection criteria for predictive tasks on graphs, accounting for many of the ad-hoc decisions and biases in the construction and analysis of graphs derived from data.

Experience

Salesforce Research
Research Scientist—AI For Good, January 2019–
Developing AI research and deployed services for Salesforce not-for-profit customers.

Amazon
Applied Scientist Intern, Mentor: Alex Smola, June 2018–Sept. 2018
Designed deep learning graph APIs on MXNet. Focused on structured computational models on graphs, and scalability. Part of the Amazon Web Services AI Platforms team.

Microsoft
Data Science Intern, Mentor: Marcello Hasegawa, May 2015–Aug. 2015
Developed textual and device models for novelty detection and attribution in the Windows 10 user population.

Lawrence Livermore National Laboratory
Research Intern, Mentor: Brian Gallagher, Jun. 2014–Aug. 2014
Formulated network inference problems over several scientific research domains. Part of the Cyber Defenders internship program.

University of Illinois at Chicago
Research Assistant, Advisor: Professor Tanya Berger-Wolf, Aug. 2012–
Model selection for network structure inference and prediction. Focusing on ecology and populations biology domains.

University of Illinois at Chicago
Research Fellow, Electronic Security and Privacy IGERT, Dec. 2013–Dec 2015
Network-based models for attribute inference and privacy preservation on real mobile device datasets.

Technicolor Research
Research Intern, Mentor: Brian Eriksson, May 2013–Aug. 2013
Rule discovery for biometric sensor time series data for actionable analysis of film audiences. Developed methods to discover and visualize dynamic audience communities.

University of Minnesota
Research Assistant, Advisor: Professor Vipin Kumar, Jan. 2010–Jun. 2012
Time series change detection and anomaly detection on large remote sensing datasets. Focused on incorporating spatial aspects for change significance testing, and domain-driven information retrieval.

University of Minnesota - Department of Computer Science
Web Applications Developer, Sept. 2004–Jun. 2007

University of Minnesota - College of Liberal Arts
Web Applications Developer, Aug. 2002–Sept. 2003

Education

University of Illinois at Chicago, 2012-
PhD in Computer Science, ongoing.
Thesis: "Network Structure Inference: Methodology and Applications"

University of Minnesota – Twin Cities, 2002–2007, 2009–2012
Master of Science in Computer Science, emphasis in spatiotemporal data mining.
Thesis: "Approximate Search on Massive Spatiotemporal Datasets."

Bachelor of Science in Computer Science, minor in Mathematics.

Bachelor of Arts in Cultural Studies and Comparative Literature.

The New School, 2007–2009
Master of Arts in International Affairs.

Tutorials

Modeling Data with Networks + Network Embedding: Problems, Methodologies and Frontiers
I. Brugere, B. Perozzi, P. Cui, W. Zhu, J. Pei, T.Y. Berger-Wolf
KDD 2018

Publications

Network Structure Inference, A Survey: Motivations, Methods, and Applications
I. Brugere, B. Gallagher, T. Y. Berger-Wolf
ACM Computing Surveys, 2018.

Network model selection with task-focused minimum description length
I. Brugere, T.Y. Berger-Wolf
BigNet WWW Workshop on Learning Representations for Big Networks, 2018.

Network model selection for task-focused attributed network inference
I. Brugere, C. Kanich, T.Y. Berger-Wolf
IEEE International Conference on Data Mining Workshop (ICDMW), 2017.

Coordination Event Detection and Initiator Identification in Time Series Data
C. Amornbunchornvej, I. Brugere, A. Strandburg-Peshkin, D. Farine, M.C. Crofoot, T.Y. Berger-Wolf
ACM Transactions on Knowledge Discovery from Data (TKDD), 2018.

Evaluating Social Networks Using Task-Focused Network Inference
I. Brugere, C. Kanich, T.Y. Berger-Wolf
MLG'17 SIGKDD Workshop on Mining and Learning in Graphs, 2017.

A General Framework for Task-Oriented Network Inference
I. Brugere, C. Kanich, T.Y. Berger-Wolf
SIAM SDM Workshop on Inferring Networks from Non-Network Data, 2017.

Both Nearest Neighbours and Long-term Affiliates Predict Individual Locations During Collective Movement in Wild Baboons
D. Farine, A. Strandburg-Peshkin, T.Y. Berger-Wolf, B. Ziebart, I. Brugere, J. Li, M. Crofoot
Nature Scientific Reports, 2016.

Collective Movement in Socially and Environmentally Heterogeneous Systems: A Case Study in Olive Baboons
M.C. Crofoot, D. Farine, A. Strandburg-Peshkin, I. Brugere, J. Li, T. Y. Berger-Wolf
American Journal of Primatology

Social Information Improves Location Prediction in the Wild
J. Li, I. Brugere, B. Ziebart, T. Y. Berger-Wolf, M. Crofoot, D. Farine
Proceedings of the 2015 International Workshop on Trajectory-based Behaviour Analytics

Modeling and Analysis of Spatiotemporal Social Networks
I. Brugere, V. M.V. Gunturi, and S. Shekhar
Encyclopedia of Social Network Analysis and Mining, 2014

Approximate Search on Massive Spatiotemporal Datasets
I. Brugere, K. Steinhaeuser, S. Boriah, and V. Kumar
Proceedings of the International Workshop on Spatial and Spatiotemporal Data Mining (SSTDM'12)

Incorporating Natural Variation into Time Series-Based Land Cover Change Identification
V. Mithal, A. Garg, I. Brugere, S. Boriah, V. Kumar, M. Steinbach, C. Potter, and S. Klooster
Proceedings of the NASA Conference on Intelligent Data Understanding (CIDU'11)

A Study of Time Series Noise Reduction Techniques in the Context of Land Cover Change Detection
X. Chen, V. Mithal, S.R. Vangala, I. Brugere, S. Boriah, and V. Kumar
Proceedings of the NASA Conference on Intelligent Data Understanding (CIDU'11)

A Novel Time Series Based Approach to Detect Gradual Vegetation Changes in Forests
Y. Chamber, A. Garg, V. Mithal, I. Brugere, M. Lau, V. Krishna, S. Boriah, M. Steinbach, V. Kumar, C. Potter, and S. Klooster
Proceedings of the NASA Conference on Intelligent Data Understanding (CIDU'11)

GOPHER: Global Observation of Planetary Health and Ecosystem Resources
A. Garg, V. Mithal, Y. Chamber, I. Brugere, V. Chaudhari, M. Dunham, V. Krishna, S. Krishnamurthy, S. Vangala, S. Boriah, M. Steinbach, V. Kumar, A. Cho, JD Stanley, T. Abraham, J. C. Castilla-Rubio, C. Potter, and S.A. Klooster
Proceedings of the IEEE Geoscience and Remote Sensing Symposium (IGARSS'11)

Service

Program Committees and Organizing:

AAAI, CIKM, ICDM, KDD, SDM 2019: PC Member
KDD 2018 PC Member
MLG 2018, 2019 Workshop at KDD: PC Member
ICDM 2019 PhD Forum Co-chair
SDM 2017: "NetInf'17: First Workshop on Inferring Networks from Non-Network Data," Co-organizer
KDD 2017: Broadening Participation in Data Mining Mentoring Co-Chair
SIAM AM 2016: "Inferring Networks from Non-Network Data," Mini-symposium Co-organizer
KDD 2016: Broadening Participation in Data Mining 2016 Coordinator
KDD 2014: Broadening Participation in Data Mining 2014 Mentoring Coordinator

Conference and Journal Reviewer:

AAAI'12, 15, 17, 18, 19; CIKM'12; ICDM'10, 11, 14; IJCAI'11; KDD'11, 12, 13, 14, 15, 16, 18, 19; PAKDD'12; SDM'11, 12, 19 | AOAS; KAIS; TKDE; ACM CSUR

Community Activities:

Google Lime campus ambassador
University of Washington-AccessSTEM volunteer

Conference Student Volunteer:

ICDM'15, 17; KDD'15, 16; SDM'17; WSDM'16

Scholarships and Awards

Fellowships and Scholarships:

IGERT Electronic Security and Privacy Fellowship, 2014-2016
UIC Chancellor's Graduate Research Fellowship, 2014-2016
Google Lime Scholarship, 2014

Awards:

IEEE ICDM 2017 Travel Award
SIAM SDM 2017 Travel Award
Tapia 2016 Celebration of Diversity in Computing, Travel Award
SIGKDD 2016 Broadening Participation in Data Mining Travel Award
WSDM 2016 Travel Award
ICDM 2015 Travel Award
Ubicomp 2015 Broadening Participation Travel Award
SIGKDD 2015 Ram Kumar Memorial Travel Award
Fifty for the Future Award supported by the Illinois Technology Foundation,
SIAM CSE 2015 Travel Award supported by the Sustainable Horizons Institute
ACM-BCB 2014 Travel Award
SIGKDD 2014 Broadening Participation in Data Mining Travel Award
Tapia 2014 Celebration of Diversity in Computing, Travel Award
SIGKDD 2013 Broadening Participation in Data Mining Travel Award

Notable Courses and Teaching

Teaching Assistant: CS401 – Computer Algorithms I
Advanced Computational Biology and Bioinformatics Seminar
Advanced Data Mining Seminar
Field Course in Computational Ecology at Mpala Research Centre, Kenya