

MARUAN AL-SHEDIVAT

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INTERESTS

Learning & information theory, sequential decision making, representation learning, multi-task learning, latent variable models. Applications in natural language, time series analysis, personalized healthcare.

EDUCATION

- Carnegie Mellon University, School of Computer Science, USA** 2015 – present
Ph.D. in Machine Learning
Advisor: Eric P. Xing
- King Abdullah University of Science and Technology, KSA** 2013 – 2015
M.Sc. in Computer Science (GPA: 4.0 / 4.0)
Thesis: “Brain-inspired Stochastic Models and Implementations.”
- Yandex School of Data Analysis, Russia** 2011 – 2013
M.Eng. (equiv.) in Data Analysis (GPA: 5.0 / 5.0)
Industry-level training in machine learning, data analysis, software engineering.
- Lomonosov Moscow State University, Russia** 2009 – 2013
B.Sc. in Physics, Summa Cum Laude (GPA: 5.0 / 5.0)
- Summer Schools**
Microsoft Research School on Algorithms and Massive Data, Moscow, Russia 2013
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PUBLICATIONS

Preprints & Working Papers

- [1] Al-Shedivat, M., Wilson, A.G., Saatchi, Y., Hu, Z., and Xing E.P.: “Learning Scalable Deep Kernels with Recurrent Structure”, In submission, 2016.

Conference & Journal Articles

- [2] Al-Shedivat, M.* , Kandasamy, K.* and Xing, E.P.: “Learning HMMs with Nonparametric Emissions via Spectral Decompositions of Continuous Matrices”, To appear in *Advances in Neural Information Processing Systems (NIPS)*, December, 2016. * denotes equal contribution.
- [3] Cissé, M., Al-Shedivat, M., and Bengio, S.: “ADIOS: Architectures Deep In Output Space”, *International Conference on Machine Learning (ICML)*, June, 2016.
- [4] Neftci, E.O., Pedroni, B.U., Joshi, S., Al-Shedivat, M., and Cauwenberghs, G.: “Stochastic Synapses Enable Efficient Brain-Inspired Learning Machines”, In *Frontiers in Neuroscience*, June, 2016.
- [5] Al-Shedivat, M., Naous, R., Cauwenberghs, G., and Salama, K.N.: “Memristors Empower Spiking Neurons with Stochasticity”, *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, June, 2015.
- [6] Al-Shedivat, M., Neftci, E., and Cauwenberghs, G.: “Learning Non-deterministic Representations with Energy-based Ensembles”, *International Conference on Learning Representations (ICLR)*, workshop track, *arXiv:1412.7272*, May, 2015.
- [7] Al-Shedivat, M., Naous, R., Neftci, E., Cauwenberghs, G., and Salama, K.N.: “Inherently Stochastic Spiking Neurons for Probabilistic Neural Computation”, *Proceedings of 7th International IEEE EMBS Neural Engineering Conference (NER)*, April, 2015.
- [8] Al-Shedivat, M., Wang, J.J., Alzahrani, M., Huang, J.Z., and Gao, X.: “Supervised Transfer Sparse Coding”, *Proceedings of AAAI Conference on Artificial Intelligence (AAAI)*, July, 2014.

Conference & Workshop Abstracts

- [9] Al-Shedivat, M., Neftci, E., and Cauwenberghs, G.: “Neural generative models with stochastic synapses capture richer representations”, *Cosyne*, March, 2015.
 - [10] Shcherbakov, M.R., Vabishchevich, P., Zubjuk, V. V., Al-Shedivat, M.F., Dolgova, T.V., and Fedyanin, A.: “Shaping of Femtosecond Laser Pulses with Plasmonic Crystals”, in *Frontiers in Optics*, 2013.
 - [11] Al-Shedivat, M.F.: “Modeling the Process of Femtosecond Laser Pulse Shaping”, *XXII International Conference “Lomonosov”*, Book of abstracts, 2274, 2013.
 - [12] Al-Shedivat, M.F.: “Modeling the Polarization State Dynamics of a Femtosecond Laser Pulse at Plasmon Polariton Resonance”, *XX International Conference “Lomonosov”*, Book of abstracts, 1298, 2011.
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EXPERIENCE

Carnegie Mellon University Sep 2015 – present
Graduate Researcher (SAILING lab) Pittsburgh, PA

- My research mainly revolves around the models of temporal and sequential processes, inference, predictive uncertainty quantification, interpretable decision-making processes.

University of California, San Diego Jun 2014 – Nov 2014
Visiting Scholar (Gert Cauwenberghs’ lab) San Diego, CA

- My research was focused on studying functional implications of synaptic stochasticity in neural networks. I approached the problem from the perspective of representations that can be learned by a generative neural network with stochastic synapses.

KAUST Sep 2013 – Jul 2015
Graduate Researcher (Sensors lab) Thuwal, KSA

- I did research in machine learning, transfer learning, and computation with stochastic networks.

Yandex, School of Data Analysis Sep 2012 – Jun 2013
Student/Intern Moscow, Russia

- Designed a map-reduce based graph clustering algorithm that was able to handle 10+ TB of available (at that time) Twitter data [*distributed systems class project*].
- Worked on a novel multi-view surface registration approach. Developed registration and clustering algorithms in C++ (in collaboration with Sergey Arkhangelskiy, Team Lead at Google).

MSU, International Laser Center, Automation Labs Sep 2010 – Aug 2011
Directed Student, Summer Engineering Intern Moscow, Russia

- Designed and built a video tracking system, both hardware lens controller and software image processing. Developed an algorithm for automatic zooming and focusing on moving objects.
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TEACHING

CMU
10-807: Topics in Deep Learning. TA for Russ Salakhutdinov Fall 2016

KAUST
CS229: Machine learning. TA for Xiangliang Zhang Spring 2014, Spring 2015

PROFESSIONAL ACTIVITIES

ACM Student Chapter 2013 – 2015
Leader of the KAUST ACM Student Chapter. Co-organizer of the ACM programming tutorials.

HONORS & AWARDS

ACM UPE Scholarship for academic excellence and contribution to ACM chapter Annual award to only four ACM student members worldwide.	2014
AAAI Student Scholarship , conference travel award, USA	2014
Lomonosov Fellowship for excellence in academics and research, Russia Annual award to only two senior students by Moscow State University.	2013
Arcimovich Fellowship for excellence in academics and research, Russia Annual award to only two senior students by Faculty of Physics.	2012

SELECTED COURSEWORK

Carnegie Mellon University Advanced Machine Learning (10-715) ◊ Probabilistic Graphical Models (10-708) ◊ Intermediate Statistics (10-705) ◊ Statistical Machine Learning (10-702) ◊ Convex Optimization (10-725) ◊ Spectral Graph Theory (15-859N)	2015 – 2016
KAUST Introduction to Optimization ◊ Data Mining ◊ Operating Systems	2013 – 2014
Yandex School of Data Analysis Algorithms ◊ Machine Learning, I-II ◊ NLP ◊ Machine Translation ◊ Computer Vision ◊ Python ◊ C++	2011 – 2013
Lomonosov Moscow State University Mathematical Analysis, I-III ◊ Complex Analysis ◊ Linear Algebra ◊ ODEs ◊ PDEs ◊ Numerical Methods for PDEs ◊ Quantum Mechanics, I-II ◊ Statistical Physics, I-II ◊ Nonlinear Dynamics	2009 – 2013
Online Introduction to AI (P. Norvig, S. Thrun) ◊ Game Theory (Stanford & UBC) ◊ Data Analysis (Johns Hopkins) ◊ Computational Neuroscience (UW) ◊ 6.002x (MIT)	2011 – 2014

SKILLS

Programming Languages	C/C++, Python, Julia, JavaScript, R, L ^A T _E X, Mathematica, MATLAB
Libraries & Frameworks	Theano, TensorFlow, NumPy, Pandas, Scikit-Learn, CUDA, OpenMP
Operating Systems	Mac OS, Unix
Communication Skills	English (fluent), Russian (native), Arabic (basic), French (elementary)

REFERENCES

Available upon request.