

MARUAN AL-SHEDIVAT

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INTERESTS

Sequential decision making, multi-task learning, deep learning, explainable models, graphical models. Applications in healthcare, time series analysis, dialog systems, multi-agent systems, and general AI.

EDUCATION

Carnegie Mellon University, School of Computer Science, USA Sep 2015 – present

Ph.D. in Machine Learning (GPA: 4.1 / 4.0)

Advisor: Eric P. Xing

King Abdullah University of Science and Technology, KSA Sep 2013 – Jun 2015

M.Sc. in Computer Science (GPA: 4.0 / 4.0)

Thesis: “Brain-inspired Stochastic Models and Implementations.”

Yandex School of Data Analysis, Russia Sep 2011 – Jun 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 Sep 2009 – Jun 2013

B.Sc. in Physics, Summa Cum Laude (GPA: 5.0 / 5.0)

EXPERIENCE

Carnegie Mellon University Sep 2015 – present

Graduate Researcher (SAILING lab)

Pittsburgh, PA

- Research mainly revolves around the models of temporal and sequential processes, inference, predictive uncertainty, interpretable decision-making processes. Equally interested in theory and applications.

Advisor: Eric P. Xing.

OpenAI May 2017 – Aug 2017

Member of Technical Staff (Intern)

San Francisco, CA

- Research in meta-learning, deep reinforcement learning, multi-agent systems.

Mentors: Pieter Abbeel, Yuri Burda, Igor Mordatch.

University of California, San Diego Jun 2014 – Nov 2014

Visiting Scholar (Gert Cauwenberghs' lab)

San Diego, CA

- Research was focused on functional implications of synaptic stochasticity in neural networks.

Mentors: Emre Neftci, Gert Cauwenberghs.

KAUST Sep 2013 – Jul 2015

Graduate Researcher (Sensors lab)

Thuwal, KSA

- Research was in machine learning, transfer learning, and computation with stochastic networks.

Advisor: Khaled N. Salama.

Yandex, School of Data Analysis Sep 2012 – Jun 2013

Student/Intern

Moscow, Russia

MSU, International Laser Center, Automation Labs Sep 2010 – Aug 2011

Directed Student, Summer Engineering Intern

Moscow, Russia

PUBLICATIONS

Preprints & Working Papers

- [1] *Contextual Explanation Networks*
Al-Shedivat, M., Dubey, A., and Xing, E.P.
In submission (arXiv:1705.10301)
Press: [NLP Highlights](#)
▷ *Abstract to be presented at the Interpretable ML and ML for Healthcare workshops, NIPS, 2017*
- [2] *Continuous Adaptation via Metalearning in Nonstationary and Competitive Environments*
Al-Shedivat, M., Bansal, T., Burda, Y., Sutskever, I., Mordatch, I., and Abbeel, P.
Technical report, OpenAI, 2017 (arXiv:1710.03641)
Press: [WIRED](#), [Quartz](#)
- [3] *Learning with Opponent-Learning Awareness*
Foerster, J.N.*, Chen, R.Y.*, Al-Shedivat, M., Whiteson, S., Abbeel, P., and Mordatch, I.
In submission (arXiv:1709.04326)
- [4] *Learning Policy Representations in Multiagent Systems*
Grover, A., Al-Shedivat, M., Gupta, J., Burda, Y., and Edwards, H.
In submission

Conference & Journal Articles

- [5] *Learning Scalable Deep Kernels with Recurrent Structure*
Al-Shedivat, M., Wilson, A.G., Saatchi, Y., Hu, Z., and Xing, E.P.
In *Journal of Machine Learning Research (JMLR)*, 18(82):137, 2017
▷ *Abstract presented at the Bayesian Deep Learning workshop, NIPS, 2016*
- [6] *HMMs with Nonparametric Emissions via Spectral Decompositions of Continuous Matrices*
Al-Shedivat, M.*, Kandasamy, K.* and Xing, E.P. (* denotes equal contribution)
In proceedings of *Advances in Neural Information Processing Systems (NIPS)*, December, 2016
- [7] *ADIOS: Architectures Deep In Output Space*
Cissé, M., Al-Shedivat, M., and Bengio, S.
In proceedings of *International Conference on Machine Learning (ICML)*, June, 2016
- [8] *Stochastic Synapses Enable Efficient Brain-Inspired Learning Machines*
Neftci, E.O., Pedroni, B.U., Joshi, S., Al-Shedivat, M., and Cauwenberghs, G.
In *Frontiers in Neuroscience*, June, 2016
- [9] *Memristors Empower Spiking Neurons with Stochasticity*
Al-Shedivat, M., Naous, R., Cauwenberghs, G., and Salama, K.N.
In *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, June, 2015
- [10] *Learning Non-deterministic Representations with Energy-based Ensembles*
Al-Shedivat, M., Neftci, E., and Cauwenberghs, G.
In *International Conference on Learning Representations (ICLR)*, workshop track, May, 2015
- [11] *Inherently Stochastic Spiking Neurons for Probabilistic Neural Computation*
Al-Shedivat, M., Naous, R., Neftci, E., Cauwenberghs, G., and Salama, K.N.
In *7th International IEEE EMBS Neural Engineering Conference (NER)*, April, 2015
- [12] *Supervised Transfer Sparse Coding*
Al-Shedivat, M., Wang, J.J., Alzahrani, M., Huang, J.Z., and Gao, X.
In proceedings of *AAAI Conference on Artificial Intelligence (AAAI)*, July, 2014

Conference & Workshop Abstracts

- [13] *The Intriguing Properties of Model Explanations*
 Al-Shedivat, M., Dubey, A., and Xing, E.P.
Interpretable ML Symposium, NIPS, December, 2017 (**spotlight**)
- [14] *Personalized Survival Prediction with Contextual Explanation Networks*
 Al-Shedivat, M., Dubey, A., and Xing, E.P.
NIPS workshop on Machine Learning for Healthcare (ML4H), December, 2017 (**spotlight**)
- [15] *Scalable GP-LSTMs with Semi-Stochastic Gradients*
 Al-Shedivat, M., Wilson, A.G., Saatchi, Y., Hu, Z., and Xing, E.P.
NIPS workshop on Bayesian Deep Learning, December, 2016
- [16] *Learning Diverse Overcomplete Dictionaries via Determinantal Priors*
 Al-Shedivat, M., Choe, Y.J., Spencer, N., and Xing, E.P.
ICML workshop on Geometry in Machine Learning, June, 2016
- [17] *Neural generative models with stochastic synapses capture richer representations*
 Al-Shedivat, M., Neftci, E., and Cauwenberghs, G.
Cosyne, March, 2015
- [18] *Shaping of Femtosecond Laser Pulses with Plasmonic Crystals*
 Shcherbakov, M.R., Vabishchevich, P., Zubjuk, V.V., Al-Shedivat, M.F., Dolgova, T.V., and Fedyanin, A.
Frontiers in Optics, 2013
- [19] *Modeling the Process of Femtosecond Laser Pulse Shaping*
 Al-Shedivat, M.
XXII International Conference "Lomonosov", Book of abstracts, 2274, 2013
- [20] *Polarization State Dynamics of a Femtosecond Laser Pulse at Plasmon Polariton Resonance*
 Al-Shedivat, M.
XX International Conference "Lomonosov", Book of abstracts, 1298, 2011

HONORS & AWARDS

NIJ Real-Time Crime Forecasting Challenge prize winner	2017
ACM UPE Scholarship for academic excellence and contribution to ACM chapter Awarded annually to only four ACM student members worldwide.	2014
KAUST Dean's Award for outstanding Ph.D. students, Saudi Arabia	declined
KAUST Graduate Fellowship , Saudi Arabia	2013 – 2015
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

TEACHING

CMU

- 10-708: Probabilistic Graphical Models. Guest lecturer and TA for Eric P. Xing Spring 2017
- 10-807: Topics in Deep Learning. TA for Russ Salakhutdinov Fall 2016

KAUST

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

SERVICES

Reviewer: NIPS (2017)

ACM Student Chapter

2013 – 2015

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

COMPUTER SKILLS

GitHub <https://github.com/alshedivat>
Languages C/C++, Python, Julia, JavaScript, ...
OS Mac OS, Unix, Windows

LANGUAGES

Russian	Native	English	Fluent
Arabic	Basic	French	Elementary