

Alexander Rakhlin

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I am a Machine Learning Engineer and Data Scientist with over 10 years of experience in data analysis and research. Currently I specialize in medical and healthcare applications of Machine Learning.

EXPERIENCE AND PROJECTS

Breast Cancer Histology Images Analysis

January 2018 – PRESENT

Automatically classify H&E stained breast histology microscopy images.

Pediatric Bone Age Assessment

November 2017 – PRESENT

Develop an algorithm to accurately determine skeletal age on a pediatric hand radiographs.

Return to Diabetic Retinopathy Detection

December 2016 – PRESENT

Detect DR in color fundus photographs of the retina.

Machine Learning projects on Kaggle

November 2013 – PRESENT

☞ **Flavours of Physics: Finding $\tau \rightarrow \mu\mu\mu$, 5th of 673.** Jul 2015–Oct 2015. In search for a rare decay phenomenon – charged lepton flavour violation. Technologies used: Fully-Connected Neural Networks, Gradient Boosted Trees, model ensembling, GPU, HDF5. [GitHub](#). [Presentation](#) for "Heavy Flavour Data Mining workshop". The sponsors: CERN, Kaggle, Intel, Yandex.

☞ **Yelp Restaurant Photo Classification**, 22nd of 355 teams (top 10%). Dec 2015–Apr 2016. Predicted attribute labels for restaurants using user-submitted photos. Caffe, Python, Scikit-learn, Pandas, H5py, Theano, Keras, XGBoost. [LinkedIn](#). [GitHub](#).

☞ **Ultrasound Nerve Segmentation**, 41st of 923 teams (top 5%). May 2016–Aug 2016. Identified nerve structures in ultrasound images to improve pain management through the use of indwelling catheters that block pain at the source. Python, Pandas, Keras

☞ **Sea Lion Population Count**, 25th of 385 teams (top 7%). Mar 2017 – Jun 2017. Developed algorithms which accurately count the number of sea lions in aerial photographs. Keras Deep Learning environment. The sponsor: NOAA Fisheries. [GitHub](#).

☞ **Diabetic Retinopathy Detection**, 131st of 661 (top 25%). Feb 2015–Jul 2015. [LinkedIn](#). Built an automated system for Diabetic Retinopathy Detection. Technologies: Fully-Connected Neural Networks, Theano, Keras, ensembling, GPU, HDF5, AWS. [GitHub](#). The sponsors: California Healthcare Foundation.

☞ **Otto Group Product Classification Challenge**, 218th of 3514 (top 10%). Mar 2015 – May 2015. Built a predictive model which is able to distinguish between main product categories. Technologies used: Fully-Connected Neural Networks, Keras, XGBoost, model ensembling, R, GPU (Keras), HDF5. [GitHub](#). The sponsors: Otto Group.

Other Kaggle projects:

☞ **NIH Seizure Prediction** (Dec 2017, top 16%) ☞ **American Epilepsy Society Seizure Prediction Challenge** (Nov 2014) ☞ **Grasp-and-Lift EEG Detection** (Jun 2015) ☞ **DecMeg2014 - Decoding the Human Brain** (Apr 2014) ☞ **NIPS 2017: Adversarial Attacks and Defenses** (Oct 2017) ☞ **Text Normalization Challenge – English/Russian Language** (Nov 2017) ☞ **The Allen AI Science Challenge** (Feb 2016, top 25%) ☞ **Plankton image identification** (Mar 2015) ☞ **Rossmann Store Sales** (Dec 2015, top 10%) ☞ **Rental Listing Inquiries** (Apr 2017, top 3%) ☞ **Telstra Network Disruptions** (Feb 2016, top 10%) ☞ **Facebook V: Predicting Check Ins** (Jul 2016, top 10%).

Neuromation – Machine Learning Researcher

April 2018 – PRESENT

Algo trading – Founder

December 2007 – PRESENT

Developer of market models and algorithms for derivative market on Moscow Exchange. Implemented and put into work an automated system for trading futures and options on equities index. Matlab/R/C#

Uniastrum Bank, Utrade.ru – Deputy Chief for operations on international markets.

July 2002 – October 2007

- Design, testing and implementation of trading strategies for investment funds.
 - Brokerage services for the Bank clients.
 - Accounting and trade automation. Localization of Interactive Brokers trading platform.
- C++/VB/Java

Education

National Research University of Electronic Technology (MIET)

MS in Computer Science and Microelectronic Devices, 1994

Awards and achievements

- Kaggle Master. A status awarded to some of the best Data Scientists in the world who have consistently submitted high-ranking solutions to the predictive modeling challenges hosted on kaggle.com, 2015.
- 190 (of 75,000) in global Kaggle ranking, as of January 2018
- Physics Prize: HEP meets Machine Learning Award. CERN, Universität Zürich, Yandex, Intel. December 2015. [link](#)

Publications, preprints, conference proceedings

- Shvets, A., Iglovikov, V., Rakhlin, A., Kalinin, A.: Angiodysplasia Detection and Localization Using Deep Convolutional Neural Networks. bioRxiv p. 306159 (2018), arXiv:1804.08024 (2018)
- Shvets, A., Rakhlin, A., Kalinin, A., Iglovikov, V.: Automatic Instrument Segmentation in Robot-Assisted Surgery Using Deep Learning. bioRxiv p. 275867 (2018), arXiv:1803.01207 (2018)
- Rakhlin, A., Shvets, A., Iglovikov, V., Kalinin, A.: Deep Convolutional Neural Networks for Breast Cancer Histology Image Analysis. arXiv:1802.00752 (2018)
- Iglovikov V., Rakhlin A., Kalinin A., Shvets A.: Pediatric Bone Age Assessment Using Deep Convolutional Neural Networks. bioRxiv p. 234120 (2017), arXiv:1712.05053 (2017)
- Rakhlin, A.: Diabetic retinopathy detection through integration of deep learning classification framework. bioRxiv p. 225508 (2017)

Professional Certifications, Development and Training

- ☞ **edX**, CS1156x: Learning From Data, 2013
- ☞ **Stanford Online**, Statistical Learning, 2014
- ☞ **Coursera**, Neural Networks for Machine Learning, 2017
- ☞ **Coursera**, Pattern Discovery in Data Mining, 2015
- ☞ **Coursera**, Cluster Analysis in Data Mining, 2015
- ☞ **Coursera**, Data Visualization, 2015
- ☞ **Coursera**, Natural Language Processing, 2012
- ☞ **Coursera**, Probabilistic Graphical Models, 2012
- ☞ **Coursera**, Introduction to Systematic Program Design 2013

Research & Development

- Machine Learning • Deep Learning • Medical Imaging • Data Clustering • Neural Networks • Support Vector Machines • Gradient Boosted Trees

Technologies

Frameworks, libraries, tools: Theano, Caffe, Keras, XGBoost, scikit-learn, neon, NumPy, SciPy, t-SNE, AWS, GPU,

Programming Languages: Python, Matlab, C#, R

IDEs: PyCharm, Anaconda, Microsoft Visual Studio, RStudio

Version Control Systems: Git, GitHub

Operating Systems: Windows, Linux (Ubuntu)

Knowledge/Skills

Machine Learning • Deep Learning • Data Clustering • Data preprocessing • Neural Networks (Fully Connected, CNN, RNN, Echo State) • Support Vector Machines • Gradient Boosted Trees • AWS • GPU • HDF5

Open Source Projects

- ☞ ICIAR 2018 Challenge on Breast Cancer Histology Images.
- ☞ MICCAI 2017 Robotic Instrument Segmentation.
- ☞ NIPS 2017 Adversarial contests.
- ☞ Sea Lion Population Count.
- ☞ Sentiment analysis. CNNs for Sentence Classification.
- ☞ Diabetic Retinopathy Detection.

Presentations

Presentation for "Heavy Flavour Data Mining workshop", February 18-19 2016, Zurich. [link](#), [link](#)

Volunteer Experiences

Coursera - Community Teaching Assistant.

April 2015 – PRESENT. Supports students learning by clarifying points, explaining concepts, and addressing misunderstandings on the forums