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 τ → μμμ, 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
• Rakhlin A., Davydow A., Nikolenko, S.: Land Cover Classification from Satellite Imagery With U-Net and Lovász-Softmax Loss. In: CVPR 2018. The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops
• 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.A. (2018) Deep Convolutional Neural Networks for Breast Cancer Histology Image Analysis. In: Campilho A., Karray F., ter Haar Romeny B. (eds) Image Analysis and Recognition. ICIAR 2018. Lecture Notes in Computer Science, vol 10882. Springer, Cham. Print ISBN 978-3-319-92999-6
• 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