Jakub Tomczak

Contact information

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Employment

2018/10 – present **Deep learning research engineer (Engineer, Staff)**, Qualcomm AI Research, Amsterdam

2016/10 – 2018/09 **Postdoc/Marie Sklodowska-Curie Individual Fellow**, University of Amsterdam, Amsterdam Machine Learning Lab (AMLAB) lead by Prof. Max Welling

2014/10 – 2016/09 **Research-and-teaching assistant professor**, Wroclaw University of Technology, Modeling and Machine Learning Lab lead by Prof. Jerzy Świątek

2012/10 – 2014/09 **Postdoc**, Wroclaw University of Technology, Modeling and Machine Learning Lab lead by Prof. Jerzy Świątek

2009/06 – 2012/09 **Researcher**, Wroclaw University of Technology, Institute of Computer Science, supervision: Prof. Adam Grzech

Education

2009/10 – 2013/03 **Ph.D. *with honours* in computer science, specialization: machine learning**, Wroclaw University of Technology, Faculty of Computer Science and Management, Poland

Title: *Incremental Knowledge Extraction from Data for Non-Stationary Objects,* supervisor*:* Prof. Jerzy Świątek

2008/08 – 2009/12 **M.Sc. in computer science**, Blekinge Insitute of Technology, Faculty of Computing, Sweden, supervisor: Prof. Ludwik Kuzniarz

2004/10 – 2009/07 **M.Sc. in computer science**, Wroclaw University of Technology, Poland, supervisor: Prof. Jerzy Świątek

Grants and Awards

Grants

1. Principal Investigator, “Deep Learning and Bayesian Inference for Medical Imaging” (Grant No. 702666), Marie Sklodowska-Curie Individual Fellowship, 2016/10/01 – 2018/09/30, 177 599 EUR

2. Researcher, "Bioinformatics tools for drug discovery" (Grant No. POIR 01.01.01-

00-1083/15), The National Centre for Research and Development (Poland), 2016/01/01 – 2016/07/01, 7 909 741 PLN

3. Researcher, "Platform of Business Processes Optimization for Information Systems" (Grant No. POIG 01.03.01-02-079/12), The National Centre for Research and Development (Poland) from EU subsidies, 2013/01/11 – 2015/04/30 10 672 218 PLN

4. Researcher, "New Information Technologies for Information Society and E-Administration using SOA paradigm" (Grant No. POIG 01.03.01-00-008/08-05), The National Centre for Research and Development (Poland) from EU subsidies, 2009/04/01 – 2013/01/31, 36 000 000 PLN

5. Principal investigator, individual grants of Faculty of Computer Science and Management, Wroclaw University of Technology within founds from the Ministry of Science and Higher Education (Poland) for financial support of young scientists and Ph.D. students, four times: 2012/2013, 2013/2014, 2014/2015, 2015/2016, altogether ~10 000 EUR

Awards & Scholarships

1. Award of Faculty Council for best Ph.D. theses at Faculty of Computer Science and Management, Wroclaw University of Technology, 2013

2. Best M.Sc. thesis award (first place in Poland), Polish Information Processing Society, 2009

3. Award of Rector of Wroclaw University of Technology for distinguished Ph.D. student, 2012

4. Award of Dean of Faculty of Computer Science and Management (Wroclaw University of Technology) for distinguished Ph.D. student, 2011

5. Award for distinguished Ph.D. student at Wroclaw University of Technology, 2010

6. Award of Rector of Wroclaw University of Technology for distinguished M.Sc. student, 2008

7. Scientific scholarship within grant *Young Staff 2015. Developing of the University teaching offer and implementing Interdisciplinary Doctoral Studies*, Wroclaw University of Technology, 2014/10 – 2015/06

8. Scientific scholarship within grant for finance of activity based on scientific research or developmental work and tasks with theirs connected serving development of young scientists Ph.D. students, Wroclaw University of Technology, two times: 2011/2012, 2012/2013

9. Scientific scholarship for best Ph.D. students at Faculty of Computer Science and Management, Wroclaw University of Technology, three times: 2009/2010, 2010/2011, 2011/2012

10. Pro-quality scholarship for scientific achievements for best Ph.D. students at Faculty of Computer Science and Management, Wroclaw University of Technology,

2011/2012

11. Best paper award at the National Conference on Automation, Poland, 2014

Teaching, Supervision & Talks

Teaching

M.Sc. level

Deep Learning, lecture, University of Amsterdam, *guest lecturer*

Media Understanding, lecture, University of Amsterdam, *guest lecturer*

Artificial Intelligence and Knowledge Engineering, laboratory, Wroclaw University of Technology

Decision Support Systems, laboratory and project, Wroclaw University of Technology

Designing Information Systems, laboratory and project, Wroclaw University of Technology

B.Sc. Level

Systems Analysis and Decision Making, laboratory, exercises, lectures, Wroclaw University of Technology, *main designer of the course curriculum*

Artificial Intelligence, laboratory, Wroclaw University of Technology

Introduction to Operating Systems, laboratory, Wroclaw University of Technology

Supervision

Ph.D. level

1. Maximilian Ilse (University of Amsterdam), title: Deep Multiple-instance Learning for Medical Imaging, co-supervisor, 2016 – ongoing

2. Szymon Zaręba (Wroclaw University of Technology), title: Deep Learning with Random Perturbations, co-supervisor, 2014 – 2016, *graduated with honours*

M.Sc. level

1. Jasper Linmans (University of Amsterdam), supervisor, title: Introspective Deep Learning Models , 2018

2. Philip Botros (University of Amsterdam), supervisor, title: Fair Deep Generative Modeling, 2018

3. Marco Federici (University of Amsterdam), supervisor, title: Information-theoretic analysis of deep generative models, 2018

4. Tim Davidson (University of Amsterdam), supervisor, title: Temporal Variational-Autoencoders, ongoing

5. Szymon Zaręba (Wroclaw University of Technology), supervisor, title: Learning algorithms for Restricted Boltzmann Machine (in Polish), 2012 – 2014

6. Marcin Kocot (Wroclaw University of Technology), supervisor, title: Image

denoising using Ising models (in Polish), 2012 – 2014

7. Przemysław Kłysz (Wroclaw University of Technology), supervisor, title: Handwriting recognition using mixture of Bernoulli distributions and EM algorithms (in Polish), 2012 – 2014

B.Sc. Level

1. Joanna Lichodij (Wroclaw University of Technology), supervisor, title: Learning features of conditional random field with bagging (in Polish), 2014 – 2015

2. Paulina Brzechffa (Wroclaw University of Technology), supervisor, title: Implementation of AdaBoost algorithm in Python with Theano package (in Polish), 2014 – 2015

3. Joanna Hawrot, Paweł Pawlik, Krzysztof Rajda, Łukasz Włodarczyk (Wroclaw University of Technology), supervisor, B.S.Eng. group project, title: Mobile Application for Intelligent Discovery of Movie's Title using Restricted Boltzmann Machine (in Polish), 2014 (top 10 best B.S.Eng project at the faculty)

4. Michał Gabor, Mateusz Głowiński, Sylwester Fiołka, Mateusz Wasilewski (Wroclaw University of Technology), supervisor, B.S.Eng. group project, title: Mobile Application for Glycemic Index Determination basing on Images (in Polish), 2014

Invited and contributed talks (Selected)

UAI, 2018/08/6-10, Monterey, California, the USA, two oral presentations on: (i) new family of normalizing flows, (ii) a hyperspherical variational posterior for VAEs

ICML, 2018/07/10-15, Stockholm, Sweden, an oral (short) presentation on the attention-based deep multiple instance learning for medical imaging

CERN, 2018/07/03, Geneve, Switzerland, an invited talk on recent developments of Variational Auto-Encoders

The Platform for Advanced Scientific Computing Conference (PASC18): Minisymposium on Generative Models and Density Estimator for High Energy Physics, 2018/07/2, Basel, Switzerland, an invited talk on "The Success of Deep Generative Models"

CWI (Dept. of Life Sciences and Health), 2018/05/29, Amsterdam, the Netherlands, an invited talk on deep generative modeling using Variational Auto-Encoders

AISTATS, 2018/04/11, Lanzarote, Canary Islands, an oral presentation on a new prior for Variational Auto-Encoders

Max Planck Institute for Intelligent Systems, 2018/03/22, Tübingen, Germany, an invited talk about a new prior for Variational Auto-Encoders

Summer School on Data Science, 2017/09/28, Split, Croatia, two lectures about deep generative modelling

Falling Walls Lab, 2017/09/25, Brussels, Belgium, a Ted-Ex talk about deep learning and medical imaging

National Cyber Security Summer School, 2017/08/24, Eindhoven, the Netherlands, a lecture on introduction to machine learning

Technische Universiteit Eindhoven, 2017/06/30, Eindhoven, the Netherlands, an invited talk about Variational Auto-Encoders

ICITSEM 2014 2014/02/12, Dubai, UAE, an oral presentation about application of RBMs in medical domain

Services

Reviewer (journals)

IEEE Transactions of Pattern Analysis and Machine Intelligence, Bioinformatics, Expert Systems with Applications, BMC Bioinformatics, IEEE Journal of Biomedical and Health Informatics, IEEE Transactions on Neural Systems & Rehabilitation Engineering, European Journal of Operation Research, Neural Processing Letters, Operations Research and Decisions, Knowledge-Based Systems, International Journal of Approximate Reasoning, Biocybernetics and Biomedical Engineering

Reviewer (conferences)

ICML 2019, ICLR 2019, AISTATS 2019, NIPS 2018, Medical Imaging with Deep Learning 2018, NIPS Workshop on Bayesian Deep Learning (2017, 2018), ACIIDS (2013, 2014, 2015), ICSS (2013, 2016), ISAT (2012, 2013, 2014, 2015, 2016), NCA (2014), CVPR-BNIVU (2018)

Conference organization

Medical Imaging with Deep Learning 2018 (MIDL), Program Committee

International Conference on Systems Science 2016 (ICSS), Conference Secretary

National Conference on Automation 2014 (NCA), Conference Secretary

International Conference on Systems Science 2013 (ICSS), Conference Secretary

International Conference Information Architecture & Technology 2011 (ISAT), Special Session Chair

Public presentations

Open Dag Amsterdam Science Park, 2017/10/7, a participant in an event popularizing science

XVII Lower Silesian Science Festival 2014, a lecturer during one of largest events in Poland on popularizing science

Publications (selected)

Journal papers

[1] **J.M. Tomczak**, S. Zaręba, S. Ravanbakhsh, R. Greiner, *Low-dimensional Perturb-and-MAP approach for learning Restricted Boltzmann Machines*, Neural Processing Letters, online 3 October 2018

[2] A. Gonczarek, **J.M. Tomczak**, S. Zaręba, J. Kaczmar, P. Dąbrowski, M. Walczak, *Interaction prediction in structure-based virtual screening using deep learning*, Computers in Biology and Medicine, online 14 September 2017

[3] M. Zięba, S. Tomczak, **J.M. Tomczak**, *Ensemble Boosted Trees with Synthetic Features Generation in Application to Bankruptcy Prediction*, Expert Systems with Applications, Vol. 58, pp. 93-101, 2016

[4] **J.M. Tomczak**, A. Gonczarek, *Learning invariant features using Subspace Restricted Boltzmann Machine*, Neural Processing Letters, Vol. 45, No. 1, pp. 173-182, 2017

[5] **J.M. Tomczak**, *Learning Informative Features from Restricted Boltzmann Machines*, Neural Processing Letters, Vol. 44, No. 3, pp. 735-750, 2016

[6] **J.M. Tomczak**, *On some properties of the low-dimensional Gumbel perturbations in the Perturb-and-MAP model*, Statistics and Probability Letters, Vol. 115, pp. 8-15, 2016

[7] A. Gonczarek, **J.M. Tomczak**, *Articulated tracking with manifold regularized particle filter*, Machine Vision and Applications, Vol. 27, No. 2, pp 275–286, 2016

[8] **J.M. Tomczak**, M. Zięba, *Probabilistic combination of classification rules and its application to medical diagnosis*, Machine Learning, Vol. 101, No. 1, pp. 105-135, 2015

[9] **J.M. Tomczak**, M. Zięba, *Classification Restricted Boltzmann Machine for comprehensible credit scoring model*, Expert Systems with Applications, Vol. 42, No. 4, pp. 1789-1796, 2015

[10] M. Zięba, **J.M. Tomczak**, *Boosted SVM with active learning strategy for imbalanced data*, Soft Computing, Vol. 19, No. 12, pp. 3357-3368, 2015

[11] M. Zięba, **J.M. Tomczak**, J. Świątek, M. Lubicz, *Boosted SVM for extracting rules from imbalanced data in application to prediction of the post-operative life expectancy in the lung cancer patients*, Applied Soft Computing, Vol. 14, pp. 99–108, 2014

[12] **J.M. Tomczak**, A. Gonczarek, *Decision rules extraction from data stream in the presence of changing context for diabetes treatment*, Knowledge and Information Systems, Vol. 34, No. 3, pp. 521-546, 2013

Conferences

[1] T. Davidson, L. Falorsi, N. de Cao, T. Kipf, **J.M. Tomczak**, *Hyperspherical Variational Auto-Encoders*, UAI, Monterey, California, the USA, 2018

[2] R. van den Berg, L. Hasenclever, **J.M. Tomczak**, Max Welling, *Sylvester Normalizing Flow for Variational Inference*, UAI, Monterey, California, the USA, 2018

[3] M. Ilse, **J.M. Tomczak**, M. Welling, *Attention-based Deep Multiple Instance Learning*, ICML, Stockholm, Sweden, 2018

[4] **J.M. Tomczak**, M. Welling, *VAE with a VampPrior*, Artificial Intelligence and Statistics (AISTATS), Lanzarote, Canary Islands, 2018 (*oral presentation*)

[5] **J.M. Tomczak**, M. Welling, *Improving Variational Auto-Encoders using convex combination linear Inverse Autoregressive Flow*, Benelearn 2017, Eindhoven, the

Netherlands, 2017

[6] M. Zięba, **J.M. Tomczak**, J. Świątek, *Self-paced Learning for Imbalanced Data*, ACIIDS, Intelligent Information and Database Systems, Lecture Notes in Computer Science, Vol. 9621, pp. 564-573, 2016

[7] M. Zięba, **J.M. Tomczak**, A. Gonczarek, *RBM-SMOTE: Restricted Boltzmann Machines for Synthetic Minority Oversampling Technique*, ACIIDS, Intelligent Information and Database Systems, Lecture Notes in Computer Science, Vol. 9011, pp. 377-386, 2015

[8] **J.M. Tomczak**, A. Gonczarek, *Sparse hidden units activation in Restricted Boltzmann Machine*, ICSEng, Advances in Intelligent Systems and Computing, Vol. 1089, pp. 181-185, 2015

[9] S. Zaręba, A. Gonczarek, **J.M. Tomczak**, J. Świątek, *Accelerated learning for Restricted Boltzmann Machine with momentum term*, ICSEng, Advances in Intelligent Systems and Computing, Vol. 1089, pp. 187-192, 2015

[10] **J.M. Tomczak**, *Relaxed information-theoretic regularization for Restricted Boltzmann Machine*, National Conference on Automation, Wroclaw, Poland, 2014

[11] K. Juszczyszyn, A. Gonczarek, **J.M. Tomczak**, K. Musiał, M. Budka, A Probabilistic Approach to Structural Change Prediction in Evolving Social Networks, International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2012), pp. 996-1001, 2012

Workshops

[1] P. Botros, **J.M. Tomczak**, *Hierarchical VampPrior Variational Fair Auto-Encoders,* ICML Workshop on Theoretical Foundations and Applications of Deep Generative Models, Stockholm, Sweden, 2018

[2] **J.M. Tomczak**, M. Ilse, M. Welling, *Deep Learning with Permutation-invariant Operator for Multi-instance Histopathology Classification*, NIPS Workshop on Medical Imaging Meets NIPS, Long Beach, the USA, 2017

[3] L. Hasenclever, **J.M. Tomczak**, R. van den Berg, M. Welling, *Variational Inference with Orthogonal Normalizing Flows*, NIPS Workshop on Bayesian Deep Learning, Long Beach, the USA, 2017

[4] **J.M. Tomczak**, M. Welling, *Improving Variational Auto-Encoders using Householder Flow*, NIPS Workshop on Bayesian Deep Learning, Barcelona, Spain, 2016

[5] A. Gonczarek, **J.M. Tomczak**, S. Zaręba, J. Kaczmar, P. Dąbrowski, M.J. Walczak, *Learning Deep Architectures for Interaction Prediction in Structure-based Virtual Screening*, NIPS Workshop on Machine Learning in Computational Biology, Barcelona, Spain, 2016

Others

[1] **J.M. Tomczak**, *Prediction of breast cancer recurrence using Classification Restricted Boltzmann Machine with Dropping*, arXiv preprint, 2013

Others

Programming skills	Python (scientific packages: PyTorch, Tensorflow, Numpy, Scikit-learn, CobraPy, RDKit, among others)
	Matlab
Languages	English (fluent)
	German (communicative)
	Dutch (A1-level)
Hobbies	Horse riding, playing guitar