TOMASZ KORBAK

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INTERESTS

Machine learning: deep representation learning, natural language processing, reinforcement learning, Bayesian machine learning
Cognitive science: Bayesian approaches in computational neuroscience: predictive coding, active inference, computational approaches to language, emergent communication
Philosophy of science: compositionality, signaling games, semantic information

RESEARCH EXPERIENCE

Human Interactivity and Language Lab, Faculty of Psychology, University of Warsaw — **Research assistant/Master's student**, *February 2019 – December 2019*

Investigating the emergence of compositional communication in multi-agent systems under the project "Developmentally informed agent-based modeling of symbolic constraints in interaction" led by Prof. Joanna Rączaszek-Leonardi.

Institute of Philosophy and Sociology, Polish Academy of Sciences — **Principal investigator**, *November 2016 – present*

Theoretical work on Bayesian approaches in computational neuroscience, representational learning in deep neural networks and enactive cognitive science under the project "Formal and computational models of self-organization in cognitive science" led by me and supervised by Prof. Marcin Miłkowski.

Institute of Computer Science, Polish Academy of Sciences — **Research intern**, *April 2017 — November 2017*

Work on neural network-based tools for processing of Polish as part of Clarin-PL project, funded by the European Commission.

INDUSTRIAL EXPERIENCE

Sigmoidal, Machine Learning Engineer — *June 2018 — present*
Samsung R&D, Junior NLP Engineer — *April 2017 — December 2017*
Inteliclinic, Python Developer — *December 2015 — March 2017*
Webinterpret, Junior Python Developer Intern — *July 2015 — September 2015*

EDUCATION

MSc in Cognitive Science, University of Warsaw — *2016 – 2019*
BSc in Cognitive Science, University of Warsaw — *2013 – 2016*
BAs in Philosophy, University of Warsaw — *2012 – 2015*

ADDITIONAL TRAINING

Bayesian Methods in Deep Learning, Moscow — *2018*
School of Pioneers (tech entrepreneurship workshops), University of Cambridge — *2018*
Computational Psychiatry Course, ETH Zurich — *2017*

SELECTED PAPERS

1. Korbak, T., Zubek, J., Kuciński, Ł., Miłoś, P. & Rączaszek-Leonardi, J. (2019). Developmentally motivated emergence of compositional communication via template transfer. NeurIPS 2019 workshop "Emergent Communication: Towards Natural Language".
2. Korbak, T. (2019). Computational enactivism under the free energy principle. *Synthese*.
3. Korbak, T. (2019). Unsupervised learning and the natural origins of content. *Avant*.
4. Korzeniowski, R., Rolczyński, R., Sadownik, P., Korbak, T. & Możejko, M. (2019). Exploiting Unsupervised Pre-training and Automated Feature Engineering for Low-resource Hate Speech Detection in Polish. *Proceedings of the PolEval 2019 Workshop*.
5. Korbak, T. & Żak, P. (2017). Fine-tuning Tree-LSTM for phrase-level sentiment classification on a Polish dependency treebank. *Proceedings of the 8th Language & Technology Conference (LTC 2017)*.
6. Korbak, T. (2015). Scaffolded Minds and the Evolution of Content in Signaling Pathways. *Studies in Logic, Grammar and Rhetoric*, 41 (54).
7. Korbak, T. (2015). Apercepcja transcendentalna w kantowskim modelu epigenezy czystego rozumu [Transcedental apperception in the Kantian model of the epigenesis of pure reason]. *Przeglad Filozoficzny – Nowa Seria*, 3 (95), p. 125-142.

CONFERENCE TALKS AND POSTERS

1. Korbak, T. A developmentally-inspired approach to compositional communication in signaling games. ML in PL conference, Warsaw, Poland
2. Korbak, T. (2019). Emergent compositional communication in generalized signaling games. 8th Peripatetic Conference on Modeling Cognitive Systems. Kiry, Poland.
3. Korbak, T. (2018). Evaluating the scalability of deep active inference. 7th Peripatetic Conference on Modeling Cognitive Systems. Małe Ciche, Poland.
4. Korbak, T. (2018). Po co nam zasada minimalizacji energii swobodnej? [Why do we need the Free Energy Principle?] Predictive processing: prospects and limitations. Warsaw, Poland (invited talk).
5. Korbak, T. (2017). Free energy principle as a model of biological and cognitive self-organization. 6th Peripatetic Conference on Modeling Cognitive Systems. Kiry, Poland.

SKILLS

Python (web frameworks and data science ecosystem), C++, PyTorch, tensorflow, git, Docker, Kubernetes, slurm, cloud computing, GNU/Linux, LaTeX

AWARDS AND FELLOWSHIPS

Fellow of Collegium Invisibile *2017 – present*
Minister of Science and Higher Education (Poland) scholarship for exceptional students *2016*
Diamond grant award for the project "Formal and computational models of self-organization in cognitive science" (168 000 PLN) *2016 – 2020*

ACADEMIC SERVICE

Member of the organizing committee of International Association for Computing and Philosophy conference, Warsaw, 21–23 June 2018.

FOREIGN LANGUAGES

Polish – native
English – full professional proficiency
French – basic

REFERENCES

Prof. Joanna Rączaszek-Leonardi
Faculty of Psychology, University of Warsaw
raczasze@psych.uw.edu.pl
Role: MSc advisor

Prof. Piotr Miłoś
Institute of Mathematics, Polish Academy of Science
pmilos@mimuw.edu.pl
Role: MSc advisor

Prof. Marcin Miłkowski
Institute of Philosophy and Sociology, Polish Academy of Science
marcin.milkowski@gmail.com
Role: BAs advisor, tutor, project supervisor

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