Djordje Miladinovic

Curriculum Vitæ

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Machine Learning Engineer & Researcher | PhD in Computer Science

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Summary

A computer scientist with a machine learning-focused PhD and experience in taking projects from concept to working system.

Education

Sep'17-Jun'21   **ETH Zürich – PhD in Computer Science – Machine Learning**.
- *Thesis:* "On Training Deep Generative Models with Latent Variables" – Prof. Joachim Buhmann.
- *Research areas:* Generative image and text modeling | variational autoencoders | representation learning | deep learning | computer vision | natural language processing | machine learning for biology.
- *Collaborators:* Groups of Prof. Jürgen Schmidhuber, Prof. Bernhard Schölkopf and Prof. Steven A. Brown.

Sep'13-Jun'16   **ETH Zürich – MS in Computer Science**.
- *Thesis:* "Perceptual Analysis Framework for Discovering Anomalies in Humanoid Motions" – Prof. Otmar Hilliges.
- *Focus:* Software engineering | operating systems | distributed computing | machine learning.

Sep'09-Sep'13   **University of Belgrade, ETF – BS in Electrical Engineering & Computer Science**.
- *Thesis:* "Java-based Interactive Software Simulator of a CISC Processor" – Prof. Zaharije Radivojević.
- *Focus:* Software engineering and design | algorithms | data structures | operating systems | hardware design.

Work Experience

Feb'17-Present   **ETH Zürich, Institute for Machine Learning – Research Scientist**.
- [Python/PyTorch] Led a team of researchers to develop a web platform that uses convolutional neural networks to recognize sleep patterns from brain signals (`http://sleeplearning.ethz.ch`) – *over 10.000 submissions worldwide*.
- [Python/PyTorch] Co-invented a new type of neural network for realistic image synthesis. Used it to *develop a state-of-the-art variational autoencoder* for image modeling (`github.com/djordjemila/sdn`).

  Research, development and *project management* in interdisciplinary collaborations:
- *Zurich Exhalomics* (`http://hochschulmedizin.uzh.ch/zurich-exhalomics`) – Led a team of students to develop a tool that automatically calibrates the mass spectrum of human breath, and also a machine-learning algorithm to detect causal relations between metabolites in the human body and sleep stages (relating metabolism to sleep).
- *Sleep Loop* (`sleeploop.ch`) – Co-developed an algorithm to recognize sleep stages from wireless device recordings.
- *VirtaMed collaboration* (`http://www.virtamed.com`) – developed a machine-learning algorithm with UI to evaluate the performance of trainee surgeons on a virtual surgery simulator (see the demo at `http://bit.ly/2PJqY2J`).

Sep'18-Dec'18   **Max Planck Institute for Intelligent Systems – Research Scientist**.
- [Python/PyTorch] Applied principles of causal reasoning to (i) develop a neural network architecture to model dynamical systems, improving unsupervised transfer learning; (ii) validate representations of deep generative models.

Sep'16-Feb'17   **Logitech Europe S.A. Data Science & Advanced Analytics – Software Engineer | ML Engineer**.
- [Python/SQL] Developed a machine-learning pipeline that (i) collects and processes user activity logs for a Logitech product from the database; (ii) uses processed data to identify user cohorts and perform targeted advertising.
- [Java/Python] Implemented a natural language processing pipeline that (i) scraps opinions from Amazon reviews on different Logitech products; (ii) automatically analyzes the sentiments from those reviews for different product aspects.

Jan'16-Sep'16   **Disney Research Zürich, Vision and Sensing Research Group – Research Scientist | ML Engineer**.
- [Python/C++/Matlab/Blender/HTML/CSS] Designed a framework for detecting mechanical failures in Disney's humanoid robots based on IMU sensor readings. The framework is based on a machine-learning algorithm that provides the human-like judgment on robot degradation. To provide training data for the algorithm, I also designed a web survey in which the participants compared graphical renderings of proper and degraded human motions.

Coding and Frameworks

Advanced	Python | PyTorch | Bash | LaTeX
Intermediate	C/C++ | Java | Matlab | SQL | HTML | CSS
Basic	Tensorflow | Torch | Node.js | C# | Jekyll | Javascript | VHDL
Frameworks	Unix | Git | SVN | CUDA | NLTK | OpenCV | Pandas | Scikit-learn | SciPy | NumPy | Scrapy | Django | Celery | ROS | UML | Amazon AWS | Hadoop MapReduce | MongoDB | PostgreSQL | Blender

Notable Projects

Machine learning	[Matlab] Designed a Netflix-like recommender system based on state-of-the-art collaborative filtering methods.
Distributed systems	[C++/Node.js] Co-developed a framework for fail-safe landing of micro-aerial vehicles, protected against Denial of Service (DoS) attacks.
	[Java/AWS/SQL] Designed a 3-tier messaging system (client-middleware-database) and its theoretical model.
Operating systems	[C] Worked on the design and optimization of a research operating system (http://www.barrelfish.org).
	[C++/Assembly] Implemented a multi-threaded kernel with time sharing.
	[C++] Implemented a simplified file system designed for partitions on a standard hard drive.
	[Java] Implemented a compiler for a simplified version of the Java language.
Hardware-related	[Java] Designed an interactive visual simulator of a CISC processor.
	[VHDL] Implemented a 32-bit ARM processor with all relevant components (pipeline/branch prediction/cache).

Selected Publications

[1] **Đorđe Miladinović**, Aleksandar Stanić, Stefan Bauer, Jürgen Schmidhuber & Joachim M. Buhmann
Spatial Dependency Networks: Neural Layers for Improved Generative Image Modeling
International Conference on Learning Representations, **ICLR 2021**

[2] Raphael Suter, **Đorđe Miladinović**, Stefan Bauer & Bernhard Schölkopf
Robustly Disentangled Causal Mechanisms: Validating Deep Representations for Interventional Robustness
International Conference on Machine Learning, **ICML 2019**

[3] **Đorđe Miladinović**, Muhammad Waleed Gondal, Bernhard Schölkopf, Joachim M. Buhmann & Stefan Bauer
Disentangled state space representations
DeepGen workshop, International Conference on Representation Learning, **ICLR 2019**

[4] **Đorđe Miladinović** et al.
SPINDLE: End-to-end Learning from EEG/EMG to Extrapolate Animal Sleep Scoring Across Experimental Settings, Labs and Species, **PloS Computational Biology 2019**

See the complete list at `http://djordjemila.github.io/#publications`

Academic Activities

Dec'19	Co-organized the "Disentanglement Challenge" at NeurIPS 2019 (`bit.ly/36bTD4W`).
2018-Present	Research fellow of Max Planck Institute for Intelligent Systems.
2017-2021	Reviewed papers for NeurIPS, ICML and ICLR.
2017-2020	Taught "Advanced Machine Learning" and "Statistical Learning Theory" at ETH Zürich.
2017-2020	Supervised more than 10 MS students (`http://djordjemila.github.io/#teaching-mentoring`).

Languages

Serbian (Native), English (Fluent), German (B1), Spanish (Beginner)

Hobbies

Waterpolo \| Swimming \| Skiing and snowboarding \| Tennis \| Cinematography \| Reading