Róbert Csordás

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EDUCATION

IDSIA http://idsia.ch, Lugano, Switzerland
PhD student 2018-pesent
Supervised by Prof. Jürgen Schmidhuber. Working on systematic generalization.

Budapest University of Technology and Economics, Budapest, Hungary
Electrical Engineering. MSc (grad. 2015) and BSc (grad. 2012). Grade: excellent.

WORK EXPERIENCE

AImotive (formerly AdasWorks) - https://aimotive.com 2015-2018
AI Research Scientist Budapest, Hungary
Worked on deep neural networks for self driving cars.

- Monocular depth prediction using neural networks.
- Neural stereo matching - predicting robust depth map with neural network.
- Recurrent network research - Convolutional LSTMs for stabilizing detections, free space detection, etc.
- Object detection, semantic segmentation

Hungarian Academy of Sciences - Institute for Computer Science and Control - https://www.sztaki.hu 2015
Software Engineer Budapest, Hungary
Worked on classical computer vision projects. For example:

- Detecting objects thrown over the fence; detecting human leaving a car.
- Autonomous forklift control system.

Innomed Medical Inc. - http://innomed.hu 2007 - 2015
Embedded Software/Hardware Engineer Budapest, Hungary

- Designed the software architecture of Linux based patient monitor (C++, QT).
- Maintained the software of the InnoCare-S patient monitor (C++).
- Wrote low level hardware drivers for InnoCare-T12.

PUBLICATIONS

Róbert Csordás, Kazuki Irie, Jürgen Schmidhuber: **The Devil is in the Detail: Simple Tricks Improve Systematic Generalization of Transformers** - We significantly improve the systematic generalization of Transformers on a variety of systematic generalization datasets using simple tricks.
EMNLP 2021 https://arxiv.org/abs/2108.12284

Kazuki Irie, Imanol Schlag, Róbert Csordás, Jürgen Schmidhuber: **Going Beyond Linear Transformers with Recurrent Fast Weight Programmers** - We we explore the recurrent Fast Weight Programmers (FWPs), which exhibit advantageous properties of both Transformers and RNNs.
arXiv preprint https://arxiv.org/abs/2106.06295

Róbert Csordás, Sjoerd van Steenkiste, Jürgen Schmidhuber: **Are Neural Nets Modular? Inspecting Functional Modularity Through Differentiable Weight Masks** - We develop a method for analyzing emerging functional modularity in neural networks based on differentiable weight masks and use it to point out important

issues in current-day neural networks.
ICLR 2021 https://openreview.net/forum?id=7uVcpu-gMD

Róbert Csordás, Jürgen Schmidhuber: **Improving Differentiable Neural Computers Through Memory Masking, De-allocation, and Link Distribution Sharpness Control** - Addresses 3 different issues with the original DNC architecture. Also proposes a new, better content-based lookup mechanism.
ICLR 2019 https://openreview.net/forum?id=HyGEM3C9KQ

Róbert Csordás, László Havasi, and Tamás Szirányi: **Detecting objects thrown over fence in outdoor scenes** - A new technique for detecting objects thrown over a critical area of interest in a video sequence made by a monocular camera.
VISAPP 2015 http://goo.gl/ZDkk4g

HIGH SCHOOL PUBLICATIONS

CallTheTux - Development of CallTheTux, a universal GSM stack for Linux.
Petnica Papers, 2007 https://goo.gl/QTCy5U

RealVM - Development of a new type of virtual machine which would allow parallel execution and fast switching between different operating systems.
Petnica Papers, 2006 https://goo.gl/8TNHf5

PrologAPI - Enabling the usage of Prolog constructs from C++.
Petnica Papers, 2005 https://goo.gl/KpV3sF

PATENTS

Róbert Csordás, Ágnes Kis-Benedek, Balázs Szalkai: **Method and Apparatus for Generating a Displacement Map of an Input Dataset Pair** - A neural network based method for fast and robust stereo matching for depth map generation.
US10380753 https://pimg-fpiw.uspto.gov/fdd/53/807/103/0.pdf

TECHNICAL STRENGTHS

Python, TensorFlow, PyTorch, Torch, C, C++, OpenCV, Algorithms, Linux, JavaScript, Bash, Matlab, Assembly

OTHER SKILLS

Machine learning frameworks: PyTorch, TensorFlow, Torch
Embedded architectures: PIC, PIC32, AVR, AVR32, ARM, XMOS, Xilinx
Databases: MySQL, MongoDB, Sphinx search
JavaScript technologies: NodeJS, jQuery
Mobile development: Android, iOS (Swift)
Electronic design tools: KiCAD, Eagle
Operating systems: Linux, OS X, Windows
Markup languages: LaTeX, XML, Markdown
Parallel programming: CUDA, numba

HOBBY PROJECTS

MobilECG II - https://github.com/robertcsordas/MobilECG-II 2014 - 2016
Open source Holter ECG. Designed the schematic diagram and the firmware.

engineerjs.com - http://engineerjs.com 2013 - 2015
Extendable online computing environment for engineers, with physical quantity, complex numbers and linear algebra support.

LANGUAGES

Hungarian (native); English, Serbian (fluent); German, Italian (beginner)