# Róbert Csordás

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## EDUCATION

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

**Budapest University of Technology and Economics**, Budapest, Hungary
MSc in Electrical Engineering. Grade: excellent. graduated in 2015
BSc in Electrical Engineering. Grade: excellent. graduated in 2012

## 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 - trained on stereo image pair by learning the projection from the left image to the right.
- Neural stereo matching - predicting depth map from stereo pairs in a more robust way than traditional methods.
- Recurrent network research - Convolutional LSTMs, GRUs 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.
- Autonomous forklift control system.
- Detecting human leaving a car.

**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

**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

**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`

**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**

**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
**Other:** CUDA

**HOBBY PROJECTS**

**MobilECG II** - `https://github.com/robertcsordas/MobilECG-II` 2014 - 2016
Hobby project: an open source Holter ECG. Designed the schematic diagram and the firmware.

**engineerjs.com** - `http://engineerjs.com` 2013 - 2015
Hobby project: an online computing environment for engineers. Written in JavaScript. I worked on the design and implemented the most of: compiler and runtime environment, physical quantities, complex numbers and basic linear algebra support, the backend, library importing and documentation system.

**LANGUAGES**

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