



Dionisis-Odysseas Sotiropoulos

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About me:

D.-Od. Sotiropoulos was born in 16 March 1994 in Athens Greece. He received 2nd stage education degree from the 2nd general lyceum of Pefki, Athens in 2012 and was admitted to the Computer Engineering and Informatics Dept. of the University of Patras, Greece through the panhellenic national exams. He completed the mandatory army service in July 2020 in the Greek Special Forces and received the Computer Engineering and Informatics Diploma in August 2020. During the same year his Thesis: Porting a Convolutional Neural Network for Stereo Vision was published in the IEEE international conference for pattern recognition (ICPR2020). In January 2022, he won a research grant to work as a research fellow in the HiPert Lab of the University of Modena and Reggio Emilia.

EDUCATION AND TRAINING

09/09/2012 – 06/08/2020

COMPUTER ENGINEER – Computer Engineering and Informatics Department of the University of Patras, Greece

The Computer Engineering and Informatics Department (CEID) is the oldest Computer Engineering Dept. and the most accredited in Greece ranking top of the list in h-index of faculty members and publications per academic among computer engineering departments in Greece.

Through my years in CEID I have accumulated academic knowledge on computers and information ranging from low level hardware such as transistor logic and hardware architecture to high level software such as distributed networks focusing on the essence of the science rather than market focused knowledge. The courses in which I excelled at were Logic/Hardware Design, Scientific Computation, Object Oriented Programming and Linear Algebra.

Website <https://www.ceid.upatras.gr/en> | **Final grade** 6.55/10 |

Thesis Porting a Convolutional Neural Network for Stereo Vision to Hardware

LANGUAGE SKILLS

Mother tongue(s): **GREEK**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C1	C1	C2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● DIGITAL SKILLS

My Digital Skills

Scripts and High Level Languages

Octave/MATLAB | Lua | Linux Bash | Html/PHP/JAVA | Arduino | C/C++

HDL and Low Level Languages

Vivado (Xilinx) | Mentor ModelSim | FPGA VHDL | assembly language | Parallel Programming (Cuda)

Other

Microsoft Word

● PUBLICATIONS

Porting a Convolutional Neural Network for Stereo Vision to Hardware [ICPR2020]

<https://drive.google.com/file/d/1PNNVXFjFqSPcrERDEs86c10SQC7XzPm/view> – 2021

Abstract—With the leaps of progress done in the field of machine learning through the last few years, Artificial Neural

Networks (ANN) are being used in more and more applications. In the field of computer vision, applications of ANNs include object recognition, motion and object tracking, and obstacle avoidance. Alternatively, ANNs are used to find the solutions of costly problems such as the construction of a depth map for stereoscopic vision. Significant research has been done using Field Programmable Gate Arrays (FPGAs) to accelerate the simulation of ANNs and achieve real-time execution. We seek to develop optimized hardware for embedded systems in order to run pretrained neural networks in real time. In this paper we analyze, reconstruct and reevaluate a pretrained convolutional neural network for stereo matching and develop a hardware architecture to be used in an FPGA so as to compute the stereo estimation of still images in real time in hardware.

Published in the "25th International Conference for Pattern Recognition 2020, Milan, Italy"

https://drive.google.com/file/d/1qZmihGZUKD654_E6zEYgK7si2wSu4rKx/view?usp=sharing

● PROJECTS

Embedded Systems

Proposed an Anti-Fuel-Theft embedded system for large trucks by applying the development process of the course.

Team project

Grade 10/10

C++

<https://github.com/dioZ17/Battleship>

Designed the game "Battleship" on bash terminal with automatic ship placement

Team project done solo

Grade 9.5/10

VLSI Design

https://github.com/dioZ17/Minalpher_VHDL_Edu_Implementation

Implemented the crypto/decryptography system Minalpher in Vivado 2018 in VHDL.

Solo Project

Grade 9/10

Web Development

Designed a food delivery system on LAMP (Linux Apache Server with SQL Database). The system utilizes google geolocation to pass incoming orders to distributors by proximity.
Team project done solo
Grade 9/10

Thesis

In my thesis I proposed the implementation of a state of the art convolutional neural network from literature to hardware. I reconstructed the model bottom up with low level code and without the use of neural network libraries in matLab for evaluation. I designed the basic components of the hardware processor (basic processing unit, memory management systems) and developed a parallelization strategy for efficient execution of the model in real time. Through this project I performed statistical analysis on network flow data to quantize the network with negligible loss of accuracy without any further training. I also reduced the total required computations of the net by manipulating normalization parameters offchip and rendering normalization and cross correlation executable by the basic processing unit. Finally, I eliminated all re-reading of inputs by exploiting vertical and horizontal overlap of input images by the convolutional kernels.
The project was done under the supervision of Dr. Economou and achieved publication in ICPR 2020.
Solo project
Grade 10/10

● GREEK ARMY RESPONSIBILITY

Special Forces - Land Vehicle Electrician

Completed the mandatory 9-month army service in the special forces of Samos island from October 2019 to July 2020 under harsh conditions along with university graduation.

● HOBBIES AND INTERESTS

Winter Sports

- Skiing (Winter Sport and Mountaineering Athlete Club of Distomo)
- Snowboarding

GMing Roleplaying Board Games

Arts

- Hand Drawing
- Video Edit
- Dance
- Electric Bass
- Harmonica

Philosophy

● **PURPOSE FOR RESEARCH**

Field of Interest and Inspiration

I seek to develop state of the art neural network accelerators to be deployed on FPGAs. I am driven long term by the pursuit of fully autonomous robot development to which neural network accelerators are mandatory for the robotic cognitive system (instead of over-network processing) and short term by resolving logical problems that arise in hardware optimization. I am fascinated by clever tricks, native only to hardware implementations, for overcoming obstacles towards novel efficiency and performance. Therefore I am directed towards a PhD in the field of hardware design in order to be able to continue my expected life-long research in pursuit of this goal.

● **WORK EXPERIENCE**

10/01/2022 – CURRENT – Modena, Italy

RESEARCH FELLOW – UNIVERSITY OF MODENA AND REGGIO EMILIA

System integration of Software/Hardware in Heterogeneous System on Chip for the Comp4Drones project for smart agricultural development application.