Yipeng Wang

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Education

Beihang University, School of Electronic Information Engineering Sep. 2016 - Present
B.E. in Electrical Engineering (Teaching language: Chinese & English)
GPA (six terms): Rank(GA): **1**/41 Overall(GA): **89.76**/100.0
Core Coursework: Advanced Algebra/ Circuit Analysis / Signal and System/ Analog circuit/ Digital Circuit /DSP/ IC design fundamentals/ Communication theory/ Information theory/ Embedded-system / Computing architecture

LTH-Lund University, Department of Electrical and Information Engineering Aug. 2018-Jan.2019
Exchange (Teaching language: English)
GPA: 5.0/5.0
Core Coursework: Structured VLSI Design (5)/ Digital IC Design (5)/(Advanced) Computer Architecture (5) / An Introduction to Wireless Systems (5)

KU Leuven, ESAT-MICAS June 2019 – Aug.2019
Visiting Scholar (Advisor: Marian Verhelst)

Tsinghua University, Institute of Circuit and System Oct. 2019-
Thesis student (Advisor: Yongpan Liu)

Research interests

Digital IC design, Software-hardware codesign, VLSI architecture for media info processing and machine learning

Research experience

Video decoder chip for video decoding based on NN Nov.2019-
Thesis | Tsinghua University
Advisor: Prof. Dr. Yongpan Liu, Tsinghua University

- A tape-out decoder design for next generation end-to-end video transmission.

Depth map extraction using SpyNet and Sphere sweeping Jul.2019-Oct.2019
ESAT-MICAS, KU Leuven
Advisor: Prof. Dr. Marian Verhelst, KU Leuven

- Designed and built a system for real time depth map extraction for a multi-camera system based on CNN, SpyNet and geometric method, and Sphere sweeping.
- Implemented RTL in Verilog and VHDL; constructed an embedded demo on ZYNQ SoC for both methods.
- Designed a data transfer pattern, compression method, and new systolic-array-like output buffer architecture.
- Realized real-time processing for full-HD (14.5 fps) based on Sphere sweeping and attained high accuracy based on SpyNet.

Phase noise(PN) compensation using dedicated pilot for 5G with ASIC implementation Oct.2018-Jan.2019
EIT, LTH, Lund University
Advisor: Dr. Liang Liu, Associated Professor, Lund University

- Implemented a hardware friendly algorithm for PN compensation using the dedicated pilot in 5G-OFDM .
- Improved throughput and latency by un-looping the deconvolutor and adding parallelism; designed in VHDL.
- Achieved the following implementation result: at least 500MHz for both 65nm balk and 28 nm ST FDSOI and at most 8 parallel; throughput reached at least 4 G complex num/s.

Stress Regulation of Ferromagnetic Anisotropy Jan.2018 – Jan.2019
Advisor: Prof. Dr. Wei S. Zhao, Professor; Dr. Na Lei, associate professor

Projects

Mixed-Bit-Width Difference-Frame CNN Accelerator for Autopilot Nov. 2019 -
Advisor: Yongpan Liu, Prof., Tsinghua University; Zhe Yuan, Dr., Tsinghua University

- A dedicated accelerator demo for Autopilot(network by NVIDIA), using diff-frame method with mixed bit-width.

- In charge of all hardware design on zynq; completed the digital core design by the end of November.

STICKER-IV: a universal neural network processor Sep. 2019 -Nov.2019

Participant | Advisor: Yongpan Liu, Prof., Tsinghua University; Zhe Yuan, Dr., Tsinghua University

- Comprehensive design of a commercial neural network accelerator including SoC and toolchain.
- In charge of all levels of controller design, memory hierarchy, and verification in Systemverilog.

Pipelined MIPS CPU (Tomasulo with speculation) Mar.2019-Apr.2019

- Classic high-performance MIPS CPU based on Tomasulo and speculative execution, with optimization on the cache solving Specter leak.
- Implemented 5 RS, 2 pipelined FU, 32 slots for ROB; successfully ran 10 basic instructions.

Embedded system implementation of neural network-based object detection for drones Jan.2019-Jun.2019

Advisor: Yuanqing Cheng | cooperation with Chinese Academy of Sciences

- Project for DAC - System Design Contest 2019; Realize object detection for drones based on NVIDIA TX2.
- Network modification based on ShuffleNet and Yolo; achieved accuracy improvement based on Distillation.
- Won **8th place** in GPU track. [Team name: Ict-Jeejio-nobug]

Simple pattern recognition machine using CNN based on single FPGA Aug.2018-Oct.2018

Project Leader | Advisor: Liang Liu

- Digital module identifying squares or circles from a simple picture
- Black and white 64x64 pixels; 1000 testing pictures; Convolutional filter 4x4; Pooling filter 15x15; 67 weights (16 conv, 48 FC1 & 3 FC2) and 5 bias (1 conv, 3 FC1 & 1 FC2)
- Achieved an accuracy of 99.8%

Smart mobile humidifier Sep.2017 - Jan.2018

*Project Leader | Awarded by the **first prize** of Electrical innovation competition of Beihang (device making).*

- Implemented a smart home IOT work, based on an embedded single chip, Arduino.
- Realized flexible movement in any normal room, maintaining constant humidity; implemented real-time temperature and humidity graphical feedback, with friendly man-machine interaction using GUI and *MiAI*.
- Successfully implemented six main functions and steady operations.

Awards

- The first prize. Academic Scholarship of Beihang [Top 3% in school] 2019
- Outstanding Undergraduate Scholarship for Oversea Study, Chinese Scholarship Council [1% nation wide] 2018
- Scholarship for Outstanding Oversea Research, Beihang [5% in University] 2019
- The first prize. IC design contest for college students, Beijing 2019 [Top 5%] 2019
- The first prize. Electrical innovation competition of Beihang (device making) [Top 5% in school] 2017

Leadership

June.2017 - May.2018 **Minister of the rights and interests, The Student Union of Department (Qiming)**

Winter, 2016 **About Educational Reform in Xi'an | Head of the social practice project.**

Skills

Programming: SystemVerilog / VHDL / Verilog / Chisel / C / Python / Matlab / Arduino
Simulation & Modeling: Xlinx Vivado & SDK & embedded-linux / Questasim Modelsim / Cadence (virtuoso, Genus) / Calibre / NI Multisim/ Quartus / Solidworks
Software: Origin Lab/ Lab View / Linux/ Adobe(Ps, Pr, Au)
Experimental Skills: ZYNQ-7000/ Vector network analyzer/ spectrum analyzer/ Magneto-optical Kerr effect microscope (Nano-MOKE)/ benchtop experience/ magnetron sputtering
Languages: Mandarin Chinese(native)/ English(fluent)/ Swedish(basic)
Interests: Drum set / Cycling / Traveling / Food

List of References

Marian Verhelst (professor, KU Leuven) marian.verhelst@kuleuven.be
Yongpan Liu(professor, Tsinghua University; startup founder, Pi2star Tech.) ypliu@tsinghua.edu.cn
Jun Wang(professor, assistant dean, Beihang University) wangj203@buaa.edu.cn
Liang Liu (associate professor, Lund University) liang.liu@eit.lth.se