Wenshuai Zhao

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Education and Experience

Sep. 2017– Jan. 2020 **M.E. Electronic and Communication Engineering, Fudan University, China**. Supervisor: Yuanyuan Wang
Thesis topic: *VHL gene mutation prediction of ccRCC based on CT images.*
GPA: 3.33/4.0 IELTS: 6.5 (Reading 8.5, Writing 6.0)

Jan. 2018– Jun. 2018 **M.Sc. Double Degree in Information and Communication Technology, University of Turku, Finland.** Supervisor: Juha Plosila

Jul. 2014– May. 2017 **Electronical Engineer. China General Nuclear Power Corporation, Shenzhen, China**

Sep. 2010– Jun. 2014 **B.E. Mechanical Design, Manufacture & Automation, Central South University, China.**
Thesis topic: Level control system for manufacturing aluminum sheet.
GPA: 85/100 (In former three years: 87/100, ranking 3/33)
All math related courses >90/100
Outstanding Graduate of Hunan Province

Research Interests

Algorithm: Machine Learning, Deep Learning, Signal Processing.

Engineering: Embedded System, ASIC and FPGA Design, CUDA Programming.

Application: Medical Image Analysis, Robots.

Research Projects

2019 **Multi-scale supervised 3D U-Net for kidneys and kidney tumor segmentation**. (Independently)

Details: We propose multi-scale supervised 3D U-Net and employ tumor aware Loss Function to enhance its performance. The Dice of kidney and tumor achieve up to 0.974 and 0.818 respectively on the 90 test patients.

Achievements: One paper submitted in Preprint; Ranking 7/106 in the top-class conference in medical image analysis (MICCAI 2019) Challenge.

2019 **CT images based noninvasive determination of VHL gene mutations in renal cell carcinoma**. (Independently)

Details: Based on the accurate tumor segmentation from pre-trained model, we extract 460 radiomic features including shape, intensity, texture and wavelet. The ensemble of KNN is employed as classifier with voting aggregation. The experiment shows the accuracy on independent test patients up to 0.8.

Achievements: One paper submitted.

2018 **GPU based accelerator for beamformer of multi-transmission ultrasound imaging modalities**. (Independently)

Details: We develop a CUDA based framework to accelerate two beamformers: Delay and Sum algorithm, and Joint Transmitting-receiving Minimum Variance algorithm. The parallel computing capacity of GPU and memories in different levels are fully utilized.

Achievements: The speeds of imaging algorithms are accelerated 100 and 20 times respectively using one Titan V GPU compared with CPU; One paper submitted.

2017- 2018

Design of a 128-channel FPGA-based platform for development and real-time implementation of new ultrasound methods. (Major participant)

Details: Surrounding the 128-channel Sonosray Ultrasound Transducer, we design a matched FPGA-based transceiver and its power, clock circuits.

Achievements: Our platform achieved the 3rd prize in the 2018 National Biomedical Engineering Challenge.

2017

Inertial sensor based real-time monitoring system for ultra-deep mine elevator attitude. (Independently)

Details: Based on inertial sensor (STIM300) and DSP (C6748), we design a monitoring system. The inertial sensor acquires the linear accelerations and angular rates along three axes. In solving the attitude matrix using Quaternion, we compare Extended Kalman Filter (EKF), Complementary Filter (CF) and Gradient Descent Algorithm (GDA) to fuse the sensor data.

Achievements: In the experiment, we obtain stable and accurate Roll and Pitch angle of the elevator.

Academic Projects

Autumn 2018

ASIC and FPGA design of 64 points FFT processor. (Major participant)

Details: We implement the 4-based Cooley-Tukey algorithm using Verilog and C++ simulation. The hardware design is then validated on ASIC and FPGA respectively.

Bluetooth communication system simulation. (Major Participant)

Details: We use Matlab to simulate the GFSK modulator and design a demodulator to enhance its performance better than 4 dB when BER is set as 0.01.

Spring 2018

Building a video surveillance and controlling IoT system. (Major Participant)

Details: Distance signal acquired by ultrasound sensor is used to trigged camera to take picture of the coming cars. Afterwards, we utilize an API to recognize the license and model, deciding if the motor would open the gate.

Sobel Application on the Xilinx Zynq Zedboard. (Major Participant)

Details: A webcam is used for the input data stream, and the output stream is shown on the HDMI display in real-time. The Sobel algorithm is implemented on FPGA to achieve real-time face detection and some edge augmentation.

Challenges

2019

The 7th place among 106 global teams in the International Conference on Medical Image Computing and Computer-assisted Intervention (MICCAI 2019) Challenge: KiTS 19.

2018

The 3rd prize in the National Data Mining competition held by Peking University.

The 3rd prize in the National Biomedical Engineering Competition.

Undergraduate

The 2nd prize of the Hunan Province Mathematical Contest in Modeling (2012).

The 2nd prize of the Hunan Province Mechanics Competition (2012).

Selected Coursework

Graduate

UTU: Machine Learning and Algorithms Seminar

UTU: FPGA Prototyping

UTU: IoT Systems: Design and Applications

UTU: Advanced Sensor Networking

Graduate	Fudan: Digital Signal Processing: Theory and Practice Fudan: High-Speed Electronic System Design Fudan: Wireless Communication Engineering Fudan: Digital Signal Processing VLSI Design Fudan: Parallel Computing: Architecture and Programming
Undergraduate	CSU: Fundament of Mechanical Control Engineering CSU: Principle & Application of Microcomputer CSU: Hydraulic Transmission and Control CSU: Fundament of Mechanical Design

Skills and Interests

Skills	**Language:** English, Mandarin Chinese. **Coding:** C++, Python, CUDA, MATLAB, Verilog, VHDL. **Deep Learning:** Pytorch, Tensorflow, Keras. **Drawing:** AutoCAD, Pro/E.
Interests	Tennis, Hiking., Ice Skating Swimming, Travelling., Skiing

Awards

Graduate	1st Prize of Fudan Academic Scholarship (2019). 3rd Prize of Fudan Academic Scholarship (2018).
Undergraduate	Outstanding Graduate of Hunan Province (2014). Outstanding Graduate of Central South University (2014). Honored Student of Central South University (100 medalists appointed from 40,000 students, 2012). The 1st Prize of CSU Academic Scholarship (2011, 2012). National Endeavor Scholarship (2011). The 2nd Prize of Sanward Scholarship (2011).

Publications

2019	Zhao, Wenshuai, and Zengfeng Zeng. "Multi Scale Supervised 3D U-Net for Kidney and Tumor Segmentation." arXiv preprint arXiv:1908.03204 (2019).

Referees

Lirong Zheng

Professor and Dean of ICT School at Fudan University, also as Full Professor/ Chair Professor in Media Electronics at KTH.

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Zhuo Zou

Professor of Electronic and Computer Systems, Fudan University, also as Adjunct Professor & Docent, University of Turku.

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