SHULIN ZHAO

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SUMMARY AND OBJECTS

I am a fifth-year Ph.D candidate in Computer Science at Penn State, USA. I enjoy doing research to solve real world design challenges. I have strong engineering and research experiences, with 8 publications on top-tier conferences. *I am seeking full-time positions in fall 2021, in the areas of AI-powered IoT/Edge, VR/AR, and Video Processing.*

EDUCATION

Pennsylvania State University *2016 - present*
Ph.D. Candidate in Computer Science and Engineering
Advisors: *Dr. Mahmut Taylan Kandemir*, *Dr. Anand Sivasubramaniam*, and *Dr. Chita Das*
Overall GPA: 3.7/4.0

Shandong University *2013 - 2016*
M.S. in Computer Science and Technology
Overall GPA: 3.8/4.0

Shandong University *2008 - 2012*
B.S. in Control Science and Engineering
Overall GPA: 3.2/4.0

RESEARCH

1. Video Processing 2017 - present
Computer System Lab (CSL) *Pennsylvania State University*

a) Virtual Reality (VR) 360^o Video Processing *First-authored*
· Reduction in data size by data-flow optimizations in Codecs
· Control-flow memoization in GPU to bypass computes

b) Video Compression *Co-authored*
· Reduce memory access by hardware caching
· Greater compression by crossing out non-critical bits

2. Internet of Things 2017 - present
Computer System Lab (CSL) *Pennsylvania State University*

a) Enable DNN Inference on Edge *First-authored*
· Boost throughput via distribution of DNN inference in local IoT
· Model-SoC co-design to optimize AI applications in IoT
· Enhance framework to scale-out and scale-up/down

b) Sensing Events Optimization *First-authored*
· Near-data-compute by local batching and kernel bypassing
· Energy-efficient IoT executions by dynamic partitioning

3. Mobile Systems [*Note: Joined late*] 2016 - 2017
Computer System Lab (CSL) *Pennsylvania State University*

a) Speedup CPU Execution on Mobile Phones *Co-authored*
· Fuse critical instruction chains as macro units and execute them earlier
· Identify such critical instruction chains with an offline profiler
· Double the fetch bandwidth by exploiting ARM's 16-bit ISA with a customized compiler

b) Relief Memory Stress *Co-authored*
· Schedule memory requests with a global view of all accelerators on mobile phones

INTERNSHIP EXPERIENCE

Kwai Inc 05/2020 - 08/2020
Y-Lab, Palo Alto, CA, USA *Research Intern*

· Neural Network (NN) model compression and compiler optimizations on edge devices

Lenovo 04/2016 - 08/2016
Networking and System, Shanghai, China *Software Engineer*

· Lenovo OpenStack backend manager, Horizon, monitor plugins

Inspir 04/2014 - 04/2015
Technology Center, Jinan, Shandong, China *Intern Engineer*

· Speedup Read/Write by memory reservation and cache re-allocation

SELECTED PUBLICATIONS

[C1]. Prasanna V. Rengasamy, Haibo Zhang, **Shulin Zhao**, Anand Sivasubramaniam, Mahmut Kandemir, Chita Das. "Selective Event Processing for Energy Efficient Mobile Gaming with SNIP", *To Appear In Proceedings of the 2020 IEEE International Symposium on Workload Characterization.* **(Accepted, IISWC 2020)**

[C2]. **Shulin Zhao**, Haibo Zhang, Sandeepa Bhuyan, Cyan S. Mishra, Ziyu Ying, Mahmut Kandemir, Chita Das, Anand Sivasubramaniam. "Deja View: Spatio-Temporal Compute Reuse for Energy-Efficient 360-degree VR Video Streaming", *To Appear In Proceedings of the 47th IEEE/ACM International Symposium on Computer Architecture.* **(Accepted, ISCA 2020)**

[C3]. Haibo Zhang, **Shulin Zhao**, Ashutosh Pattnaik, Mahmut Kandemir, Anand Sivasubramaniam, Chita Das. "Distilling the Essence of Raw Video to Reduce Memory Usage and Energy at Edge Devices", *In Proceedings of The 52th Annual IEEE/ACM International Symposium on Microarchitecture.* **(MICRO 2019)**

[C4]. **Shulin Zhao**, Prasanna V. Rengasamy, Haibo Zhang, Sandeepa Bhuyan, Nachiappan C. Nachiappan, Anand Sivasubramaniam, Mahmut Kandemir, Chita Das. "Understanding Energy Efficiency in IoT App Executions", *In Proceedings of The 39th IEEE International Conference on Distributed Computing Systems.* **(ICDCS 2019)**

[C5]. Prasanna V. Rengasamy, Haibo Zhang, **Shulin Zhao**, Nachiappan C. Nachiappan, Anand Sivasubramaniam, Mahmut Kandemir, Chita Das. "CritICs Critiquing Criticality in Mobile Apps", *In proceedings of The 51th Annual IEEE/ACM International Symposium on Microarchitecture.* **(MICRO 2018)**

[C6]. Haibo Zhang, Prasanna V. Rengasamy, Nachiappan C. Nachiappan, **Shulin Zhao**, Anand Sivasubramaniam, Mahmut Kandemir, Chita R Das. "FLOSS: FLOw Sensitive Scheduling on Mobile Platforms", *In Proceedings of the 55th Annual Design Automation Conference.* **(DAC 2018)**

[C7]. Prasanna V. Rengasamy, Haibo Zhang, Nachiappan C. Nachiappan, **Shulin Zhao**, Anand Sivasubramaniam, Mahmut Kandemir, Chita Das. "Characterizing Diverse Handheld Apps for Customized Hardware Acceleration", *In proceedings of 2017 IEEE International Symposium on Workload Characterization.* **(IISWC 2017)**

[C8]. Haibo Zhang, Prasanna V. Rengasamy, **Shulin Zhao**, Nachiappan C. Nachiappan, Anand Sivasubramaniam, Mahmut Kandemir, Ravi Iyer, Chita Das. "Race-to-sleep + Content Caching + Display Caching: a Recipe for Energy-efficient Video Streaming on Handhelds", *In proceedings of The 50th Annual IEEE/ACM International Symposium on Microarchitecture.* **(MICRO 2017)**

TEACHING EXPERIENCE

Teaching Assistant, Penn State Fall 2016
Operating Systems *CMPSC 473*

Guest Lecture, Penn State

· *CSE 597*: Advances and Applications in Deep Learning Spring 2017
· *CSE 598*: Advances in Computer Architecture Fall 2018

TALKS

Deja View: Spatio-Temporal Compute Reuse for Energy-Efficient 360-degree VR Video Streaming
ISCA 2020 — *June 2020, Online*

Understanding Energy Efficiency in IoT App Executions — July 2019
ICDCS 2019 — *Dallas, Texas, USA*

HONORS AND AWARDS

Student Travel Grant

· Travel Grant for MICRO — October 2017
· Travel Grant for ICDCS — July 2019

REFERENCES

References are available on request.