Md Rubel Ahmed

(+1)813-570-5540 | rubelahmed.github.io | mdrubelahmed@usf.edu

SUMMARY

- Developed frameworks for SoC trace mining
- Working knowledge of MIPS, RISC-V, x86 architectures
- Computer Architecture and FPGA design teaching experience

EDUCATION

Ph.D. in Computer Science and Engineering *July 2023 (Exp.)*
University of South Florida, Tampa, FL CGPA: 3.81/4.00

M.S. in Computer Engineering *May 2022*
University of South Florida, Tampa, FL CGPA: 3.91/4.00

B.S. in Computer Science and Engineering *March 2017*
Khulna University of Engineering and Technology, Bangladesh CGPA: 3.23/4.00

TECHNICAL STRENGTHS

Programming Languages	C/C++, Python
EDA Tools	Vitis HLS, Modelsim, Xilinx ISE Webpack, Vivado HLx
Architectural Simulator	Simplescalar, and gem5
Miscellaneous	Data Mining, Deep Learning, VHDL, Verilog, Z3 solver, Make, Git, Vim, Linux

EXPERIENCE

Research Intern *Sept. 2022 - Present*
Mitsubishi Electric Research Laboratories, Cambridge, MA
- Developed ML model for a target application
- High-Level Synthesis for ML models
- FPGA Development

Research Assistant *August 2019 - August 2022*
The SEES Lab, U. of South Florida, Tampa, FL
- Instrumented and generated traces from SoCs modeled in VHDL, gem5, Rocket Chip Generator
- Developed an algorithm for automatic specification generation using data mining techniques
- Mentored Research Experience for Undergrad (REU) students

Course Instructor *May 2019 - July 2022*
University of South Florida, Tampa, FL
- Computer Architecture (Summer 2022, 2019)
- Computer Architecture Lab (Summer 2022)

Teaching Assistant *August 2018 - July 2022*
University of South Florida, Tampa, FL
- FPGA Design (Spring 2020)
- Computer Architecture (Fall 2019)
- System Integration and Architecture (Spring 2019)

Software Engineer *Nov 2017 - July 2018*
Synchronous ICT, Dhaka, Bangladesh
- Worked on multimedia processing using FFMPEG.
- Developed data-driven cross-platform mobile app using React Native.

ACADEMIC/SIGNIFICANT PROJECTS

- **>128 bit prime factorizer :** Designed FPGA implementation of prime factorizer for larger numbers >128 bit using VHDL and implemented on Zedboard.
- **Single Cycle Processor:** Designed a single cycle processor consisting of ALU, and multibank main memory in logisim.
- **Memory system performance analysis:** Analyzed memory system performance using gem5 simulator and 4 SPEC-CPU2000 benchmarks.
- **Addition and Multiplication matrix operations:** Designed an FSM controller to implement the multiplication and addition logic using Vivado and prototyped on Zed board.

PUBLICATIONS

J2 Shuvo, Salman Sadiq; Symum, Hasan; **Ahmed, Md Rubel**; Yilmaz, Yasin; Zayas-Castro, Jose L, "Multi-Objective Reinforcement Learning Based Healthcare Expansion Planning Considering Pandemic Events", IEEE Journal of Biomedical and Health Informatics (J-BHI, IF 7.021).

J1 Md Rubel Ahmed, Hao Zheng, Parijat Mukherjee, Mahesh C. Ketkar, Jin Yang, "Mining Patterns From Concurrent Execution Traces", IEEE Transactions on Computer-Aided Design of Integrated Circuits & Systems (TCAD, h5 53).

C6 Hao Zheng, **Md Rubel Ahmed**, Parijat Mukherjee, Mahesh C. Ketkar, Jin Yang, "Model Synthesis for Communication Traces of System Designs", The 39^{th} IEEE International Conference on Computer Design (ICCD'21).

C5 Md Rubel Ahmed, Hao Zheng, Parijat Mukherjee, Mahesh C. Ketkar, Jin Yang, "A Comparative Study of Specification Mining Methods for SoC Communication Traces" (ISVLSI'21).

C4 Salman Sadiq Shuvo , **Md Rubel Ahmed**, Hasan Symum, Yasin Yilmaz, "Deep Reinforcement Learning Based Cost-Benefit Analysis for Hospital Capacity Planning", International Joint Conference on Neural Networks (IJCNN'21).

C3 Md Rubel Ahmed, Hao Zheng, Parijat Mukherjee, Mahesh C. Ketkar, Jin Yang, "Mining Message Flows from System-on-Chip Execution Traces", The 22^{nd} International Symposium on Quality Electronic Design (ISQED'21).

C2 Salman Sadiq Shuvo, **Md Rubel Ahmed**, Sadia Binta Kabir, Shaila Akter Shetu, "Application of Machine Learning Based Hospital Up-gradation Policy for Bangladesh", 7^{th} Int'l Conf. on Networking, Systems and Security (NSysS'20).

C1 Amit Sutradhar, Md. Samiul Haque Sunny, Manash Mandal, **Rubel Ahmed**, "Design and construction of an automatic electric wheelchair: An economic approach for Bangladesh", 2017 3^{rd} International Conference on Electrical Information and Communication Technology (EICT'17).

PREPRINTS

C2 Ahmed, Md Rubel and Zheng, Hao, "Deep Bidirectional Transformers for SoC Flow Specification Mining", publisher: arXiv, 2022, doi:10.48550/ARXIV.2203.13182

C1 Ahmed, Md Rubel and Nadimi, Bardia and Zheng, Hao, "Mining SoC Message Flows with Attention Model", publisher: arXiv, 2022, doi:10.48550/ARXIV.2209.07929.

POSTERS/PRESENTATION

P7 Md Rubel Ahmed, Hao Zheng, "Model Synthesis for Communication Traces of Systems Designs", WIP paper at 58^{th} Design and Automation Conference (DAC), Dec. 2021.
P6 Md Rubel Ahmed, Hao Zheng, "Model Synthesis for Communication Traces of System-on-Chip Designs", USF Annual Graduate Research Symposium. Sept. 2021
P5 Md Rubel Ahmed, Hao Zheng, "Mining Message Flows from SoC Execution Traces", 57^{th} Design and Automation Conference (DAC), Jun 2020.
P4 Md Rubel Ahmed, Yuting Cao, Hao Zheng, "Specification Mining for SoC Validation using Data Mining Techniques", 56^{th} Design and Automation Conference (DAC), Jun 2019.
P3 Md Rubel Ahmed, Yuting Cao, Hao Zheng, "Message Flow Mining for SoC Validation for Safe and Secure IoT Edge Node Design", Warren B. Nelms Annual IoT Conference, Dec 2019.
P2 Md Rubel Ahmed, Yuting Cao, Hao Zheng, "Execution Trace Mining for SoC Validation for Safe and Secure IoT Edge Node Design", IFIP International Internet of Things Conference, Oct 2019.
P1 Md Rubel Ahmed, Yuting Cao, Hao Zheng, "Specification Mining from Message Flows for SoC Validation", 2019 FICS Research Conference on Cybersecurity, Mar 2019. doi: 10.1109/MDAT.2015.2499272

PROFESSIONAL ACTIVITIES

- Reviewed article for IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
- Treasurer for IEEE-CS USF Student Chapter (2020 - 2022)
- Judge for 2021 USF Undergraduate Research Conference
- Registered volunteer for Meals on Wheels of Tampa
- Volunteer of IFIP IoT Annual Conference 2019

AWARDS

- USF Engineering Alumni Society Scholarship'22
- NSF travel grant for ISVLSI'21
- USF Student Govt. travel grant for ISQED'21
- Young Fellow (58^{th} DAC, 2021)
- A. Richard Newton Young Student Fellowship award: 56^{th}(2019) and 57^{th}(2020) Design Automation Conference