Sathwika Bavikadi

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An Innovative and committed PhD student with strong skills in Machine Learning, Computer Architecture, and Signal Processing also looking forward for an opportunity to take pleasure in learning new skills to tone my knowledge and experience in Research and Development with enthusiasm, honesty and hard work.

Education

Doctor of Philosophy (Ph.D.) in Electrical and Computer Engineering **January 2020 - Present**
George Mason University, Fairfax, Virginia, USA

Master of Science in Electrical Engineering with emphasis in Signal Processing January 2016 - January 2018
Blekinge Institute of Technology, Karlskrona, Sweden

Bachelor of Technology in Electronics and Communications Engineering **September 2012 - January 2018**
Jawaharlal Nehru Technological University, Kukatpally, Hyderabad, India

Experience

Graduate Research Assistant
at George Mason University, *Fairfax,Virginia, USA*

- Worked in a team to develop the Machine learning algorithms like CNN, DNN to implement on hardware accelerators
- Worked on model optimization of CNN algorithms to work on tiny memory platforms like non-von Neumann computing architectures
- Worked on developing a new computing system to enable ML acceleration.

Technologies Used: Python, TensorFlow, Pytorch, C++, VHDL, Verilog, Xilinx

Graduate Teaching Assistant
at George Mason University, *Fairfax,Virginia, USA*

- Worked as an Instructor for courses like Digital System Design with VHDL, FPGA Design with VHDL
- Worked as an Instructor for Learning from data, helped in designing the Machine Learning based assignment

Technologies Used: Python, TensorFlow, Pytorch, VHDL, Verilog, Xilinx

Visiting Research Assistant **May 2021 to August 2021**
at University of Southern California- Information Sciences Institute *Arlington, Virginia, USA*

- Working on implementing ML on Side-channel analysis (SCA)
- Working on generation of power traces using FPGAs like Artix, Virtex board using chipwhisperer platform for SCA

Technologies Used: Python, TensorFlow, VHDL, C/C++, Xilinx

PD Baseband Developer **August 2017 to February 2020**
at Ericsson *Lund, Sweden*

- Mainly working on the L1 Physical layer and in Uplink section
- Implementation of 5G baseband architecture, functionality and features. 5G feature systemization and participate in pre-studies as needed

Technologies Used: Python C, C++, Unix, Jira, Git, UML

Summer Internship **June 2016 to August 2016**
at Defence Electronics Research Laboratory (DLRL) *Hyderabad, India*

- Summer internship project entitled The methods of reducing noise reducing and enhancing the signal-to-noise ratio in the Signal Processing lab at DLRL

Technologies Used: MATLAB

Engineering Trainee **June 2015 to July 2015**
at Advance Training Institute Electronics & Process Instrumentation (ATI-EPI) *Hyderabad, India*

- The summer training was based on Advanced Embedded System Programming & Application Development.
- Gained skills in Assembly Level Programming, experience in programming and implementation of the same on the 8086 microprocessor, 8051, PIC, ARM microcontroller kits as an experiment

Technologies Used: C/C++, Assembly language

Technical Skills

Programming Languages: 80x86 Assembler, C/C++, Python, CUDA, VHDL, Verilog
Scientific softwares: MATLAB, Simulink, Scilab, Lab-VIEW
ML libraries and frameworks: TensorFlow, Keras, PyTorch,Caffe, OpenCV, scikit-learn, numpy, pandas, matplotlib
Software and IDE Tools: Visual Studio, PyCharm, Spyder, Jupyter notebook, Eclipse, Visual DSP++, Xilinx
Office softwares: Microsoft Office, Libre Office, LaTeX, DocBook
Operating system: iOs, Linux, Windows, Unix

Coursework

Learning from Data, Neural Networks, Deep Machine learning, Hardware accelerator for ML, Digital System Design with VHDL, Advanced Microprocessor & Micro controllers, Advanced Computer Architecture, Adaptive Signal Processing, Multidimensional signal processing, Digital signal processing, Applied adaptive signal processing, Antenna wave theory, Network Security and Cryptography

Projects

Master Thesis: Estimation and correction of the distortion in forensic image due to rotation in the photo camera: It has several applications in Computer Vision, Image Processing fields. The thesis proposes two different methods for addressing the problem of rotation caused by the photo camera in the case of forensic images. Implementation is done in MATLAB.

Bachelor Thesis: Face Recognition using PCA Algorithm: It is a Biometric Application, it presents a methodology for face recognition based on information theory approach of coding and decoding the face image. Implementation is done in MATLAB

Other projects: • GPU Accelerated Beam-forming, • IoT-based indoor human-presence detection using PIR sensor, • Chirp-based acoustic radar, • Image enhancement and restoration using signal processing techniques, • Secured transmission of Image using run-length encoding, • Fetal heartbeat recognition.

Selected Publications

Conference Papers:

1. **Bavikadi, Sathwika**, Purab Ranjan Sutradhar, Mark A. Indovina, Amlan Ganguly, and Sai Manoj Pudukotai Dinakarrao. Polar: Performance-aware on-device learning capable programmable processing-in-memory architecture for low-power ml applications. In *2022 25th Euromicro Conference on Digital System Design (DSD)*, pages 889–898, 2022
2. **Bavikadi, Sathwika**, Purab Ranjan Sutradhar, Amlan Ganguly, and Sai Manoj Pudukotai Dinakarrao. upim: Performance-aware online learning capable processing-in-memory. In *2021 IEEE 3rd International Conference on Artificial Intelligence Circuits and Systems (AICAS)*
3. **Bavikadi, Sathwika**, Purab Ranjan Sutradhar, Khaled N. Khasawneh, Amlan Ganguly, and Sai Manoj Pudukotai Dinakarrao. A review of in-memory computing architectures for machine learning applications. GLSVLSI '20

Journal Articles:

1. **Bavikadi, Sathwika**, Abhijitt Dhavlle, Amlan Ganguly, Anand Haridass, Hagar Hendy, Cory Merkel, Vijay Janapa Reddi, Purab Ranjan Sutradhar, Arun Joseph, and Sai Manoj Pudukotai Dinakarrao. A survey on machine learning accelerators and evolutionary hardware platforms. *IEEE Design & Test*, 39(3):91–116, 2022
2. P. R. Sutradhar, **S. Bavikadi**, M. Connolly, S. K. Prajapati, M. A. Indovina, S. M. Pudukotaidinakarrao, and A. Ganguly. Look-up-table based processing-in-memory architecture with programmable precision-scaling for deep learning applications. *IEEE TPDS*, 2021
3. P. R. Sutradhar, M. Connolly, **S. Bavikadi**, S. M. Pudukotai Dinakarrao, M. A. Indovina, and A. Ganguly. pPIM: A programmable processor-in-memory architecture with precision-scaling for deep learning. *IEEE Computer Architecture Letters*, 2020

Professional Activites

Books Writing Assistance: Machine Learning for Computer Scientists and Data Analysts from an Applied Perspective.
Reviewer : SUSCOM 2023, ICCD 2022.
Contributed talks: Presented my PhD work at ICONS 2021 Doctoral Consortium.
Awards and Recognition: • Selected for 58th, 59th DAC Young fellowship Program. • Achieved 50% Scholarship during masters program (2016). • Ranked 17 out of thousands in IIMDP JNTU Kakinada Entrance Examination (2012).
Leadership Experiences: • I was Team Leader for a team of 4 members for my Bachelor thesis (2016). • At Ericsson was the Scrum master for the team I worked with, as well as a lead driver for Ericsdotter (female network in Ericsson) (2018-2019) • President of a Yoga Club at George Mason University (2020-2023)

References

- Dr. Sai Manoj PD, Assistant Professor, George Mason University, USA - spudukot@gmu.edu
- Dr.Amlan Ganguly, Associate Professor and HOD of CE, Rochester Institute of Technology, USA - axgeec@rit.edu
- Dr. Benny Lovstrom, Associate Professor and Dean, Blekinge Institute of Technology, Sweden - benny.lovstrom@bth.se
- Dr. Andrew Schmidt, Senior Computer Scientist, University of Southern California, USA. - aschmidt@isi.edu