Burhan Ahmad **Mudassar**

Machine Learning and Hardware Systems Engineer & Ph.D Student

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Summary

Graduate Research Assistant at GREEN Lab, currently working on a Ph.D under the supervision of Dr. Saibal Mukhopadhyay. My thesis is focused on smart cameras with integrated on-camera machine learning algorithms. 2+ years experience with Deep Learning Frameworks for Computer Vision. 3+ years experience in RTL design with Verilog. Interested in working in a cross-platform team focused on solving both hardware and software challenges.

Education

NUST(National University of Sciences and Technology) — *Islamabad, Pakistan*

B.S. in Electronics Engineering — *Aug 2008 - Aug. 2012*

- Awarded Chancellor's Silver Medal for securing 2nd place within the batch

Georgia Institute of Technology — *Atlanta, GA, USA*

M.S. in Electrical and Computer Engineering — *Aug 2013 - May 2015*

- Specialized in VLSI

Georgia Institute of Technology — *Atlanta, GA, USA*

Ph.D in Electrical and Computer Engineering — *Aug 2016 - Exp Aug 2020*

- High-level vision tasks for embedded platforms

Work Experience

Georgia Institute of Technology — *Atlanta, USA*

Graduate Research Assistant — *Jan 2017 - PRESENT*

- Efficient Algorithms and Hardware for Deep Learning
- Deep Learning based Feedback control of Camera Parameters
- Intelligent Applications and Enablers for Smart Cameras

Georgia Institute of Technology — *Atlanta, USA*

Graduate Teaching Assistant — *Aug 2016 - May 2017*

- Conducted office hours and assignment grading for ECE 6122 – Advanced Programming Techniques with C++
- Created assignments with autograding and conducted office hours for ECE 8813 – Adv. Digital Design with Verilog

Center for Advanced Research in Engineering (CARE) — *Islamabad, Pakistan*

Senior Design Engineer — *May 2015 - July 2016*

- Development of Software Defined Radio Unit
- Hardware/Software Co-Design of waveform transceivers on FPGA+DSP
- Implemented CPM Coarse Timing Recovery, Carrier Phase and Frequency Offset Module in FPGA
- Implemented GMSK Frequency Hopping Modulator on TI TMS320C64X DSP

Georgia Institute of Technology — *Atlanta, USA*

Graduate Research Assistant — *Jan 2014 - May 2015*

- Master's Thesis: Energy-Aware, Energy Efficient Moving Object Detection Module on FPGA

China Mobile Pakistan (Zong) — *Islamabad, Pakistan*

Sr. Officer NSS — *July 2012 - Aug 2013*

- Operations and Maintenance for NSS Nodes including MSC, MGW, HLR

YouPark — *Islamabad, Pakistan*

Intern — *Oct 2011 - Mar 2012*

- Created a Financial Management Application with OCR Receipt Scanning on the Android Mobile Platform

COGNET-SEECS (Cognitive Radio Research Group) — *Islamabad, Pakistan*

Intern — *July 2011 - Aug 2011*

- Implemented tree based channel assignment algorithms in Network Simulator 2

HSSD-SEECS (Hybrid Solid State Disk Research Group) *Islamabad, Pakistan*

Intern *Jan 2011 - Feb 2011*

- Developed controller RTL for NAND Flash and MRAM chips in Verilog and implemented them on a Virtex 5 FPGA

AMSG-SEECS (Analog and Mixed-Signal Research Group) *Islamabad, Pakistan*

Intern *Jul 2010 - Aug 2010*

- Developed Mouse and Keyboard RTL based firmware on Spartan II FPGA kit

Honors & Awards

2012	**1st place**, ICT-COMPPEC Digital Systems Category	*Islamabad, Pak*
2012	**Best Industrial Project**, NUST-SEECS Open House	*Islamabad, Pak*
2013	**Gold Medal for Best Research Project**, 6th UG Convocation NUST-SEECS	*Islamabad, Pak*
2013	**Silver Medal for Securing 2nd Position in Batch**, 6th UG Convocation NUST-SEECS	*Islamabad, Pak*
2013	**Fulbright Scholarship**, MS in ECE at Georgia Tech	*Atlanta, USA*

Skills

1. **Programming Languages:** Python, C/C++, System Verilog, TCL
2. Pytorch/Tensorflow/Caffe 3. Cadence Virtuoso

Publications

Journal Publications

1. Jong Hwan Ko, **Mudassar, Burhan Ahmad**, and Saibal Mukhopadhyay. An energy-efficient wireless video sensor node for moving object surveillance. *IEEE Transactions on Multi-Scale Computing Systems*, 1(1):7–18, 2015

Conference Publications

1. Jong Hwan Ko, **Mudassar, Burhan**, Taesik Na, and Saibal Mukhopadhyay. Design of an energy-efficient accelerator for training of convolutional neural networks using frequency-domain computation. In *54th ACM/EDAC/IEEE Design Automation Conference (DAC)*. IEEE, 2017
2. Ramyad Hadidi, Bahar Asgari, **Mudassar, Burhan Ahmad**, Saibal Mukhopadhyay, Sudhakar Yalamanchili, and Hyesoon Kim. Demystifying the characteristics of 3d-stacked memories: A case study for hybrid memory cube. In *IEEE International Symposium on Workload Characterization (IISWC)*. IEEE, 2017
3. Ramyad Hadidi, Bahar Asgari, Jeffrey Young, **Mudassar, Burhan Ahmad**, Kartikay Garg, Tushar Krishna, and Hyesoon Kim. Performance implications of nocs on 3d-stacked memories: Insights from the hybrid memory cube. In *IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*. IEEE, 2018
4. Saibal Mukhopodhyay, Marilyn Wolf, Mohammed F Amir, Evan Gebahrdt, Jong Hwan Ko, Jae Ha Kung, and **Musassar, Burhan A**. The camel approach to stacked sensor smart cameras. In *Conference on Design, Automation Test in Europe (DATE)*, 2018
5. **Mudassar, Burhan A**, Jong Hwan Ko, and Saibal Mukhopadhyay. An unsupervised anomalous event detection framework with class aware source separation. In *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, 2018
6. **Mudassar, Burhan A**, Jong Hwan Ko, and Saibal Mukhopadhyay. Edge-cloud collaborative processing for intelligent internet of things: A case study on smart surveillance. In *55th ACM/ESDA/IEEE Design Automation Conference (DAC)*. IEEE, 2018
7. Priyabrata Saha, **Mudassar, Burhan A**, and Saibal Mukhopadhyay. Adaptive control of camera modality with deep neural network-based feedback for efficient object tracking. In *15th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS)*. IEEE, 2018
8. **Mudassar, Burhan A**, Priyabrata Saha, Yun Long, Mohammed F Amir, Taesik Na, Jong Hwan Ko, Marilyn Wolf, and Saibal Mukhopadhyay. A camera with brain - embedding machine learning in 3d sensors. In *Conference on Design, Automation Test in Europe (DATE)*, 2019
9. **Mudassar, Burhan A** and Saibal Mukhopadhyay. Focalnet - foveal attention for post-processing dnn outputs. In *International Joint Conference on Neural Networks (IJCNN)*, 2019
10. Taesik Na, Minah Lee, **Mudassar, Burhan A**, Priyabrata Saha, Jong Hwan Ko, and Saibal Mukhopadhyay. Mixture of pre-processing experts model for noise robust deep learning on resource constrained platforms. In *International Joint Conference on Neural Networks (IJCNN)*, 2019