Aswin Natesh Venkatesh

Digital Design Engineer at InvenSense · Embedded Systems & Digital Design Enthusiast

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Experience

TDK InvenSense Inc. *San Jose, CA*

FPGA Design Engineer *Jan. 2019 - Present*

- Current role emphasizes on ASIC/FPGA hardware design for motion sensor products.
  - FPGA Design
    - Integrating Digital and Analog models on Xilinx FPGAs platform for design emulation and system validation
    - Define FPGA architecture, RTL Synthesis and timing analysis and optimization
    - Setup and manage continuous integration using Jenkins pipeline, version control for IP's using Git
  - ASIC Design
    - Define architecture, Implement logic design for 32-bit Edge Motion Processor IP operating at 6Mhz (110nm)
    - Collaborate with cross-functional teams to layout ISA, model simulator, assemblers and test-bench development
    - Support Verification team with and address RTL bugs, writing assertions and achieve max code coverage
    - Provided on-going maintenance support for Satellite IPs, Memory blocks and vendor IPs
    - Analyse Lint, Synthesis, Power, CDC reports for issues and address issues as required
  - HW/SW System Validation
    - Develop validation test cases for FPGA pre-release validation and sanity testing
    - Develop automated simulation to validation test conversion suite for rapid debug
    - Extensive bench testing and debug using logic analyzers, oscilloscopes, and protocol analyzers (SPI/I2C/I3C)
    - Support new hardware bring-up for FPGA and Silicon LGA/LCC motion sensors

TDK InvenSense Inc. *San Jose, CA*

Hardware Engineering Intern (ADC-FPGA protoyping) *May. 2018 - Aug. 2018*

- Designed and Implemented a Hi-Speed 14 Bit 150 MSPS ADC-FPGA System (Cyclone V) for sampling raw Ultrasonic (PZT) Signals.
- Task involved selection of ADC, FPGA& design of front-end low-noise amplifiers, impedance matching circuits signal conditioning.
- Part of Advanced Technology Group, working on next-gen sensors guided by Dr. Peter Hartwell, CTO at TDK InvenSense Inc.

Solarillion Foundation *Chennai, India*

Research Assistant | Undergraduate Research Assistant (earlier) *Aug. 2015 - May. 2017*

- Lead authored 2 publications and led 2 projects on smart and assistive living.
- Technical lead in the design and development of device test-bench & Custom Made Sensors.
- Mentored undergraduate students and peers in embedded systems and hands-on circuit debugging.

Skills

Bus Protocols	AMBA AHB • AMBA APB • SPI 3W/4W • I2C
Programming	Verilog, System Verilog, Python, Embedded C, Shell, Jenkins
Hardware Platforms	Altera Cyclone V • Xilinx Zynq • Atmel Family • MBED/ARM Cortex • Nordic BLE's
EDA/Software Tools	Cadence Xcellium, Genus • Synopsys Design Compiler, Spyglass • Xilinx Vivado • IAR Workbench • KEIL μVision
Validation Tools	JTAG debugger • Logic/protocol Analyzer • Meters • Oscilloscopes • Signal generators
Expertise	Sensor System Development • Rapid Prototyping using MPU's & FPGA's • Board & IP Level Bring-Up

Education

Stony Brook University *Stony Brook, NY*

Masters in Electrical Engineering - (GPA 3.50/4.00) *Aug. 2017 - Dec. 2018*

Concentration: Computer Architecture, Digital logic design, System specification and modelling
Research: Worked under Prof. Shan Lin on areas of Cyber Physical Systems and Sensor Networks

Anna University *Chennai, India*

Bachelors in Engineering, Electrical and Electronics Engineering *Aug. 2012 - Apr. 2016*

Select Projects

Micro-Architecture of Synergistic Processing Unit of Sony Cell — *Stony Brook, NY*

Part of Graduate Coursework "Computer Architecture" — *Jan 2018 - May 2018*

- Designed a SONY Cell Processor Architecture (SPU) that includes the detection of structural, data and control hazards. Involves behavioral modeling at RTL level using System Verilog to simulate the instruction flow in the pipelined processor.

Logic simulation and ATPG using PODEM — *Stony Brook, NY*

Part of Graduate Coursework "Advanced VLSI System Testing" — *Jan 2018 - May 2018*

- Implemented an algorithm in C++ to generate correct output of a large digital circuit. The algorithm also makes use of PODEM for Automatic Test Pattern Generation (ATPG) to find test vectors which detects all single stuck at faults in the circuits.

Hardware Generation Tool for ASIC — *Stony Brook, NY*

Part of Graduate Coursework "Adv. Digital System Design and Generation" — *Aug 2017 - Dec 2017*

- Developed a C++ based accelerated hardware generator(System Verilog) for performing Matrix Vector Multiplication with configurable 3 layer neural network, and an algorithm that effectively optimizes the hardware for the required degree of parallelism.

Research Publications

Low-Cost Wireless Intelligent Two Hand Gesture Recognition System — *Montreal, Canada*

Published at 2017 Annual IEEE Systems Conference (SysCon), Canada (goo.gl/dMd8Uz) — *Apr. 2017*

- Led the design implementation of a two hand gesture recognition system to recognize static gestures across 8 globally used sign languages and aid the audio vocally impaired. - Architected the hardware software co-design for the system.

Low Cost Smart Glove for Universal Control of IR Devices — *Kerala, India*

Published at 2016 IEEE International Symposium on Technology and Society (ISTAS) (goo.gl/48lzLd) — *Nov. 2016*

- Developed a gesture recognition system that acts as an universal remote control for multiple consumer electronic appliances. A custom designed sensory glove is used as input to the system.

Intelligent Smart Helmets for Automatic Control of Headlamps — *Banglore, India*

Published at 2015 IEEE International Conference on Smart Sensors and Systems (goo.gl/FrgtcC) — *Oct. 2015*

- Developed a smart helmet that enhances road safety among motorcyclist by tracking the user gestures and providing better visual aid at night.

Achievements

2018	**Top 10**: BitCamp Hack 2018 - Best use of MLH Hardware	*Maryland, MD*
2018	**1st/36**: Hack @ CEWIT 2018 - Best use of CISCO'S MERAKI AP	*Stony Brook, NY*
2016	**Finalist**: AU Titan Hackathon 2015 - Anna University	*Chennai, India*
2015	**1st/200**: SVCE Innovates - Student Research Competition - 3 Consecutive Years	*Chennai, India*

Certifications

Object Oriented Programming using C++ — NIIT Limited, India | License:11CUZZZZZ9276

Advanced Programming in 'C' — NIIT Limited, India | License:10DJZZZZZ8932

Scientific Python — TDK InvenSense, San Jose