

Ibrahim Ahmed

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Education

Vanderbilt University

PhD in Electrical Engineering

Expected May 2021

Coursework in: High-Performance Computing, Algorithms, Real-time Systems, Image Processing, Computer Vision, Embedded Systems, Digital Electronics, Semiconductor Physics

BS Electrical Engineering and Physics

May 2016

Coursework in: Modeling and Simulation, Applied Machine Learning, Algorithms, VLSI Design, Microcontrollers, FPGA Design, Galactic and Stellar Astrophysics

Research Experience

Vanderbilt University Department of Electrical Engineering

Aug 2016 - Present

Graduate Researcher/Teaching Assistant

- Research and implement artificial intelligence based control on systems with faults.
- Design and compare various fault-tolerant control algorithms under environmental constraints.
- Mentor 7 electrical engineering design teams through their senior year capstone projects.

Vanderbilt University Department of Physics & Astronomy

Jun 2016 - Aug 2016

Research Assistant

- Studied formation of dark matter halos in galaxies via high performance computer simulations.
- Developed algorithms to fit data to ellipsoids to check against λ -Cold Dark Matter models of halo formation.
- Wrote a multiprocessor compatible data mining library to visualize 3.7TB of n-body physics simulation output.

Institute for Space and Defense Electronics, Vanderbilt University

Jun 2014 - Aug 2014

Research Intern

- Researched effects of solar and cosmic radiation on memory chips in space.
- Designed an interface in VHDL using a DE2 FPGA to test SRAM chips for single event upsets after irradiation.
- Documented code and interface operation procedures for use by graduate student researchers.

Relevant Projects

QLearning

<https://github.com/hazrmard/QLearning>

- Developed a framework for modeling hybrid environments with faults and learning optimal control behavior.
- Implemented hierarchical temporal difference learning with tabular and functional value approximations.

SatTrack

<https://github.com/hazrmard/SatTrack>

- Led a team of 5 engineers to develop a software-defined radio based satellite communication system.
- Designed an interactive front-end in JavaScript for hardware interface and trajectory visualization.

ingurPCA

<https://github.com/hazrmard/ingurPCA>

- Developed a machine learning library that employs dimensionality reduction to simplify text processing.
- Natively implemented supervised and unsupervised regression and classification algorithms.

Skills

Programming: Python, C, C++, Java, JavaScript, SQL, Go, Assembly, VHDL, Bash, Powershell

Libraries/Frameworks: Numpy, Flask, Django, OpenMP, CUDA, PETSc, AngularJS, D3.js

Applications: MATLAB, Mathematica, \LaTeX 2 ϵ , SPICE, Cadence

Other Experience

Schneider Electric

Jun 2015 - Aug 2015

Business Intelligence Intern

- Programmed SQL procedures to consolidate 40 million overlapping transactions into 1.5 million records.
- Rewrote periodic table back-up procedures to eliminate redundancies and reduced backup sizes by 75%.

Vanderbilt University Office of Residential Education

Aug 2015 - May 2016

Resident Adviser

- Identified residents facing academic or personal challenges and provided support.
- Arranged recreational and educational events like movie nights and talks in collaboration with campus organizations to serve a community of 700 residents.

Leadership and Teamwork

Vanderbilt Institute for Digital Learning

Aug 2017 - Present

Graduate Fellow

- Explore novel uses of digital media (virtual reality, data visualization) to promote learning in classrooms.
- Produce videos and presentations to convey academic research to a broad audience.
- Collaborate with a multi-disciplinary team of graduate fellows to make on-campus digital resources more accessible.

Vanderbilt Student Volunteers for Science

Jan 2014 - May 2014

Volunteer

- Taught 8th graders in Nashville public schools fundamentals of robotics using LEGO Mindstorms kits.
- Hosted interactive sessions with students on university education and careers in engineering.

Publications

Conference Papers

Ahmed, Ibrahim, et al. "Comparison of model predictive and reinforcement learning methods for fault tolerant control" in IFAC-PapersOnLine, Warsaw, Poland, 2018 (Submitted).

Blog Posts (Selected)

Ahmed, Ibrahim. Escaping Echochambers. Iahmed.me, 20 Oct. 2017, <http://iahmed.me/post/escaping-echochambers/>.

Ahmed, Ibrahim. Algorithms: Balancing. Iahmed.me, 6 Feb. 2017, iahmed.me/post/algorithm-concepts/algorithms-balancing/.