Praveen Venkatesh

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EDUCATION

Program	Institution	CGPA / %	Year graduated
Ph.D., Electrical & Computer Engineering	Carnegie Mellon University Pittsburgh, PA	3.83	2019 *(expected)*
B.Tech (Honors), Electrical Engineering (minor in Physics)	Indian Institute of Technology Madras Chennai, India	9.11	2014
CBSE XII	National Public School Indiranagar Bangalore, India	95.8	2010
CBSE X	National Public School Indiranagar Bangalore, India	95.2	2008

PUBLICATIONS

Conference papers

- Praveen Venkatesh and Pulkit Grover, "Is the direction of greater Granger causal influence the same as the direction of information flow?", *Allerton Conference on Communication, Control and Computing*, 2015 *(accepted)*
- Pulkit Grover, Jeffrey A Weldon, Shawn K Kelly, Praveen Venkatesh, Haewon Jeong, "An information theoretic technique for harnessing attenuation of high spatial frequencies to design ultra-high-density EEG", *Allerton Conference on Communication, Control and Computing*, 2015 *(accepted)*

Posters

- Praveen Venkatesh and Pulkit Grover, "Is the direction of greater Granger causal influence the same as the direction of information flow?", *Neuroscience 2015*, 21 October 2015

TEACHING

At Carnegie Mellon University

- Teaching Assistant for *18-290: Signals and Systems* [Spring, 2015]

At the Indian Institute of Technology, Madras

- Teaching Assistant for *EE4371: Introduction to Data Structures and Algorithms* [Spring, 2014]

AWARDS

- Was one of the inaugural recepients of the Henry L. Hillman Presidential Fellowship [2015-16]

RELEVANT COURSEWORK (CMU)

- Neural Data Analysis
- Information Flows: Communication, Computational and Neuronal
- Estimation, Detection and Identification
- Intermediate Statistics
- Compressive Sensing and Sparse Representations
- Information Theory
- Error Control Coding

COURSE PROJECTS

Hidden Markov Model to fit internet traffic data (for Estimation and Detection) **[Spring 2015]**

- Analyzed internet traffic data and fit a Hidden Markov model to determine the statistics of underlying states

Granger causality in feedback networks (for Information Flows) **[Fall 2014]**

- Explored the validity of Granger causality as a measure of the direction of information flow in simple feedback networks
- Led to the publication "Is the direction of Granger causal influence..." at *Allerton 2015*

OLDER PROJECTS & COURSEWORK

PROJECTS OUTSIDE OF CURRICULUM

Parallelizing neuronal solvers **[Summer, 2013]**

- Worked on parallelizing the Hines matrix solver of the Multiscale Object Oriented Simulation Environment (MOOSE) using CUDA
- Parallelized the implementation of sparse matrix inversion within the MOOSE simulator
- This work was done in collaboration with the MOOSE team at the National Centre for Biological Sciences

Finite difference time domain (FDTD) simulations **[Dec 2012 - Jan 2013]**

- Performed a number of simulations of electromagnetic fields in various configurations, using the FDTD method
- Analyzed a framework for implementing the FDTD method in a non-orthogonal, generalized, curvilinear coordinate system

Chess Program **[2009-10]**

- Implemented a two player chess program in 11^{th} grade, complete with a GUI using binary graphics libraries
- Implemented an extremely simplistic AI to make the chess program single-player in 12^{th} grade

COURSE PROJECTS AND REPORTS

Analysis of the modes of vibration of a drum (for Waveguides) **[May 2013]**

- Performed a theoretical analysis and developed an analytical model for the modes of vibration of a cylindrical drum
- Considered the effect of impingement of a non-trivial drumstick on the membrane surface

Paper presentation on Image Synthesis using Graph Cuts (for Digital Video Processing) **[April 2013]**

- Described the paper by Kwatra et. al. which uses graph cut techniques to synthesize larger images conforming to a given pattern.

Review paper on the Hashimoto-Stevens channel routing algorithm (for Data Structures) **[April 2013]**

- Described the seminal paper by Hashimoto and Stevens which used a greedy algorithm to perform wire routing by optimizing channel assignment

Image stitching using KLT (for Digital Video Processing) **[April 2013]**

- Developed a program to perform image stitching (or mosaicing) using the Lucas-Kanade tracker

Background subtraction (for Digital Video Processing) **[February 2013]**

- Developed a program to perform background subtraction on a video using a per-pixel Gaussian Mixture Model

Graph-based Image Processing (for Networks: Models, Theory and Algorithms) **[November 2012]**

- Developed an image processing program for salient node detection based on network-theoretical algorithms
- Created a graph from an image using feature vectors to define edge weights and performed a random walk on the graph to determine the salient node

RELEVANT COURSE WORK (IIT MADRAS)

Signal Processing, Communication and Networking

- Networks and Systems
- Analog and Digital Signal Processing
- Networks: Models, Theory and Algorithms
- Communication Systems
- Analog Communication Systems
- Digital Communication Systems
- Adaptive Signal Processing
- Communication Networks

Computer sciences and computational sciences

- Computer Organisation and Microprocessors
- Introduction to Data Structures and Algorithms
- Digital Video Processing
- Computational Neuroscience

Mathematics

- Calculus I: Functions of one variable
- Calculus II: Functions of several variables
- Linear Algebra and Optimization
- Probability and Random Processes

SKILLS

- Languages known: Assembly, C, C++, Python, Bash shell scripting, Makefiles, PHP, JavaScript, VHDL, Verilog, Visual Basic, LaTeX
- Operating systems: GNU/Linux, Windows
- Tools, platforms and IDEs: Microsoft Office, numpy and scipy, DevC++, TurboC++, BorlandC++, AutoCAD, Keil μVision, Xilinx, ModelSim, PSpice, Visual Basic, GIMP
- Well versed with the concepts of objected oriented programming and well known among peers for documenting capability

PROFESSIONAL EXPERIENCE

Intern at Sasken Communication Technologies Ltd. **[May-July 2012]**

- Worked on porting Mozilla's OS for mobile phones, called Boot2Gecko, onto an unsupported Android platform
- Project involved debugging of cross-compiled code and recompilation for a different architecture

Worked on the VyapaarSEWA project in Sasken [May-July 2010]

- Used PHP to create a web framework for managing backend transactions of buyers and sellers

POSITIONS OF RESPONSIBILITY

Managerial member, Web Operations team, National Service Scheme chapter of IIT Madras [2011-13]

- Constructed the back-end of the website using Django from scratch – including server and DB setup
- Designed the background for the front page of the website using GIMP

Coordinator, Shaastra Astrophotography workshop [2011]

- Organized observation sessions (including astrophotography) and an image processing workshop

Coordinator, Shaastra Web Operations [2011]

- Part of a team that developed the website of the institute's annual technical inter-college fest: Shaastra 2011 (hosted at shaastra.org; source code available here)
- Wrote the backend database logic of the site using the Django web framework, written in python

Cyber Association Secretary/President [**10^{th}, 11^{th}, 12^{th} grades**]

- Organized three yearly inter-house competitions: Cyber Quiz, Programming and Gaming

SCHOLASTIC ACHIEVEMENTS

- Attended the software summer camp organized by Infosys (Catch Them Young) [9^{th} grade]
- Gold medalist in Math and Science - International Assessment for Indian Schools [10^{th} grade]
- National Talent Search Examination - State level scholar (Rank 14) [10^{th} grade]
- Cleared Regional Mathematics Olympiad and attended the regional camp [11^{th} grade]
- Cleared Regional Physics Olympiad [12^{th} grade]
- SAT Score: 2040; Received an offer of admission to the School of Computer Science at Carnegie Mellon University for an undergraduate course
- Indian Institutes of Technology Joint Entrance Examination: all India rank 184