

Anuva Kulkarni

5562 Hobart Street, #511, Pittsburgh, PA, USA 15217 • +1 (781) 859-7449 • anuva.kulkarni@gmail.com •

Education

PhD, Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, USA (2015 – present)
Masters, Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, USA (December 2014)
B.E.(Hons) Electrical and Electronics Engineerin, Birla Institute of Technology and Science, Pilani, India (May 2013)

Skills

Operating systems : Windows, Linux
High Level languages: MATLAB, FORTRAN, C, C++, Python
Tools : MATLAB, LaTeX, CUDA, Xilinx ISE, Code Composer Studio (from TI), LPCXpresso (from NXP), Cadence Spectre, PSpice, AutoCAD, MS Office
Development platforms: Intel 8086, MSP430 processors from Texas Instruments, ARM Cortex-M3 processors from NXP.
Languages Spoken: Hindi, Marathi, English, Spanish

Research Interests

Signal and image processing, algorithms, high performance computing, machine learning

Work Experience

Research Assistant, Indian Institute of Science – Jan. 2013 – May 2013
Project : Algorithms for locating non-defective items in a large population
Summer Intern, Sci-Com Software, India – May 2012 – July 2012
Project : Wireless Automated Parking Lot using the LPC1769 ARM processor and a GSM Modem
Summer Intern, Canopus Instruments, India – May 2011 – July 2011
Project : Internet based data acquisition and control of remote field devices using the MSP430 and the CS8900 Ethernet LAN controller.

Publications and Poster Presentations

Extended Abstract, ICPP 2018: *Algorithm Design for Large Scale FFT-Based Simulations on CPU-GPU Platforms*
Poster Presentation, ACM Supercomputing (SC 2017): *Large Scale FFT-based Stress-strain Simulations with Irregular Domain Decomposition*, with Franz Franchetti and Jelena Kovacevic
Paper, Winter Simulations Conference 2017: *DiSH Simulator: Capturing Dynamics of Cellular Signaling with heterogenous knowledge*, (third author) with Khaled Sayed, Yu-Hsin Kuo and Natasa Miskov-Zivanov, Carnegie Mellon University
Paper, IEEE GlobalSIP 2015: *Unsupervised Image Segmentation using Comparative Reasoning and Random Walks* with Filipe Condessa and Jelena Kovacevic, Carnegie Mellon University
Poster Presentation, Q-bio 2015: *Automation of Model Design and Analysis for Big Mechanisms*, with Cheryl Telmer and Natasa Miskov-Zivanov
Poster Presentation, IWBD 2015: *Big Mechanism Design and Analysis Automation*, with Cheryl Telmer and Natasa Miskov-Zivanov
Poster Presentation, CMU: *Tracking Consumer Data Flow in Online Advertising*, Team Project, Carnegie Mellon University
Project Presentation, CMU: *Classification of Histological Teratoma Images*, Individual Project, Carnegie Mellon University
JED-i Poster Presentation, IISc, India: *Algorithms for locating non-defective items in a large population* with Chandra Murthy, IISc, Bangalore

Research Experience

Signal processing and multiresolution techniques to reduce communication overhead in large scale FFT-based partial differential equation solvers (*Carnegie Mellon University*)
Advised by: Prof. Franz Franchetti & Prof. Jelena Kovacevic, Current

- Developing algorithms to reduce all-all communication in parallel algorithms involving large scale Fast Fourier Transforms
- Using real world example of FORTRAN differential equation simulations of stress-strain relationships in materials undergoing deformation

Poster presented at ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC17)
Model design and analysis automation for big mechanisms(*Carnegie Mellon University*)
Advised by: Prof. Natasa Miskov-Zivanov & Prof. Jelena Kovacevic, March 2015 – December 2015

- Implemented frameworks for automated development of executable models using information extracted from literature for cancer cell networks

Poster presented at Q-bio and IWBD 2015

Unsupervised image segmentation using Winner-Take-All Hash and Random Walks algorithm (*MS Graduate Project, Center for Biomedical Imaging, Carnegie Mellon University*)

Advised by: Prof. Jelena Kovacevic, January 2014 - present

- Developed an unsupervised segmentation algorithm for images, with a focus on biomedical images using the concept of comparative reasoning from machine learning followed by creating a probability map using Random Walks
- Designed an automated seed selection method for Random Walks algorithm using Gibbs sampling for Dirichlet Process Mixture Models

Published in *IEEE GlobalSIP Proceedings, 2015*

Near-fall detection in seniors using head-mounted accelerometers and gyrometer sensor (*Graduate Research Assistant, Carnegie Mellon University*)

Advised by: Prof. Peter Gilgunn, Summer 2014

- Designed a system using Multinomial Logistic Regression to predict the probability of instability in daily activities. The system is used for human motion database analysis for recognizing near-falls in senior citizens. It can be deployed on a smartphone to provide real-time feedback

Classification of Histological Teratoma Images (*Class project for Wavelets and Multiresolution Techniques, Carnegie Mellon University, Fall '13*)

- Used wavelet techniques and Gabor filters along with Support Vector Machines to find methods of efficient classification of different tissue sub-types in a histological image
- Used Superpixels for test image partition and iterated over Superpixel coarseness to ensure fastest possible computation speed for a fixed desired accuracy.

Bachelor Thesis title: Algorithms for locating non-defective items in a large population. (*Signal Processing for Communications Lab, IISc, Bangalore, India*) **Advised by: Prof. Chandra Murthy**, January – May 2013

- Implemented three algorithms for the problem of Group Testing, which is a boolean form of Compressed Sensing. The algorithms were row-based, column-based and convex optimization (L1 - minimization) based. methods to find a small number of non-defectives from a large collection of items with very few measurements.
- (Presented at JED-i Project Challenge Exhibition, IISc Bangalore)

Wireless Automated Parking Lot using the LPC1769 ARM processor and a GSM Modem (*Summer Internship at Sci-com Software, Pune, India*) May 2012 – July 2012

- Designed and implemented firmware for a wireless parking prototype which enables users to reserve space via SMS. Compiled results for analysis of spectrograms obtained using the Short Time Fourier Transform (STFT) for a Vehicle classifier, in MATLAB.

Internet based data acquisition and control of remote field devices using the MSP430 and the CS8900 Ethernet LAN controller (*Summer Research Internship at Canopus Instruments, India*) May 2011 – July 2011

- Designed a system to monitor data and send instructions to field devices by means of TCP/IP connection over a LAN.

Related Coursework

Graduate Coursework: Compressive Sensing, Computing for Biology, Machine Learning for Signal Processing, Machine Learning, Wavelets and Multiresolution techniques, Pattern Recognition theory, Image Video Multimedia, Cognitive Video

Leadership and Volunteering

Graduate Student Member, **Society of Women Engineers (SWE)**, Carnegie Mellon University

Treasurer of **ECE Graduate student Organization (EGO)**, Carnegie Mellon University

Member of community service organization **Juntos-Creating Ties**, (with Bridges Org., Nicaragua) Carnegie Mellon University

Core Member of the **IEEE Student Branch** at BITS- Pilani, Goa

Academic Representative for the Dept. of Electrical & Electronics, BITS-Pilani, Goa (2011-2012)

Honors

Member, **ECE Honor Society Eta Kappa Nu**, Carnegie Mellon University

Graduated BE(Hons.) with **First Class with Distinction** (Year 2013)