Saragadam Raja Venkata, Vishwanath

PhD in ECE, Carnegie Mellon University

5000 Forbes Ave, Porter Hall,
Pittsburgh PA 15217

vishwanathsrv@cmu.edu

Research interests

I am interested in the area of signal processing, computer vision, computational photography and machine learning. My research is aimed at a novel combination of fast algorithms as well as efficient optical setups to capture and process visual information that pushes the boundaries of spatial, spectral and temporal resolutions.

Conference Papers

- V Saragadam, J Wang, X Li, A Sankaranarayanan, "Compressive spectral anomaly detection", International Conference on Computational Photography, 2017
- V Saragadam, A Sankaranarayanan, X Li, "Cross-scale predictive dictionaries for image and video restoration", International Conference on Image Processing, 2016

Journal publications

- V Saragadam, and A Sankaranarayanan, "KRISM – Krylov Subspace-based optical computation of hyperspectral images", (under review), Transactions on Graphics, 2018
- V Saragadam, A Sankaranarayanan, X Li, "Cross-scale predictive dictionaries", Transactions on Image Processing, 2018

Education

Carnegie Mellon University **2014 -**

- Doctorate of Philosophy in Electrical and Computer Engineering.
- Advised by *Prof. Aswin Sankaranarayanan* and *Prof. Xin Li*

Carnegie Mellon University **2014 - 2016**

- Master of Sciences in Electrical and Computer Engineering.

Indian Institute of Technology Madras **2010 - 2014**

- B.Tech(Hons.) in Electrical Engineering with minor degree in Operations Research.
- Cumulative Grade Point Average: 9.42/10
- Recipient of Siemens award for highest GPA in electrical engineering 2014 batch.

Teaching experience

- Recipient of the Outstanding Teaching Assistant award of 2018 in the ECE department at Carnegie Mellon University.
- Head Teaching assistant for "Signals and Systems" at Carnegie Mellon University under Prof. Pulkit Grover and Prof. Byron Yu. I was responsible for recitation sessions, homeworks, and managing the teaching assistants group.
- Teaching assistant for "Signals and Systems" at Carnegie Mellon University under Prof. Pulkit Grover and Prof. Byron Yu. I was responsible for recitation sessions and setting questions for homeworks.
- Teaching assistant for "Image and Video Processing" at Carnegie Mellon University under Prof. Aswin Sankaranarayanan. I was responsible for recitation sessions and setting questions for homeworks.

Internship

Snap Inc., New York City, New York **May - August 2018**

- Under the guidance of Shree Nayar, and Prof. Mohit Gupta (University Wisconsin Madison)
- Worked on Augmented Reality hardware.

Intel corporation, Santa Clara, California **May - August 2015**

- Worked on convolutional sparse coding for recognition tasks
- Fast implementation of convolutional sparse coding for handling massive training data using multithreading.

Maschinenfabrik Reinhausen GmbH, Regensburg, Germany **May - July 2013**

- Wrote XML validation script for Bachmann platform.
- Ported tap changing monitoring system to Bachmann platform.
- Created emulation module for voltages and temperatures for software modules.
- Created automation system for documentation of software modules.

Sasken Communication Technologies, Chennai, India **May - July 2012**

- Ported Boot 2 Gecko, Mozilla's web based mobile operating system to Huawei U8150.
- Compiled Gecko render engine and Linux kernel to ARM platform.

Conferences and workshops

- Invited talk at University of Maryland College Park on "KRISM – Krylov subspace-based optical computing of hyperspectral images", 2018
- Invited talk at Johns Hopkins University on "KRISM – Krylov subspace-based optical computing of hyperspectral images", 2018
- Presented demo on "KRISM – Krylov subspace-based optical computing of hyperspectral images" at International Conference on Computational Photography, 2018, held in Carnegie Mellon University, Pittsburgh.
- Presented paper on "Compressive spectral anomaly detection" at International Conference on Computational photography, 2017, held in Stanford University, California.
- Invited talk at Indian Institute of Sciences, Bangalore, India on "Cross-scale predictive dictionaries", 2017
- Invited talk at International Institute of Information Technology, Hyderabad, India on "Sparse representations and its applications", 2017
- Presented paper on "Cross-scale predictive dictionaries for image and video restoration" at International Conference on Image Processing, 2016, held in Phoenix, Arizona.
- Volunteered at International Conference of Computational Photography, 2015, held in Houston, Texas.
- Participated in IEEE SPS Summer School on Signal Processing and Machine Learning for Big Data, 2016, held in Pittsburgh, Pennsylvania.
- Winner of third prize in IEEE All India Young Engineers Humanitarian challenge, 2012, held in Bangalore, India.
- Presented a poster on "Controlling a two-degree of freedom pantograph plotter" at National Conference on Mechanisms and Machines, 2011, held in Chennai, India.

Positions of Responsibility

- Web chair for International Conference on Computational Photography 2018, held in Carnegie Mellon University.
- Volunteer for "Camera workshop" as part of Gelfand Outreach Program at CMU in 2016 and 2017.
- Member of Avanti Fellows. I mentored a high school student for appearing in competitive exams for undergrad in engineering.
- National Service Scheme, IIT Madras. Volunteer from 2010-2011. Project reprsentative for "Making toys from trash" from 2011-2012. Advisory committee member from 2012-2014.
- IEEE student memeber of Signal Processing Society.

Scholastic Achievements

- Recipient of *Prabhu and Poonam Goel Graduate fellowship* for the academic year 2018/19 at Carnegie Mellon University.

- Recipient of the Outstanding Teaching Assistant award of 2018 in the ECE department at Carnegie Mellon University.
- Recipient of Dean's tuition fellowship for graduate studies at Carnegie Mellon University.
- Recipient of Siemen's award for highest GPA in electrical engineering in IIT Madras.
- Recipient of the *Shri V Rajagopalan Memorial award* for outstanding performance in 3^{rd} and 4^{th} semesters in electrical engineering.
- Recipient of the *M Sankaraih and M Saradah scholarship* for outstanding performance in sophomore year.
- Recipient of the CBSE merit scholarship for professional studies 2010 - 2014.
- Qualified for the DAAD WISE scholarship 2013 for internship at TU Bremen.
- Qualified for the S N Bose scholars program 2013 for internship at University of Wisconsin Madison.
- Secured 155^{th} rank in IIT Joint Entrance Examination 2010 among 470,000 students.
- Selected for the *Kishore Vaigyanik Prothsahan Yojana*(KVPY) scholars program 2010 for higher studies in basic sciences, awarded by Department of Science and Techonlogy, Government of India.

Skills

- **Computer languages:**
  - Proficient at coding in C, C++, Python, Cython and Matlab.
  - Working knowledge of VHDL, Verilog, Assembly(8051, ARM), CUDA and PLC ladder logic.
- **Computer tools and platforms:**
  - Proficient at Microsoft Office, Autodesk 3ds Max, Spice opus and LaTeX.
  - Working knowledge of AutoCAD, Xilinx IDE, keil μVision, Modelsim and Bachmann PLC platform.
- **Operating systems:** Microsoft Windows, Linux(Debian, Red hat, Arch).

Other projects and articles

Optimal measurement matrix for signals in a union of subspaces **March - May 2014**

- Worked on obtaining optimal measurement matrix with least number of measurements for a signal lying in a finite union of finite dimensional subspaces.
- Part of Convex Optimization course at Carnegie Mellon University.

Detecting text in natural images **September - December 2014**

- Worked on detecting text in natural images as part of the computer vision course at Carnegie Mellon University.
- Code hosted at `https://github.com/satwikkottur/ImageTextDetector`

Utilizing motion sensors for some image processing applications **August 2013 - May 2014**

- Worked on image registration, image deblurring, and depth estimation on mobile device using motion sensors data, under the guidance of *Prof. A N Rajagopalan*[1]
- Thesis can be downloaded at `www.ece.cmu.edu/~vsaragad/academics/report.pdf`

Accessible Reading material **May 2011 - December 2012**

- Developed a low cost semi autonomous assistive device for tactiling simple images in pre-literacy and early literacy books for visually impaired children under the guidance of *Dr. Anil Prabhakar, Dr. Sujatha Sreenivasan and Dr. Nitin Chandrachoodan.*
- Patent pending. *(Patent Application No. 4091/CHE/ 2011"Tactograph" Date of Entry 28th November 2011 in the names of Indian Institute of Technology - Madras and Chetana Charitable Trust).*

Canny edge detection using Python and SCIPY **September 2012**

- Published an article on implementing the canny edge detector in python in "Linux For You", a famous open source magazine in India.

Image segmentation using graph partitioning **August - November 2012**

- Worked on segmenting objects in images using random walk models and community detection as a part of *Introduction to social networks* course under the guidance of *Dr. Andrew Thangaraj and Dr. Krishna Jagannathan.*
- Code hosted at `https://github.com/vishwa91/grimp`.

[1]Department of Electrical Engineering, IIT Madras

Analog spectrum analyzer **April - May 2013**

- Made an analog spectrum analyzer based on mixer as part of Analog circuits lab.
- Spectrum analyzer could detect sinusoids distinctly for frequencies betweeen 500Hz and 5kHz.

Relevant Courses

Carnegie Mellon University

- Applied Stochastic Processes
- Linear Systems
- Convex Optimization
- Estimation, detection and identification
- Computer Vision
- Intermediate Statistics
- Compressive sensing and sparse approximation
- Information theory
- Physics based methods in vision
- Advanced Digital Signal Processing

Indian Institute of Technology Madras

- Networks and systems
- Analog and digital signal processing
- Introduction to communication networks
- Introduction to data structures and algorithms
- Communication systems
- Analog IC design
- Computer Aided Designing for electrical engineering
- Digital communication
- Communication networks
- Digital IC design
- Speech signal processing
- Analog and digital filter design