Shanmukha Ramakrishna Vedantam

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Education

- **Virginia Polytechnic Institute and State University, United States (2013-2015)**
  Master of Science, Computer Engineering
  GPA: 4.0/4.0, Advised by: Prof. Devi Parikh
  Specialization: Computer Vision and Machine Learning
- **International Institute of Information Technology (IIIT), Hyderabad, India (2009-2013)**
  Bachelor of Technology, Electronics and Communication Engg.
  GPA: 8.21/10, Advised by: Prof. K. Madhava Krishna
  Specialization: Vision for Robotics

Publications

- **Adopting Abstract Images for Semantic Scene Understanding**: C. Lawrence Zitnick, Ramakrishna Vedantam, and Devi Parikh. Accepted to PAMI, 2015
- **CIDEr: Consensus-based Image Description Evaluation**: Ramakrishna Vedantam, C. Lawrence Zitnick, and Devi Parikh. In submission to CVPR, 2015.

Work Experience

Research Assistant, Fall 2014
Bradley Department of ECE at Virginia Tech, United States

- Semantic Scene Understanding
- Supervisor: Prof. Devi Parikh, Virginia Tech

Research Internship, Summer 2014
Center for Visual Computing, Ecole Centrale de Paris/ INRIA - Saclay, France

- Worked on Loopy Part Models for Face Detection
- Supervisor: Prof. Iasonas Kokkinos, Ecole Centrale de Paris

Teaching Assistant, Fall 2013 and Spring 2014
Bradley Department of ECE at Virginia Tech, United States

- Teaching assistant for ECE 2504, Introduction to Computer Engineering
- Responsible for grading, conducting office hours and project evaluation for a class of 60+ students

Internship, Summer 2012
Siemens AG - Corporate Research and Technologies, India

- Implemented a dense 3D reconstruction pipeline for aerial images using tracking, structure-from-motion and multi-view stereo software
- Supervisor: Dr. Antony Priyakumar, Siemens Corporate Research - Bangalore

Teaching Assistant, Monsoon 2011 and Spring 2013
International Institute of Information Technology, India

- Teaching Assistant for a freshman year course on Digital Logic and Processor Design
- Teaching Assistant for Introduction to Humanities

Professional Services

- Reviewer for ICVGIP (Indian Conference on Computer Vision, Graphics and Image Processing), 2014

Honors and Achievements

- Was selected for, and attended the International Computer Vision Summer School (ICVSS) - 2014, Sicily

- Awarded Dean's List I for Excellence in Academics for Monsoon 2011 and Spring 2012 and Dean's List II for Monsoon 2009 at IIIT-Hyderabad
- Winner of Judges award and Peer award at Siemens CTT Intern Tech Challenge, 2012
- Our team placed 3rd in global aerospace competition CANSAT 2011 organized by NASA, AAS and AIAA
- Attained top 20 rank in Regional Mathematics Olympiad Organized by National Board for Higher Mathematics (NBHM) from Gujarat State. Qualified for the Indian National Mathematics Olympiad, 2008
- Finalist for the Bal Shree honor, conferred by the President of India for outstanding creativity in Science, 2008
- Attained All India Rank 134 in National Science Olympiad, 2006

Selected Projects

- **Evaluation of Image Descriptions** *Virginia Tech and Microsoft Research*
  Advisor: Dr. Devi Parikh and Dr. C. Lawrence Zitnick Fall 2014
  Worked on evaluation of image description methods. Proposed a novel evaluation protocol, named CIDEr (Consensus-based Image Description Evaluation) that utilizes human consensus. Showed that our protocol attains better agreement with humans than existing choices. This work is in submission to the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015
- **Loopy Part Models for Face Detection** *INRIA-Saclay and Virginia Tech*
  Advisor: Dr. Iasonas Kokkinos and Dr. Dhruv Batra Summer 2014
  Augmented the Deformable Parts Model (DPM) based face detector and landmark estimator of Xue and Ramanan with loopy part models. Utilized dual decomposition and an augmented lagrangian technique called ADMM (Alternating Direction Method of Multipliers) to solve the resulting inference problem efficiently, often achieving zero primal dual gap. Applied the model to get results comparable to the state of the art for detection and landmark localization
- **Adopting Abstract Scenes for Semantic Scene Understanding** *Virginia Tech and Microsoft Research*
  Advisor: Dr. Devi Parikh and Dr. C. Lawrence Zitnick Spring 2014
  Studied image memorability and object level saliency for abstract, cartoon-like images. Conducted experiments on Amazon Mechanical Turk using a game-like interface to collect image memorability and object-saliency annotations. Correlated these properties to semantic importance of objects, mined using text. This work has been accepted to IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2015
- **Understanding and Predicting Importance** *Virginia Tech*
  Advisor: Dr. Devi Parikh Spring 2014
  Formulated importance prediction in abstract images as a structured prediction problem, where importance is defined as the likelihood of an object in an image being mentioned in a description. Incorporated task related insights into feature and model (structure) selection. Predicted importance of objects at upto 86 % accuracy on the Abstract-50S dataset
- **Image Denoising using Dictionary Learning for Medical Images** *IIIT Hyderabad*
  Advisor: Dr. Jayanthi Sivaswamy Spring 2013
  Studied the effectiveness of using sparse coding for medical image denoising. Used a dictionary learning approach named K-SVD to eliminate synthetic gaussian noise on diverse modalities like MRI, CT, Sonar etc. Quantified the average signal gain on a per-modality and per-organ basis. Adapted the approach to work on specular noise by using log transformations
- **Floor Following Quadcopter** *IIIT Hyderabad*
  Advisor: Dr.K.Madhava Krishna Monsoon 2012 and Spring 2013
  Implemented an indoor floor-following navigation method for the AR.Drone Parrot Quadcopter. An appearance based model for the floor was learnt using a mixture of gaussians (GMM) to classify a scene as floor vs non-floor. Using these cues, navigation commands were given to the quadrotor (yaw, pitch, roll) to ensure the quadrotor always flew over floor regions

Coursework

- **Graduate Coursework**: Computer Vision Systems, Advanced Computer Vision, Introduction to Machine Learning, Probabilistic Graphical Models, Independent Study - Deep Learning (Ongoing), Numerical Analysis and Software (Ongoing)
- **Selected Undergraduate Coursework**: Mobile Robotics, Artificial Neural Networks, Speech Signal Processing, Medical Image Processing, Engineering Systems, Data Structures, Operating Systems and Algorithms

Skills

- **Programming Languages**: Matlab, C++, Python
- **Libraries**: OpenCV, ROS (Robot Operating System)
- **Human Computation**: Amazon Mechanical Turk

Extra Curricular

- Volunteered in organizing Mid-Atlantic Computer Vision (MACV) workshop at Virginia Tech
- Regular participation in Computer Vision and Machine Learning Reading Group at Virginia Tech
- Hosted all the Talks at Felicity - 2011, annual college fest of IIIT Hyderabad
- Coordinator and Founder- Entrepreneurship Cell at IIIT Hyderabad
- Class Representative for ECE Undergraduate batch
- Member, Students Parliament (Monsoon 2012 and Spring 2013)
- Campus Ambassador for Teach for India at IIIT (2011 to 2012)
- Trained in Carnatic Classical music for 7 years

References

- Prof. Devi Parikh, *Virginia Tech* (email: parikh@vt.edu)
- Dr. C. Lawrence Zitnick, *Microsoft Research* (email: larryz@microsoft.com)
- Prof. Dhruv Batra, *Virginia Tech* (email: dbatra@vt.edu)
- Prof. Iasonas Kokkinos *Ecole Centrale Paris* (email: iasonas.kokkinos@ecp.fr)