

SHANMUKHA RAMAKRISHNA VEDANTAM

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EDUCATION

- **Virginia Polytechnic Institute and State University, United States (2013-present)**
Ph.D, Computer Engineering
GPA: 3.85/4.0, 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

- **Learning Common Sense through Visual Abstraction:** Ramakrishna Vedantam, Xiao Lin, Tanmay Batra, C. Lawrence Zitnick, and Devi Parikh. *In submission to IEEE International Conference on Computer Vision (ICCV), 2015*
- **CIDeR: Consensus-based Image Description Evaluation:** Ramakrishna Vedantam, C. Lawrence Zitnick, and Devi Parikh. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015*
- **Adopting Abstract Images for Semantic Scene Understanding:** C. Lawrence Zitnick, Ramakrishna Vedantam, and Devi Parikh. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2015*

WORK EXPERIENCE

Graduate Research Assistant, Fall 2014 - Present

Bradley Department of ECE at Virginia Tech, United States

- Language, Vision and Common Sense
- 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

- **Conference:** Reviewer for ICVGIP 2014, ICCV 2015, CVPR 2016

- **Journals:** Reviewer for IJCV (International Journal of Computer Vision)

HONORS AND ACHIEVEMENTS

- Was selected for, and attended the International Computer Vision Summer School (ICVSS), (2014)
- Best Discussion Participant Award, Advanced Computer Vision Course, Virginia Tech, (Spring, 2014)
- Awarded Dean's List for Excellence in Academics at IIIT Hyderabad, (Monsoon, 2009 & 2011, Spring 2012)
- Winner of Judges award and Peer award at Siemens CTT Intern Tech Challenge, (2012)
- Our team placed 3rd in global aerospace competition CANSAT organized by NASA, AAS and AIAA, (2011)
- 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)
- Awarded Chacha Nehru Scholarship for Artistic and Innovative Excellence from National Council of Educational Research and Training (NCERT), (2008)
- Attained All India Rank 134 in National Science Olympiad, (2006)
- All India Rank 13 in Indian National Cartography Association (INCA) Map Quiz, (2006)

SELECTED PROJECTS

- **Learning Common Sense** *Virginia Tech*
 Advisor: Dr. Devi Parikh and Dr. C. Lawrence Zitnick Spring 2015
 Proposed a model to classify common sense tuples such as <man> *looks at* <cake> based on how plausible they are. Showed that better performance can be achieved on tuple classification by combining textual and visual cues. This work is in submission to the IEEE International Conference on computer Vision (ICCV), 2015
- **Evaluation of Image Descriptions** *Virginia Tech*
 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 accepted to the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015
- **Loopy Part Models for Face Detection** *INRIA-Saclay*
 Advisor: Dr. Iasonas Kokkinos and Dr. Dhruv Batra Summer 2014
 Augmented the Deformable Parts Model (DPM) based face detector and landmark estimator 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*
 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 the IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 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, Numerical Analysis and Software, Data Analytics-2, Convex Optimization, Deep Learning for Perception (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, Lua
- **Libraries:** OpenCV, Torch
- **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)