

Shiv Surya

Research Interests

Machine learning and deep learning applied to computer vision: generalized object detection (cross-depiction), learning strategies for deep learning, hierarchical deep networks, deep-ensembles and dense object counting.

Education

2013–2015 **M.S Electrical Engineering**, *University of Southern California*, Los Angeles, CA, USA.

2009–2013 **B.E Electrical and Electronics Engineering**, *Rashtreeya Vidyalyaya College of Engineering (RVCE)*, Bengaluru, KA, India.

Graduated with *Distinction*. Senior thesis advised by Dr.Dinesh M.N

Research Experience

2016-present **Research Staff**, *Video Analytics Laboratory, Indian Institute of Science*, Bengaluru, KA, India.

Working on independent research and algorithm implementation primarily in deep learning for computer vision.

2014-2015 **Research Assistant**, *University of Southern California*, Los Angeles, CA, USA.

Implemented statistical classifiers for determining liveness of speech from noisy telecommunications data. Designed corpus annotation scheme and researched possible features, machine learning models under the guidance of Dr. Matthew Black.

Summer 2012 **Research Intern**, *Aeronautical Development Establishment*, Bengaluru, KA, India.

Researched and developed image registration algorithms for registering remotely sensed far IR video frames.

Awards and Honors

- **Best Senior Thesis in Electrical Engineering**, 2013.

Publications

ACMMM 2016 Ravi Kiran Sarvadevabhatla*, **Shiv Surya***, Srinivas Kruthiventi and Venkatesh Babu R. **SwiDeN: Convolutional Neural Networks For Depiction Invariant Object Recognition**, *2016 ACM International Conference on Multimedia (ACMMM '16)* (poster)

*equal contributors as first authors

ICVGIP 2016 **Shiv Surya** and Venkatesh Babu R. **TraCount: A Deep Convolutional Neural Network for Highly Overlapping Vehicle Counting**, *Indian Conference on Computer Vision, Graphics and Image Processing, 2016* (oral)

Programming experience

Mainstream C, C++, Python, Lua, MATLAB

Scripting Bash, AWK

Libraries CAFFE, Torch, Lasagne, Kaldi, PRAAT, OpenCV, OpenSmile, CVX

Tools Git, GDB, MS Office

Research Projects

- Feb–May 16 **SwiDeN: Switching Deep Networks**, *Video Analytics Laboratory, Indian Institute of Science*.
We designed SwiDeN : our Convolutional Neural Network (CNN) architecture which recognizes objects regardless of how they are visually depicted (line drawing, realistic shaded drawing, photograph etc.). In SwiDeN, we utilize a novel ‘deep’ depictive style-based switching mechanism which appropriately addresses the depiction-specific and depiction-invariant aspects of the problem. We compare SwiDeN with alternative architectures and prior work on a 50-category Photo-Art dataset containing objects depicted in multiple styles. Experimental results show that SwiDeN outperforms other approaches for the depiction-invariant object recognition problem.
Code: <https://github.com/val-iisc/swiden>
- May– Aug 16 **Dense Vehicle Counting using deep learning**, *Video Analytics Laboratory, Indian Institute of Science*.
Designed deep neural network architecture for vehicle counting in dense traffic scenes. Work accepted for oral presentation at ICVGIP 2016.
- Aug–Dec 16 **Dense Crowd Counting using Switching Networks**, *Video Analytics Laboratory, Indian Institute of Science*.
Designed deep neural network architecture for crowd counting in dense urban scenes. Work submitted to top-tier computer vision conference.
- Jun–Nov 16 **Curriculum for region based object detector**, *Video Analytics Laboratory, Indian Institute of Science*.
Designed curriculum learning strategies for Fast-RCNN based object-detectors. Observed improved performance in low data scenario.

Course Work

Applied Linear Algebra (EE441)	Digital Image Processing (EE569)
Probability for Engineers (EE503)	Multimedia Data Compress (EE669)
Pattern Recognition (EE559)	Algorithms (CSCI570)
Machine Learning (EE660)	Speech Processing (EE519)
Estimation Theory (EE563)	

Public Speaking

- Aug 2016 **Speaker**, *Deep Learning workshop*, Rashtriya Vidyalaya College of Engineering (RVCE).
Gave a half-day technical talk to undergraduate computer science students as a part of 3 day deep learning workshop.
- Nov 2016 **Speaker**, Rashtriya Vidyalaya College of Engineering (RVCE).
Gave a 2 hour technical talk to undergraduate students as a part of their Computer Vision course.