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Shiv Surya

Education

University of Southern California(USC), USA   2013 - 2015
M.S in Electrical Engineering

Rashtriya Vidyalaya College of Engineering(RVCE), India   2009 - 2013
B.E in Electrical and Electronics Engineering

Technical Skills

Programming Languages: C++, C, MATLAB, Shell scripting, Unix tools, LaTeX.

Libraries and Tools: STL(C++) CAFFE, Torch, GDB, Kaldi, Microsoft Visual studio, OpenCV, OpenSMILE, PRAAT, Git, PRTools, LIBSVM, CVX, Microsoft Office.

Machine Learning\Signal Processing Algorithms: Deep Learning, Computer Vision, Visualization, Bayesian inference, Manifold learning, Factor Analysis, Regression, Logistic Classifier, Random Forests, Ensemble Classifiers, Kalman filtering(most variants like EKF,WKF), EM, Monte Carlo techniques.

Image-Video Processing Algorithms: Warping algorithms, Morphological processing, Homography, SIFT, Denoising algorithms, Super-resolution, Compression algorithms, H.265, H.264, Texture segmentation, Tracking.

Audio Processing Algorithms:Denoising, source-separation, DOA, Beam-forming, VAD, Filtering.

Publications

SwiDeN: Convolutional Neural Networks For Depiction Invariant Object Recognition, 2016 ACM on Multimedia Conference (MM '16)
Ravi Kiran Sarvadevabhatla*, Shiv Surya*, Srinivas S S Kruthiventi, and Venkatesh Babu R.
(*Equal contribution as first authors)

TraCount: A Deep Convolutional Neural Network for Highly Overlapping Vehicle Counting(accepted at ICVGIP 2016 for ORAL)
Shiv Surya and Venkatesh Babu R.

Work Experience

Video Analytics Laboratory (VAL), IISc   Research Staff
Bangalore, India   Feb 2016 – Present
Working on independent research and algorithm implementation and analyzing experimental data primarily in Deep Learning for Computer Vision. Work in generalized object detection accepted at ACMMM. Work in highly overlapping vehicle counting submitted to ICVGIP 2016. Ongoing work in self-paced curriculum for detectors submitted to AAAI.

Aeronautical Development Establishment,DRDO   Computer Vision Research Intern
Bangalore, India   Summer 2012
Researched and developed image registration algorithms for registering remotely sensed far IR video frames. All algorithms were implemented with Matlab interface with C++functions for optimization.

Research Projects **SwiDeN: Switching Deep Networks** C++

Video Analytics Laboratory (VAL), IISc Feb 2016 – May 2016

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

Dense Vehicle Counting using deep learning C++

Video Analytics Laboratory (VAL), IISc May 2016 – Aug 2016
Team size=1

Designed deep neural network architecture for vehicle counting in dense traffic scenes. Work submitted to ICVGIP 2016(Accepted).

Dense Crowd Counting using switching networks Python

Video Analytics Laboratory (VAL), IISc Aug 2016 – Nov 2016
Team size=2

Designed deep neural network architecture for crowd counting in dense urban scenes. Work submitted to CVPR 2016.

Curriculum for region based object detector Python,Matlab,C++

Video Analytics Laboratory (VAL), IISc June 2016 – NOv 2016
Team size=1

Designed curriculum learning strategies for Fast-RCNN based object-detectors. Observed improved performance in low data scenario.

Colorization, Sketch sequence recognition Python,Matlab,C++

Video Analytics Laboratory (VAL), IISc Nov 2016 – Present
Team size=3

Sketch sequence recognition and colorization using deep learning.
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Image and video processing\CV projects C++

USC Aug 2013 - May 2014

Super-Resolution ,Image grading, Denoising, texture analysis, image warping, morphing, edge detection, halftoning and morphological processing, video codec analysis for H.264, H.265 and compression algorithms like Huffman encoding, Vector quantization, SF coders in C. All projects were implemented as a part of image processing, estimation theory and multimedia and data compression courses.

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

Awards

- Best Capstone Project in Electrical Engineering (2013)