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Shiv Surya

Education

University of Southern California(USC), USA 2013 - 2015
M.S in Electrical Engineering CGPA-3.30

Rashtriya Vidyalaya College of Engineering(RVCE), India 2009 - 2013
B.E in Electrical and Electronics Engineering CGPA-9.21

Technical Skills

Programming Languages: C++, C, MATLAB, Shell scripting, Unix tools(AWK,grep,sort etc), LaTeX.

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

Machine Learning\Signal Processing Algorithms: Deep Learning, 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.

Work Experience

Video Analytics Laboratory (VAL), IISc Research Staff
Bangalore, India Feb 2016 – Present
Team size=3/1
Working on independent research and algorithm implementation and analyzing experimental data primarily in Deep Learning for Computer Vision. Initial work in generalized object detection submitted to ACMMM.

SAIL,USC Research Assistant
Los Angeles, CA July 2014 – February 2015
Team size=2
Implemented statistical classifiers for determining liveness of speech, AMD from noisy telecommunications data.Designed corpus annotation scheme and researched possible features, machine learning models under the guidance of Prof. Matthew Black.

Aeronautical Development Establishment,DRDO Computer Vision Research Intern
Bangalore, India Summer 2012
Team size=1
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.

Academic and Research Projects

Adaptive Cross Approximation for Dense Matrices C++
Personal\exploratory project Dec 2015 – Jan 2016
Team size=1
Implemented Adaptive Cross Approximation algorithm for dense matrices in C++ using Eigen matrix library

Regression on compressive concrete strength dataset Python
Personal\exploratory project,USC Jan 2015 - Feb 2015
Team size=1
Implemented regression on highly non-linear data from UCI-concrete compressive strength dataset and used regularization with Ridge, Lasso and Orthogonal Matching Pursuit regularization in an expanded polynomial space to achieve R2 score of 0.85 (an improvement from 0.53 referred in publication) on a disjoint test dataset. This performance is comparable with the neural networks classifier described in the publication.
https://github.com/shivsurya/UCI_concretedata

Source separation\VAD in noisy speech data MATLAB
Personal\exploratory project,USC Jan 2015 – June 2015
Team size=1
Implemented LTSV based VAD and spectral and power subtraction methods, wiener filtering and non-negative matrix factorization (NMF) for source separation in noisy speech data for noise types like including white, pink and non-stationary noises like speech babble.
https://github.com/shivsurya/speech_denoising

Super-resolution of image via sparse representation MATLAB, CVX
USC Jan 2015 – May 2015
Team size=1
Implemented super-resolution algorithm via sparse representation using raw image patches. Analyzed effects of different backpropagation algorithms, effects of training parameters, dictionary size and regularization constants.
https://github.com/shivsurya/superResolution_ sparseRepresentation

Machine Learning projects MATLAB
USC Jan 2014 – Dec 2014
Team size=1
Classification of forest covertype dataset from UCI-ML database using LDA, QDC, SVM, Random forest classifier and classifier combinations , and Automatic feature representation learning using K-means on the MNIST handwritten digits dataset.

Image and video processing\CV projects C++
USC Aug 2013 - May 2014
Team size=1
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)
Probability for Engineers (EE503)
Pattern Recognition (EE559)
Machine Learning (EE660)
Estimation Theory (EE563)
Digital Image Processing (EE569)
Multimedia Data Compression (EE669)
Algorithms (CSCI570)
Speech Processing (EE519)