Nimisha T M

Image Processing and Computer Vision Lab
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EDUCATION

Ph.D, Indian Institute of Technology, Madras — 2013– till date
Electrical Engineering Department
Specialization: Image Processing

M.Tech, National Institute of Technology, Calicut — 2011–2013
Electronics and Communication Engineering Department
Specialization: Signal Processing
CGPA: 9.23

B.Tech, Amrita College of Engineering, Kollam — 2007–2011
Electronics and Communication Engineering Department
CGPA: 9.02

DISSERTATION

M.Tech: " An Exploration into Sparse Signal Representation and Recovery"
Under Guidance of Dr. G. Abhilash, NIT Calicut.

RESEARCH TOPICS

Cross Camera Mapping
The photometric properties of a scene changes with varying camera and illumination. Hence depending on the capturing device there is a variation in the observed images. We come up with a camera invariant representation of the image for the purpose of change detection and panorama.

Underwater Color Restoration
Light as it propagates in deep water, it undergoes a wavelength dependent attenuation resulting in blue ting, color cast and hazy appearance of underwater images. We try to color correct these images and produce its equivalent as seen from outside the water column.

Dictionary Replacement for 3D reconstruction
Sparse representations has found great application in image processing community. The central idea here is that any natural signal can be represented sparsely in an over-complete dictionary. We use this idea to estimate the latent image and depth map from a space variantly blurred image.

From Video to Pan Shots
We synthesize pan photos from motion blurred videos. Pan photography is used to capture motion in images. It improves the aesthetic feel of an image. But capturing such images require great amount of skill and effort. We ease this by synthesizing the same from a captured video.

Image Deblurring
Images obtained with long exposure time using a hand-held camera is degraded by motion blur artifacts. Restoring such images is highly ill-posed and several priors have been introduced to regularize the optimization. Here we tried a learning based approach using the concept of blur-invariant features that are extracted with a deep autoencoders to assist in deblurring.

PUBLICATIONS

1. Abhijith Punnappurath, T. M. Nimisha, and A.N. Rajagopalan,Multi-image blind super-resolution of 3D scenes, IEEE Transactions on Image Processing. Accepted for publication.

2. T.M Nimisha, Akash kumar S and A.N.Rajagopalan,"Blur-Invariant Deep Learning for Blind Deblurring" in International Conference on Computer Vision (ICCV), Venice, Italy 2017. (Accepted)

3. T.M Nimisha, M. Arun, and A.N. Rajagopalan, Dictionary Replacement for Single Image Restoration of 3D Scenes, in British Machine Vision Conference (BMVC), York, UK. September 2016.

4. T M Nimisha, Karthik Seemakurthy, A N Rajagopalan, Narayanaswamy Vedachalam and Ramesh Raju, "Color Restoration in Turbid Medium", In Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP) 2016.

5. Nimisha T.M., A.N. Rajagopalan, and R. Aravind. "Seamless Change Detection and Mosaicing for Aerial Imagery." In CVPR workshop on The Computer Vision in Vehicle Technology (CVVT) 2015

PROFESSIONAL/ ACADEMIC ACHIEVEMENTS

- Reviewer for NCC 2017
- Assisted my Professor in reviewing for ICVGIP 2016, NCVPRIPG 2015, ICAPR 2014 and IETE Journal
- Won first prize in "Code to Optimize" event conducted in the technical event Shaastra 2016, IIT Madras

TEACHING EXPERIENCE

I have worked as a teaching assistant for the following courses

- EE6132: Deep learning for image processing — July-Nov 2017
- EE5175: Image signal processing — Jan-June 2017/2016
- EE1100 : Basic electrical engineering — July-Nov 2016
- EE5130: Digital signal processing — July-Nov 2015

RELEVANT COURSES

Digital Signal Processing	Image Signal Processing
Digital Video Processing	Linear Algebra
Probability Theory	Detection and Estimation Theory

WORKSHOP ATTENDED

- The Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP) 2016/2014.
- Summer School on Deep Learning 2016 conducted by IIIT Hyderabad.

SKILLS

MATLAB, Torch, Python and C (basics)