

# Kuldeep S. Kulkarni

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## Summary

During my PhD, I proposed deep learning based, fast, data-driven solutions to inverse problems like compressive image and light-field reconstructions, the first of their kind, as well as novel solutions to reconstruction-free computer vision from computational imagers. During my internship stints, I have worked on action detection in videos using bi-directional LSTMs and weakly supervised problems like joint localization of multiple concepts like action, object and person. I was one of the 30 graduating students selected to participate at the **CVPR 2017** Doctoral Consortium, and have won the best paper award at **CVPR CCD workshop 2015**. A track record of mentoring masters and PhD students for the past 5 years, and have been involved in writing grants during my PhD. I have played key roles in successful cross-university collaborations with labs from CMU, Cornell University, University of Arizona and University of Maryland. Currently, I am working on image and video generation problems using generative adversarial networks (GANs).

## Employment

**Research Scientist at Adobe Research, Bengaluru** (Mar 2019- present)

**Post-doctoral Researcher at Carnegie Mellon University, Pittsburgh** (August 2017- Feb 2019) Advisor: Aswin Sankaranarayanan

## Education

- **PhD** in Electrical Engineering with Arts, Media and Engg. (AME) concentration (Fall 2012 - Summer 2017)  
Arizona State University, Tempe
- **Master of Science** in Electrical Engineering with Signal Processing and Communication as specialization (Fall 2010 - Summer 2012)  
Arizona State University, Tempe
- **Bachelor of Technology** in Electrical and Electronics Engg. (2005-2009)  
National Institute of Technology Karnataka, Surathkal, India.

## Publications, Book Chapters and Patents

- Michael Jones, Tim Marks, **Kuldeep Kulkarni**, Method and System for Detecting Actions in Videos using Contour Sequences, US Patent App. 15/670,021, 2019
- Suhas Lohit, Rajhans Singh, Kuldeep Kulkarni, Pavan Turaga, Rank-Regularized Measurement Operators for Compressive Imaging, Asilomar Conference, 2019
- **Kuldeep Kulkarni**, Pavan Turaga, Anuj Srivastava, Rama Chellappa, Pattern Recognition, **Wiley Encyclopedia on Electrical and Electronics Engineering**.
- **Kuldeep Kulkarni**, Suhas Lohit, Pavan Turaga, Ronan Kerviche, Amit Ashok, 'ReconNet: Non-Iterative Reconstruction of Images from Compressively Sensed Measurements', **IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2016** [citations: 175].
- Suhas Lohit, **Kuldeep Kulkarni**, Ronan Kerviche, Pavan Turaga, Amit Ashok, 'Convolutional Neural Networks for Non-iterative Reconstruction of Compressively Sensed Images', **IEEE Transactions on Computational Imaging**, 2018
- **Kuldeep Kulkarni**, Pavan Turaga, 'Reconstruction-Free Action Inference from compressive imagers', **IEEE Transactions on Pattern Analysis and Machine Intelligence**, 2016.
- **Kuldeep Kulkarni**, Pavan Turaga, 'Fast integral image estimation at 1% measurement rate', under revisions at **IEEE Transactions on Pattern Analysis and Machine Intelligence**.

- Sohil Shah, **Kuldeep Kulkarni**, Arijit Biswas, Ankit Gandhi, Om Deshmukh, Larry Davis, ‘Weakly Supervised Learning of Heterogeneous Concepts in Videos’, **European Conference on Computer Vision (ECCV) 2016**<sup>1</sup>.
- Suhas Lohit, **Kuldeep Kulkarni**, Pavan Turaga, Jian Wang, Aswin Sankaranarayanan ‘Reconstruction-free Inference on Compressive Measurements’, at the **4th IEEE Workshop on Computational Cameras and Displays (CCD)**, held in conjunction with IEEE CVPR, 2015. (**Best Paper Award**)
- Mayank Gupta\*, Arjun Jauhari\*, **Kuldeep Kulkarni**, Suren Jayasuriya, Alyosha Molnar, Pavan Turaga, ‘Compressive Light Field Reconstruction using Deep Learning’, at **CVPR 2017 CCD workshop**
- Suhas Lohit, **Kuldeep Kulkarni**, Pavan Turaga, ‘Direct Inference on Compressive Measurements using Convolutional Neural Networks’, **International Conference on Image Processing**, 2016
- P8: **Kuldeep Kulkarni**, Pavan Turaga, ‘Recurrence Textures for Activity Recognition from compressive cameras’, **International Conference on Image Processing**, 2012.
- Ankit Gandhi, Arijit Biswas, Om Deshmukh, Sohil Shah, **Kuldeep Kulkarni**, Method and System for Multimedia Processing to Identify Concepts in Multimedia, patent application submitted to USPTO.
- Li-Chi Huang, **Kuldeep Kulkarni**, Pavan Turaga, Anik Jha, Suhas Lohit, Suren Jayasuriya, Pavan Turaga, CS-VQA: Visual Question Answering with Compressively Sensed Images, ICIP 2018.

## Mentoring Experience

I have mentored the following masters and PhD students.

- Suhas Lohit - His master’s thesis work was awarded the ‘**Best Paper Award**’ at **4th IEEE Workshop on Computational Cameras and Displays (CCD)**, held in conjunction with CVPR 2015. Currently, PhD student at ASU.
- Mayank Gupta - His master’s thesis work on compressive light-field reconstruction using deep learning was presented at the CVPR 2017 CCD workshop. Currently at Meta Co, San Mateo, CA
- Li-Chi Huang - His master’s thesis work on compressive-VQA was accepted at ICIP 2018. Currently at Graftek Imaging.
- Tejas Gokhale at CMU, currently PhD student at ASU.

## Prior Work Experience

- **Research Intern** at Mitsubishi Electric Research Labs (MERL), Cambridge, MA (May-Sep 2016). Action detection in videos using computationally efficient contour image features and multi-scale, bi-directional LSTMs. A patent application based on this work has been filed. Host: Mike Jones
- **Research Intern** at Xerox Research Centre India, Bengaluru, India (May-Aug 2015). Worked on joint spatio-temporal localization of multiple concepts like ({object,action},{subject,action}) in weakly-labeled youtube videos, leading to a paper at ECCV 2016.
- **Research Intern** at Bausch & Lomb, Rochester, NY (May-Aug 2013). Applied image processing techniques for segmentation of OCT images of contact lens.
- **Project Assistant**: Dept. of Instrumentation Engg and Applied Physics, Indian Institute of Science, (July 2009- March 2010)
- **Summer Intern**: Dept. of Electrical Engg., Indian Institute of Science, (May 2008-June 2008). Applied shape-context feature descriptor for online hand-writing recognition of two South-Indian languages, Kannada and Tamil.

## References

Available upon request.

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<sup>1</sup>CVPR and ECCV are highly selective computer vision conferences with acceptance rates of around 25%, similar to top journals like TPAMI, which has a impact factor of 5.781.