Mangal Prakash

PhD candidate in Computer Science

🌐 Pfotenhauerstr. 108, Dresden, Germany

👤 https://mangalp.github.io

@ prakash@mpi-cbg.de

⌨ mangalp

in mangalprakash

Profile

PhD student working with computer vision, discrete optimization and machine learning for biomedical image analysis. Developing methods and software using deep learning, probabilistic generative models and graphical models for image denoising, object segmentation and tracking in biomedical images.
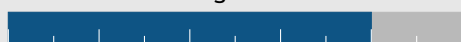
With broad skill sets covering important aspects of computer vision and software development, looking for opportunities in the healthcare and biomedical sector.

Interests

- 🎓 Deep Learning
- 🎓 Segmentation
- 🎓 Few Shot Learning
- 🎓 Image Denoising
- 🎓 Probabilistic Generative Models
- 🎓 Discrete Optimization
- 🎓 Software Development

Skills

Machine Learning

Deep Learning

Computer Vision

Image Processing

Discrete Optimization

Segmentation

Denoising

Pytorch

Python

Java

Education

Aug 2017 – May 2021 (expected)	*TU Dresden/Max Planck Institute of Molecular Cell Biology and Genetics/ Center for Systems Biology Dresden* PhD student in Computer Science working on image denoising, segmentation and tracking for biomedical images.
Aug 2014 – Dec 2016	*University of Minnesota Twin Cities* GPA: 3.73/4.0 MSc in Electrical Engineering with specialization in distributed control systems.
Aug 2010 – April 2014	*National Institute of Technology Durgapur* GPA: 9.35/10.0 *B.Tech in Electrical Engineering.*

Key Projects

Since 2019	*Unsupervised image denoising* TU Dresden/MPI-CBG/CSBD Developed a principled approach to model diversity denoising task within variational autoencoder framework using model of imaging noise. Introduced Gaussian Mixture Models based parametric representation of camera noise for training deep learning based algorithms for fully unsupervised denoising.
Since 2019	*Few shot learning of segmentation* TU Dresden/MPI-CBG/CSBD Analyzed the effects of unsupervised denoising for deep learning based cell segmentation in presence of limited ground truth annotations. Implemented end-to-end training schemes for joint denoising and segmentation.
2017-2019	*Cell tracking with graphical models* TU Dresden/MPI-CBG/CSBD Proposed a fast approximate solver for the combinatorial problem known as tracking-by-assignment. Proposed solver outperforms commercial state-of-the-art solvers like Gurobi.
2014-2016	*Optimal resource allocation for smart grids* Univ. of Minnesota Developed a distributed scheme that enables a distributed energy resource in a network to arrive at viable power reference commands while satisfying local constraints on its generation and loads it has to service.

Selected Publications

2020	M. Prakash et.al. DenoiSeg: Joint Denoising and Segmentation, ECCV 2020, Bio Image Computing Workshop. (*Oral presentation).
2020	M. Prakash et.al. DivNoising: Diversity Denoising with Fully Convolutional Variational Autoencoders, arXiv, 2020.
2020	M. Prakash et.al. Fully Unsupervised Probabilistic Noise2Void, IEEE ISBI, 2020. (*Oral presentation).
2020	M. Prakash et al. Leveraging Self-Supervised Denoising for Image Segmentation, IEEE ISBI, 2020.
2020	S. Haller, M. Prakash et al. A Primal-Dual Solver for Large-Scale Tracking-by-Assignment, AISTATS 2020.
2019	M. Prakash et al. Distributed Stopping Criterion for Consensus in the Presence of Delays. In IEEE Transactions on Control of Network Systems, 2019.

Awards

2014	Awarded College of Science and Engineering Fellowship for pursuing graduate studies at the University of Minnesota.
2013	Awarded the prestigious Indian Academy of Sciences Summer Fellowship for undergraduate research.

Internships

Aug 2012– July2013	*Control System for Micro Machines* CMERI & Univ. of Paris Sud Developed concept and adaptive control methodologies for an ultra-precision drive and modular controllers for micro-nanometer level travel resolution of micro machine tools.

Relevant Courses

Computer Vision, Component Based Software Engineering, Nonlinear Control Theory, Graphical Models and Discrete Optimization.