Deepak Anand

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DOMAIN

Deep Learning
Machine Learning
Computer Vision
Image Processing
Medical Imaging
Control Systems

EDUCATION

IIT BOMBAY

PhD (Electrical Engg.)
Dec 2019 | Mumbai
CPI: 8.34 / 10

MGR UNIVERSITY

BTech (E&C Engg.)
June 2012 | Chennai
CPI: 9.08 / 10

EXPERIENCE

Project Staff
Lead-free Piezoelectric sensor development
IIT Hyderabad
[Jan'13-Dec'13]

SKILLS

- Languages
  - Python • C++ • C
  - Matlab
- Libraries
  - PyTorch • fast.ai
  - TensorFlow • Keras
  - Scikit-Learn • Pandas
  - Numpy • Matplotlib

TEACHING

- Introduction to Machine Learning
- Image Processing
- Multivariable Control
- Matrix Computations
- Control Systems

COLLABS

- UIC, Chicago
- CWRU, Ohio
- PathPresenter.net, NY
- Gryffin
- TMH, Mumbai
- Lilavati, Mumbai

SPORTS

- PG Passing-out Color 2018-2019
- Coach & Manager Ultimate (2016-2019)
- Sports Councilor Hostel 1, (2017-2018)

RESEARCH & PUBLICATIONS

DEEP LEARNING

- **Deepak Anand**, Shrey Gadiya, Amit Sethi, "**Graph Convolutional Networks from the Ground Up**," under review at Pattern Recognition Letters, July 2019
- **Deepak Anand**, Gaurav Patel, Yaman Dang, Amit Sethi, "**Switching Loss for Class Imbalanced Medical Image Segmentation**," submitted to ACM TOMM, May 2019

COMPUTATIONAL PATHOLOGY

- **Deepak Anand**, Shrey Gadiya, Amit Sethi, "**Histographs: Graphs in Histopathology**," under review at SPIE Medical Imaging, August 2019
- **Deepak Anand**, Kumar Yashashwi, Amit Sethi, Swapnil Rane, "**Automated BRAF Mutation Prediction from H&E Images in Thyroid Cancer**," under review at JCO, July 2019
- **Deepak Anand**, Nikhil Cherian, Shubham Dhage, Amit Sethi, "**Automated HER2 Mutation Prediction from H&E Images in Breast Cancer**," under review at JPI, June 2019
- **Deepak Anand**, Goutham Ramakrishnan, Amit Sethi, "**Fast GPU-Enabled Color Normalization for Digital Pathology**," IEEE IWSSIP, Croatia, April 2019
- Aditya Golatkar, **Deepak Anand**, Amit Sethi, "**Classification of Breast Cancer Histology using Deep Learning**," ICIAR 2018, Povoa de Varzim, Portugal, May 2018

Ongoing Projects

- **Modeling Intra-tumoral Heterogeneity in Breast Cancer** |Prof. A. Sethi [Jan 2019 - Jun 2019]
  Modeled a deep learning approach to establish **tumor heterogeneity** in breast cancer histopathology whole-slide images. Benchmark results against heterogeneity by **genomic tests**
- **Generalized Transfer Learning in H&E Images via Compression** |Prof. A. Sethi [May'18 - Jun'19]
  Generalized feature mining for histopathology by compression as a **self-supervision** task for transfer learning. Our approach outperforms popular ImageNet based transfer learning
- **Graph Guided Gleason Grading in Prostate Cancer** |Prof. A. Sethi [May'18 - Jun'19]
  Proposed **graph-based attention** mechanism to train deep learning models with weak labels. Attained state-of-the-art Gleason grading using graph attention **without regional annotations**

RADIOLOGY

- **Deepak Anand**, Yaman Dang, Amit Sethi, "**Pixel-wise Segmentation of Right Ventricle of Heart**," IEEE TENCON, June 2019

Ongoing Projects

- **Solving Jigsaw Puzzles to Reduce Annotations in Radiology** |Prof. A. Sethi [May'18 - Jun'19]
  Formulated a **self-supervision** task of solving **jigsaw puzzles in radiology** to exploit structure for transfer learning. Outperformed ImageNet based models by using **one-sixth** training data

COMMUNICATIONS AND CONTROL

- Yashashwi Kumar, **Deepak Anand**, Sibi Raj B. Pillai, Prasanna Chaporkar, and K. Ganesh. "**MIST: A Novel Training Strategy for Low-latency Scalable Neural Net Decoders**," arXiv preprint arXiv:1905.08990, May 2019
- Ameer K. Mulla, **Deepak Anand**, Debraj Chakraborty, Madhu N. Belur, "**Leader Selection for Minimum-Time Consensus in Multi-Agent Networks**," 56^{th} IEEE Conference on Decision and Control, Melbourne, Australia, December 2017

Ongoing Projects

- **Stability Analysis for Fast Settling Switched DPLL** |Prof. S. Gupta & P. Palliwal [May'18 - Jun'19]
  Derived **stability conditions** for Digital Phase Locked Loop architectures using multiple **Lyapunov functions** for **switched systems** and experimentally verified them on a real system.

ORGANIZATIONAL

- **Organized** the multi-organ nucleus segmentation challenge **MoNuSeg** at **MICCAI 2018**
- **Reviewed six research papers** from **MICCAI 2018** and **one research paper** from **CDC 2019**
- Taught **predictive analysis** for "**Fundamentals of IoT Design**," course of **CEP, IIT Bombay**
- Spoke on "**Broad applications of Deep Learning in Electrical Engineering**" at IIT Bombay
- "**Fast GPU-Enabled Color Normalization for Digital Pathology**," oral ppt. at **IWSSIP 2019**
- **Presented and developed** "**Oral-cancer screening app**" at **TCTD Symposium 2019**, IIT Bombay
- Delivered an **invited talk** on "**Applications of deep-learning in healthcare**" at **Nvidia**, Bangalore