

# DEEPAK ANAND

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## EDUCATION

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**Indian Institute of Technology Bombay, Mumbai, India** Jan '14 - Dec '2019  
*PhD* in Electrical Engineering (Guide [Prof. Amit Sethi](#)) GPA: **8.34/10**

### **Thesis - Medical Image Analysis using Deep Learning**

Extension of unsupervised, supervised, self-supervised, graph-based, and multi-instance learning techniques to the medical domain which has challenges like low training samples, large uninformative regions, noisy labels, huge data sample size, and inherent noise in the data-preparation across hospitals.

**Dr. M.G.R. Educational and Research Institute, Chennai, India** July '08 - July '12  
*BTech* in Electronics and Communication Engineering GPA: **9.08/10**

## PROFESSIONAL EXPERIENCE

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- **Griffyn Robotech Private Limited** Pune, IN  
*Head of AI* Jan '20 - Ongoing  
Trained a team of 25 computer vision and data scientists. Built patented and IPR protected products in the domain of computer vision, predictive maintenance and recommendation systems.
  - \* **AI-based evaluation and decision making product** in the reverse logistic chain of cell phones for Fortune 500 client using *generative models* and *attention-based CNNs* for *semantic segmentation*
  - \* Vision guided **cosmetic grading and functional testing** robotic solution for cell phones using *reinforcement learning* based *space-exploration*, *object detection*, and real-world *coordinate mapping*
  - \* Machine learning-based **revenue maximization of auction processes** in the reverse logistics of cell phones using *multi-level time-series forecasting*, *anomaly detection*, and *optimal auction-theory* policies
  - \* *Few-shot learning*-based **surface inspection** and IIOT 4.0 products for automobile manufactures along with *optimal vision system* for defect capture by the *selection of cameras and illumination strategy*
  - \* Novel *edge-analytics platform* for in-house built *IIOT gateway* to facilitate **predictive maintenance** and throughput monitoring via *recommendation engines*, *time-series analysis* and *distribution estimation*
- *Deep learning & AI Consultant* March '19 - Dec '19  
Develop AI modules for cosmetic evaluation of products for optimization of resale value and objectiveness
- **PathPresenter** New York, USA  
*Deep learning & AI Consultant* March '19 - Dec '19  
Design of a commercial web-based platform for digital pathology compatible with FDA standards
- **SkinAI Health Solutions Private Limited** New Delhi, IN  
*Deep learning & AI Consultant* Sep '19 - Dec '19  
Integrate AI/ML-based models for predictive analysis of dermatology diseases with 100+ conditions
- **FlipFake** Ghaziabad, IN  
*Deep learning & AI Consultant* Sep '19 - Dec '19  
Building easily deployable screening and verification schemes for identifying counterfeiters or fake products
- **Indian Institute of Technology Hyderabad** Hyderabad, IN  
*Project Assistant* Jan '13 - Dec '13  
Synthesized lead-free piezoelectric materials for vibration sensors and the corresponding driver circuits

## PEDAGOGICAL ACHIEVEMENTS

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- **Publications & Patents**
  - [D Anand](#), K Yashashwi, N Kumar, S Rane, PH Gann, A Sethi, **Weakly supervised learning on unannotated H&E stained slides predicts BRAF mutation in thyroid cancer with high accuracy**, *The Journal of Pathology*, Nov 2021
  - M Sureka, A Patil, [D Anand](#), A Sethi, **Visualization for Histopathology Images using Graph Convolutional Neural Networks**, *IEEE BIBE*, Oct 2020
  - A Mahajan, S Bagalkote, A Jathar, V Alhat, N Warorkar, [D Anand](#), Griffyn Robotech Pvt. Limited, **Inspection and cosmetic grading through image processing system and method**, *US 10,753,882 B1*, Aug 2020

- D Anand, G Patel, Y Dang, A Sethi, **Switching Loss for Generalized Nucleus Detection in Histopathology**, arXiv preprint, Aug 2020
- D Anand, D Tank, H Tibrewal, A Sethi, **Self-Supervision vs. Transfer Learning: Robust Biomedical Image Analysis Against Adversarial Attacks**, *IEEE ISBI*, Apr 2020
- H Loya, P Poduval, D Anand, N Kumar, A Sethi, **Uncertainty estimation in cancer survival prediction**, arXiv preprint, March 2020
- D Anand, S Gadiya, A Sethi, **Histograms: graphs in histopathology**, *SPIE Medical Imaging*, Mar 2020
- D Anand, NC Kurian, S Dhage, N Kumar, S Rane, PH Gann, A Sethi, **Deep learning to estimate human epidermal growth factor receptor 2 status from hematoxylin and eosin-stained breast tissue images**, *Journal of Pathology Informatics*, Jan 2020
- A Patil, D Tamboli, S Meena, D Anand, A Sethi, **Breast Cancer Histopathology Image Classification and Localization using Multiple Instance Learning**, *IEEE WIECON*, Nov 2019
- H Loya, D Anand, P Poduval, N Kumar, A Sethi, **A Bayesian framework to quantify survival uncertainty**, *ESMO MAP, London*, Oct 2019
- N Kumar, R Verma, D Anand, et.al., A Sethi, **A Multi-organ Nucleus Segmentation Challenge**, *IEEE TMI*, Oct 2019
- D Anand, Y Dang, A Sethi, **Pixel-wise Segmentation of Right Ventricle of Heart**, *IEEE TENCON*, Oct 2019
- D Anand, G Ramakrishnan, A Sethi, **Fast GPU-Enabled Color Normalization for Digital Pathology**, *IEEE IWSSIP*, Croatia, May 2019
- K Yashashwi, D Anand, SRB Pillai, P Chaporkar, K Ganesh, **MIST: A Novel Training Strategy for Low-latency Scalable Neural Net Decoders**, arXiv preprint, May 2019
- S Dhage, D Anand, N Kumar, PH Gann, and A Sethi, **Abstract P4-02-11: Computer vision detects morphological correlates of HER2 positive breast cancer in H&E stained histological images**, *SABCS, American Association for Cancer Research*, Jan 2019
- D Anand, S Gadiya, A Sethi, **Some new layer architectures for Graph CNN**, *arXiv preprint*, Nov 2018
- A Golatkar, D Anand, A Sethi, **Classification of Breast Cancer Histology using Deep Learning**, *ICIAR*, May 2018
- AK. Mulla, D Anand, D Chakraborty, MN. Belur, **Leader Selection for Minimum-Time Consensus in Multi-Agent Networks**, *IEEE CDC, Melbourne*, Dec 2017
- **Research Grants & Awards**
  - **Facebook’s Ethics in AI Research Awards** *(Principal Investigator: Prof Amit Sethi)*
  - **TCTD Seed Grant Proposal** *(Principal Investigator: Prof Amit Sethi)*
  - **Runner-up prize of INR 100,000 Intel Python HackFury<sup>2</sup>**
  - **Best Paper Award IEEE WIECON 2019**
  - **IIT Bombay’s PG Passing-out Color Awards (Sports) 2019**
- **Paper-review and Workshops**
  - 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**
- **Talks & Tutorials**
  - ML and emerging technologies at **25<sup>th</sup> National Conference on IoT 4.0** (Oct 2020)
  - ML hands-on session at **IoT Fundamentals and Case Studies (CEP)** at IIT Bombay (Sep 2019)
  - SRG talk on **Making Machines Learn** at Electrical Engineering, IIT Bombay (Aug 2019)
  - ML hands-on session at **Fundamentals of IoT Design (CEP)** at IIT Bombay (Jul 2019)
  - **Broad applications of Deep Learning in Electrical Engineering** at IIT Bombay (May 2019)
  - Poster presentation on **Oral-cancer screening app**, at **TCTD Symposium**, IIT Bombay (Jan 2019)
  - **Deep Learning in Healthcare**, at Nvidia’s “**The Convergence of HPC with AI**” (Dec 2018)
- **Teaching Assistantship:** Introduction to ML \* Image Processing \* Matrix Computations and Algebra
- **Skills:** Python \* PyTorch \* fast.ai \* TensorFlow \* Keras \* Scikit-Learn \* Pandas \* NumPy \* Matplotlib