SUBHAYAN MUKHERJEE

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Educational qualification

2015 – 2020 (**Grad**: April)
University of Alberta, Edmonton, Canada
5th year **PhD** Candidate & R.A. (**Machine Learning** & **Vision**), **Computing Science**: GPA 4 / 4

2012 – 2014
National Institute of Technology Karnataka (**NITK**, formerly **KREC**), Surathkal, India
M.Tech by Research in Information Technology (**Computer Vision**): GPA 8.33 / 10

2005 – 2009
Heritage Institute of Technology (autonomous), Kolkata, India
B.Tech in Information Technology (Final Year project on **Image Processing**): GPA 7.9 / 10

Industrial experience

2017 – 2018
3vGeomatics Inc, Vancouver, Canada
Research Intern, *Mitacs Accelerate* + **C**onsortium of **A**erospace **R**esearch & **I**nnovation in **C**anada
Deep / Machine Learning based Large-scale mapping of ground displacement with InSAR Satellite Images: Developed first ever Convolutional Neural Network-based filtering and pixel-wise signal quality quantification methodology for InSAR, and further improved it to a CNN-guided generative modeling-based approach based on Gaussian Mixture Model. Implemented in Keras with Tensorflow-GPU back-end and Python, supported by numpy, scipy, scikit-image, scikit-learn, and matplotlib libraries in Anaconda environment.

2016 – 2017
Dolby Laboratories Inc, Sunnyvale, California, USA
Video Imaging Research Intern, Imaging Advanced Development group
Patent ***US2017/0308996A1*** *on coding artifact reduction methods in HDR images.*
Dolby Vision codecs encapsulate traditional ones like AVC/HEVC, and provide HDR capability. However, banding artefacts need to be handed while displaying SDR content on HDR screens. Computationally constrained mobile GPU environments restrict use of traditional filtering-based methods. I developed a dithering-based solution. It operates on individual pixels and modulates noise injection based on slope of Inverse Tone Mapping curve. Use cases also include those where the input is quantized due to bit-depth conversion, but the unquantized original version is unavailable. I conducted subjective experiments on the Dolby Pulsar display to validate my method. Simulations/prototyping via MATLAB and implementations in the C programming language.

2014 – 2015
Informatica Business Solutions Pvt Ltd, Bangalore, India
Software Engineer, R&D *(Product Development in Java), Informatica Services Platform*
Product development in Informatica Core Technology Group, focusing on Informatica Services Platform. The ISP software modules are used by most Informatica software products. ISP is a collection of Application Program Interfaces written in Java. I was responsible for improving the performance of those API's & maintaining them.

2009 – 2011
Infosys Ltd, Bhubaneswar, India
Software Engineer *(Mainframes, in Healthcare domain) for US-based insurance giant AETNA*
Published article and mainframes software tool for effort savings in software development.

Software knowledge

Platforms	Windows, Linux
Languages	Python, C/C++, Java, MATLAB
Databases	MySQL, Oracle
Utilities	Git, Perforce
Libraries	Keras (Tensorflow), Scikit-learn, Scikit-image, OpenCV, Numpy, Scipy
Applications	VersionOne, Eclipse, Spyder, DevTrack

Languages

Bengali	Native
English	Second
Hindi	Third
German	Basic

Certifications

- ✓ Sun Certification: Java 2 Platform, Standard Edition 5.0 Programmer (SCJP 5.0) with 98% marks
- ✓ German Language: Ramakrishna Mission Institute of Culture, Golpark, Kolkata with 83% marks

Selected publications (First Author)

1. "Potential of deep features for opinion-unaware, distortion-unaware, no-reference image quality assessment", International Conference on Smart Multimedia (**Springer**), Dec 16-18, 2019, **San Diego**, **USA**
2. "CNN-based Real-Time Parameter Tuning for Optimizing Denoising Filter Performance", **16**th ICIAR (**Springer**), 27th to 29th August 2019, **University of Waterloo**, **Canada**
3. "CNN-Based InSAR Coherence Classification", **17**th **IEEE** Sensors, Oct 28-31, 2018, **New Delhi, India**
4. "CNN-based InSAR Denoising and Coherence Metric", **17**th **IEEE** Sensors, Oct 28-31, 2018, **New Delhi**, **India**
5. "A Fast Segmentation-free Fully Automated Approach to White Matter Injury Detection in Preterm Infants", Medical and Biological Engg. & Computing (SCI Indexed, **Springer**, Impact Factor: **2.04**) Vol 57, Issue 1, pp 71-87
6. "Adaptive Dithering using Curved Markov-Gaussian Noise in the Quantized Domain for Mapping SDR to HDR Image", International Conference on Smart Multimedia (**Springer**), Aug 24-26, 2018, **Toulon**, **France**
7. "Highlighting Objects of Interest in an Image by Integrating Saliency and Depth", **23rd IEEE** International Conference on Image Processing (**ICIP** 2016), **Phoenix**, **USA**, 25th to 28th September 2016
8. "Entropy-difference based Stereo Error Detection", **12th IEEE** Image Video and Multidimensional Signal Processing (**IVMSP** 2016) workshop, **Bordeaux**, **France**, 11th and 12th July 2016
9. "Depth-based Selective Blurring in Stereo Images Using Accelerated Framework", 3D Research (ESCI Indexed, **Springer**, CiteScore: **1.02**) Vol 5, Issue 3, September 2014
10. "A Hybrid Algorithm for Disparity Calculation from Sparse Disparity Estimates Based on Stereo Vision", **10th IEEE** International Conference on Signal Processing and Communications (**SPCOM**), Indian Institute of Science (**IISc**), **Bangalore**, **India**, 22nd to 25th July 2014

Invited services to the research community

- **Reviewer** for Remote Sensing Letters (Taylor & Francis)
- **Reviewer** for Journal of Visual Communication and Image Representation (Elsevier)
- **Reviewer** for Egyptian Journal of Remote Sensing and Space Sciences (Elsevier)
- **Local Arrangements Chair**, 30th IEEE Conf. on Systems, Man & Cybernetics, Banff, Canada

Selected achievements & Awards

- Alberta Graduate Excellence Scholarship (CAD 12,000) from Government of Alberta, Canada
- Pansy and George Strange Graduate Scholarship (declined the offer due to Dolby internship)
- Runner-Up Certificate for Early Achievement Award (PhD) in Computing Science department
- Scored 98 percentile in the India Govt. sponsored GATE (Graduate Aptitude Test in Engineering) scholarship. This award fully covered all tuition and living expenses incurred during Master's
- 3rd in a national level C Programming Competition organized at Jadavpur University, Kolkata

Selected academic Projects

1. Opinion-unaware Distortion-unaware No-reference Image Quality Assessment using Deep Features
2. Detecting ground movements from InSAR satellite images using deep learning-based methods
3. Designing a hybrid approach to selective focusing of stereo images, using depth and saliency
4. Development of novel white matter injury detection method from preterm brain MR images
5. Design & validation of novel entropy-based confidence measure for stereo error detection
6. Development of a novel stereo depth extraction algorithm, its parallel implementation using CPU-GPU acceleration and depth-based selective blurring to simulate shallow Depth-of-Field
7. Satellite image clarity enhancement using clustering algorithms in Java