Soumendu Majee

CONTACT INFORMATION

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RESEARCH INTERESTS

Computational Imaging, Computed Tomography, and Machine Learning

EDUCATION

Ph.D., Electrical and Computer Engineering — June 2021
Purdue University, IN, USA
Advisors: Prof. Charles A. Bouman and Prof. Gregery T. Buzzard
Thesis: High Speed Imaging via Advanced Modeling
GPA: 4.0/4.0

B.Tech., Electronics and Electrical Communication Engineering — May 2014
Indian Institute of Technology, Kharagpur, India
GPA: 9.1/10

SKILLS

- **Programming languages**: Python, Cython, MATLAB, C, C++, C#, Bash, LaTeX
- **Libraries/Packages/Tools**: Pytorch, Tensorflow, Keras, OpenCV, scikit-learn, OpenMP, MPI, Git, ADB

EXPERIENCE

Staff Research Engineer — March 2024 - Present
Senior Engineer, Research — April 2022 - February 2024
MPI Lab, Samsung Research America, TX, USA

- Worked on the development and commercialization of AI Zoom for Samsung Galaxy S24
- Led the IQ commercialization of Under Display Camera for Samsung Galaxy Z Fold5
- Worked on the development and commercialization of Under Display Camera for Samsung Galaxy Z Fold4
- Worked on the commercialization of Expert-Raw for Samsung Galaxy S23

Postdoctoral Research Associate — July 2021 - April 2022
Los Alamos National Laboratory, NM, USA

- Material Identification from Radiographs and Intrinsic Radiation
- Learning Noise-robust Features for Dynamic Reconstruction

Research Aide — July 2019 - Sept 2019
Advanced Photon Source, Argonne National Laboratory, IL, USA

- Coded Exposure for High Speed X-ray CT Imaging
  - Developed CodEx: a synergistic combination of coded acquisition and reconstruction for high speed tomographic imaging

Graduate Research Assistant — Jan 2015 - June 2021
Purdue University, IN, USA

- Multi-Slice Fusion for 4D X-ray CT Reconstruction
  - Developed a novel method "Multi-Slice Fusion" that fuses multiple low-D Convolutional Neural Networks to implement a 4D image prior
- Denoising Short-exposure Dynamic Radiographs
  - Developed a deep-learning based transfer-learning method for denoising short-exposure dynamic radiographs
- Multi-Domain Weighing for Metal Artifact Reduction in X-ray CT

- Developed a novel data and image domain weighing for reducing metal artifacts in X-ray CT

- Multi-Orientation Fusion CT reconstruction
  - Developed a modular method to fuse information from multiple CT scans at different orientations to produce a joint reconstruction

- Cone-beam X-ray CT reconstruction of Additively Manufactured Parts
  - Developed a high fidelity CT reconstruction method using scatter correction for defect detection in additively manufactured Parts

- Detection and Localization of Neurons in Fluorescence Microscopy Images
  - Developed novel neuron detection method to improve frame-rate of fluorescence microscopy neuron imaging by selectively scanning neuron locations.

Undergraduate Researcher Jan 2014 - August 2014
Indian Institute of Technology, Kharagpur, India

- Efficient Wideband Spectrum Sensing for Cognitive Radio
  - Developed a novel spectrum estimation algorithm for spectrum sensing in cognitive radio

Research Intern May 2013 - July 2013
University of Toronto, ON, Canada

- Detection of Human Thought from EEG (Electroencephalograph) Signals

Publications

Balke, T., Davis Rivera, F., Garcia-Cardona, C., Majee, S., McCann, M.T., Pfister, L. and Wohlberg, B.E., 2022. Scientific Computational Imaging COde (SCICO). Journal of Open Source Software, 7(LA-UR-22-28555).

Majee, S., Aslan, S., Gursoy, D. and Bouman, C.A., 2022. CodEx: a modular framework for joint temporal de-blurring and tomographic reconstruction. IEEE Transactions on Computational Imaging, 8, pp.666-678.

Majee, S., Balke, T., Kemp, C.A., Buzzard, G.T. and Bouman, C.A., 2021. Multi-slice fusion for sparse-view and limited-angle 4D CT reconstruction. IEEE Transactions on Computational Imaging, 7, pp.448-462.

Balke, T., Majee, S., Buzzard, G.T., Poveromo, S., Howard, P., Groeber, M.A., McClure, J. and Bouman, C.A., 2018. Model-Based Cone-Beam Tomography with Scatter Correction. Manuscript in preparation for IEEE Transactions on Computational Imaging.

Majee, S., Balke, T., Kemp, C.A., Buzzard, G.T. and Bouman, C.A., 2019, May. 4D X-ray CT reconstruction using multi-slice fusion. In 2019 IEEE International Conference on Computational Photography (ICCP) (pp. 1-8). IEEE.

Balke, T., Majee, S., Buzzard, G.T., Poveromo, S., Howard, P., Groeber, M.A., McClure, J. and Bouman, C.A., 2018. Separable models for cone-beam MBIR reconstruction. electronic imaging, 2018(15), pp.181-1.

Majee, S., Ye, D.H., Buzzard, G.T. and Bouman, C.A., 2017. A model based neuron detection approach using sparse location priors. Electronic Imaging, 2017(17), pp.10-17.

Majee, S., Ray, P. and Cheng, Q., 2015, November. Efficient wideband spectrum sensing using random projection. In 2015 49th Asilomar Conference on Signals, Systems and Computers (pp. 141-145). IEEE.

Invited Talks

Electronic Imaging January 2023
Samsung Research America January 2022
Oak Ridge National Laboratory March 2021
Los Alamos National Laboratory February 2021

Department Of Energy Light-source Tomography Coordination Meeting — February 2021
Electronic Imaging — January 2021
Electronic Imaging — January 2019

Professional Volunteering

Paper Reviewer
IEEE Transactions on Image Processing
IEEE Transactions on Computational Imaging
IEEE International Conference on Image Processing
International Journal of Medical Physics Research and Practice
Journal of Nondestructive Evaluation

Teaching Experience

Teaching Assistant — Fall 2014, Spring 2016, Spring 2017
Purdue University
Linear Circuits Analysis (ECE 201)
Digital Image Processing I (ECE 637)

Scholarships & Awards

- Awarded MITACS Globalink Research Fellowship — Summer 2013
- Awarded the Jagadis Bose National Science Talent Search Scholarship — 2010 - 2014
- Ranked 1 in the WBJEE Engineering Entrance Examination — 2010

References

Available upon request