MADHURI NAGARE

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SUMMARY

- Proficiency in Machine Learning, Inverse Problems, Image Processing (medical CT and satellite images)
- Skilled in implementing deep learning framework: convolutional nets, generative models
- 8 years of experience in industry and academia leading to publications and patents
- Highly adept at collaborating with interdisciplinary and cross-cultural teams

EDUCATION

May 2024 (Expected)	Ph.D. in Electrical and Computer Engineering Advisor: Dr. Charles A. Bouman | CGPA: $3.93/4$ | Purdue University, West Lafayette, USA
June 2015	Master of Technology in Geoinformatics and Natural Resources Engineering CGPA: $9.86/10$, **Silver Medalist** | Indian Institute of Technology (IIT) Bombay, Mumbai, India
June 2013	Bachelor of Technology in Electronics and Telecommunication Engineering CGPA: $9.44/10$, **Gold Medalist** | College of Engineering, Pune (COEP), Pune, India

TECHNICAL SKILLS

Programming Languages:	PYTHON, C, MATLAB, BASH, SWIFT
Libraries:	TENSORFLOW, KERAS, OPENCV
Key Courses:	Computer Vision, Model-Based Image Processing, Machine Learning, Optimization Methods, Probability, Estimation Theory, Real Analysis

MEDICAL IMAGING & DEEP LEARNING EXPERIENCE

Sep. 2018-Ongoing (Ph.D. Thesis)	**Bias Reducing Methods for Enhancement of X-ray Computed Tomography (CT) Images** *Research Assistant & Ph.D. Candidate | Advisor: Dr. Charles A. Bouman | Purdue University* - Analyzed a limitation of deep learning (DL) based denoising and deblurring methods of producing over-smooth (highly biased) images lacking texture - Designed algorithms to operate at user-specified points on the bias-variance trade-off curve, thereby to retain and produce clinically important texture in CT images - Implemented end-to-end DL pipeline with convolutional nets and generative models - **Collaborated** with **interdisciplinary** teams of researchers, engineers and clinicians - Delivered **12% higher Likert score** in clinical evaluations
May 2019-Aug. 2019	**Deep Learning Based Solutions for X-ray Computed Tomography (CT) Reconstruction** *Ph.D. Intern | GE Healthcare, Waukesha, USA* - Studied concepts of medical imaging and reconstruction algorithms - Improved robustness of a DL based reconstruction method by adding noise while training - Achieved on an average **1.5 dB** higher peak signal-to-noise ratio

SELECTED PUBLICATIONS

- **M. Nagare**, J. Tang, O. Rahman, B. Nett, R. Melnyk, K. D. Sauer, and C. A. Bouman. A noise preserving sharpening filter for CT image enhancement. In *ICIP - IEEE Int. Conf. Image Process.*, 2022
- **M. Nagare**, R. Melnyk, O. Rahman, K. D. Sauer, and C. A. Bouman. A bias-reducing loss function for CT image denoising. In *ICASSP - IEEE Int. Conf. Acoust., Speech, Signal Process.*, 2021
- **M. Nagare**, E. Kaneko, M. Toda, H. Aoki, and M. Tsukada. Cloud shadow removal based on cloud transmittance estimation. In *IGARSS - IEEE Int. Geoscience and Remote Sens. Symp.*, 2018
- **M. Nagare**, H. Aoki, and E. Kaneko. A unified method of cloud detection and removal robust to spectral variability. In *IGARSS - IEEE Int. Geoscience and Remote Sens. Symp.*, 2017

SELECTED PATENTS

- *Texture matching generative adversarial network*: USPTO Application Number 63/410,486 (Filed Sept. 2022)
- *Resolution recovery of CT images*: USPTO Application Number 17/807,779 (Filed Jun. 2022)
- *Denoising of CT images*: US 2022/0375038 A1 (Published Nov. 2022)

Work Experience

Oct. 2015- Aug. 2018	**NEC Corporation, Tokyo, Japan** *Assistant Researcher* • Developed techniques to remove thin clouds and their shadows from a multispectral image while accommodating for variability in a cloud spectrum • Boosted cloud removal accuracy of the state-of-the-art method by **22%** • Increased accuracy of cloud shadow removal by **5%** • Implemented codes in C for NEC's atmospheric correction software module

Machine Learning Research

Jul. 2014- Jun. 2015 (Master's Thesis)	**Decision Tree Classifiers (DTC) for Satellite Images** *Research Assistant & Master's Candidate	Advisor: Dr. B. Krishna Mohan	IIT Bombay* • Designed a DTC optimized with a genetic algorithm to extract nonlinear class boundaries in a feature space by utilizing a unique set of a classifier and features at each node • Improved accuracy for land use classification compared to conventional DTC

Leadership

Apr. 2021- Apr. 2022	**International Student Ambassador**	International Students and Scholars, Purdue University • Led onboarding of incoming international students during weeks-of-welcome
Jul. 2019- Dec. 2019	**Treasurer**	Indian Graduate Students at Purdue, Purdue University • Secured funding from the Student Organization Grant Allocation Board for cultural events
Oct. 2016- May 2017	**Group leader**	Machine Learning Reading Group, NEC Corporation • Built and managed a group to learn concepts and advances in machine learning
Jun. 2014- Jun. 2015	**Executive Member**	Graduate Academic Council, IIT Bombay • Led a team of 15 coordinators to organize an onboarding event for 1300+ graduate freshmen
Jul. 2013- Jun. 2014	**Graduate Cultural Coordinator**	Graduate Cultural Council, IIT Bombay • Coordinated with 10 members to organize a cultural fest for 3500+ students

Teaching Experience

Fall 2018	**Teaching Assistant** for Probabilistic Methods at Purdue University • Mentored a class of 80 students to understand concepts of probability and python
Fall 2014	**Teaching Assistant** for Satellite Image Processing at IIT Bombay • Conducted MATLAB training sessions for a batch of 27 students

Professional Service

• Reviewer for IEEE Transactions on Computational Imaging, IEEE International Conference on Image Processing, Journal of Medical Imaging, Journal of the Indian Society of Remote Sensing
• Member of IEEE Eta Kappa Nu (HKN)

Awards

• Won honorable mention for poster presentation at Purdue Engineering Graduate Showcase 2021
• Secured **Rank 4** in 2009 Maharashtra Health & Technical Common Entrance Test among 200K+ students
• Awarded with scholarship for undergraduate study (2009 - 2013) by the Govt. of Maharashtra

Extracurricular

• Contributed to the Guinness World Record of 'Most people solving Rubik's Cube'
• Cleared two exams of classical Kathak Nrutya Dance