Dipayan Mitra

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RESEARCH INTEREST

Target tracking, estimation theory, compressive sensing, digital signal and image processing, machine learning.

EDUCATION

**Department of Electrical and Computer Engineering,
McMaster University, Hamilton, Canada**

Ph.D. Candidate   2020- present

- Advisor: Prof. Ratnasingham Tharmarasa
- Thesis Title: *TBD*

**Department of Systems and Computer Engineering,
Carleton University, Ottawa, Canada**

Master of Applied Science (M.A.Sc.)   2017-19

- Advisor: Prof. Sreeraman Rajan
- Thesis Title: *Investigation of Kronecker-based Recovery in Compressive Sensing*

**Department of Electrical Engineering,
Maulana Abul Kalam Azad University of Technology,
Kolkata, India**

Bachelor of Technology (B.Tech)   2013-17

- Advisor: Prof. Probal Mukherjee
- Project Title: *Study of Illumination in a Closed Room Under Varying Conditions & Determination of Light Sensor Characteristics*

TEACHING EXPERIENCE

McMaster University
Teaching Assistant
- Course Title: Digital Signal Processing   Fall 2021, 22
- Course Title: Data Structures and Algorithms   Winter 2021, 22, 23

Carleton University
Teaching Assistant
- Course Title: Problem Solving & Computers   2017-19

SCIENTIFIC RESEARCH EXPERIENCE

McMaster University University
Graduate Research Assistant   Sept. 2020 - present
- Developing algorithm for 3D ground target tracking using biased angle-only airborne sensor.
- Improving tracking performance by optimal sensor trajectory planning and range sensor fusion.

University of Toronto
Research Assistant   Sept. 2019 - Aug. 2020
- Gradient compression in distributed machine learning.

Carleton University

Research Associate   May - Aug. 2019
- Investigation of compressed domain machine learning learning for sparse signals.

Carleton University

Graduate Research Assistant   Sept. 2017- Apr. 2019
- Investigation of Kronecker-based compressive sensing recovery technique to improve signal (segmented) quality during reconstruction, using different deterministic and random sensing matrices.
- Extending 1-D Kronecker-based compressive sensing recovery to 2-D signals.
- Performing statistical analysis on compressed signals, avoiding computationally expensive sparse recovery, using deterministic sensing.

More details are available here: [Projects]

JOURNAL ARTICLES

1. **D. Mitra**, A. Balachandran, R. Tharmarasa, "Ground Target Tracking Using an Airborne Angle-Only Sensor with Terrain Uncertainty and Sensor Biases," *Sensors*, 2022, 22(2), 509, pp. 1-26.

2. **D. Mitra**, H. Zanddizari and S. Rajan, "Investigation of Kronecker-based Recovery of Compressed ECG Measurements," *IEEE Transactions on Instrumentation and Measurement*, vol. 69, no. 6, June 2020, pp. 3642-3653.

REFEREED CONFERENCE PAPERS

1. **D. Mitra**, R. Tharmarasa, "Sensor Fusion and Optimal Platform Trajectory Planning for Ground Target Localization with Terrain Uncertainty and Measurement Biases," *25th IEEE International Conference on Information Fusion (FUSION)*, Linköping, Sweden, July 2022, pp. 1-8.

2. H. Sadreazami, **D. Mitra**, M. Bolic and S. Rajan, "Compressed Domain Contactless Fall Incident Detection using UWB Radar Signals," *18th IEEE International New Circuits and Systems Conference (NEWCAS)*, Montreal, QC, Canada, June 2020, pp. 90-93.

3. **D. Mitra** and S. Rajan, "Deterministic Compressed Domain Analysis of Multi-channel ECG Measurements," *IEEE International Symposium on Medical Measurements and Applications (MeMeA)*, Bari, Italy, June 2020, pp. 1-6.

4. H. Zanddizari, **D. Mitra** and S. Rajan, "Blind Deterministic Compressive Sensing for Biomedical Images," *IEEE International Symposium on Medical Measurements and Applications (MeMeA)*, Bari, Italy, June 2020, pp. 1-5.

5. **D. Mitra**, S. Rajan, B. Balaji, "A Deterministic Compressive Sensing Approach for Compressed Domain Image Analysis," *IEEE Sensors Applications Symposium (SAS)*, Sophia Antipolis, France, March 2019, pp. 1-6.

6. **D. Mitra**, H. Zanddizari and S. Rajan, "Improvement of Recovery in Segmentation-based Parallel Compressive Sensing," *18th IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*, Louisville, KY, USA, Dec 2018, pp. 501-506.

7. **D. Mitra**, H. Zanddizari and S. Rajan, "Improvement of Signal Quality During Recovery of Compressively Sensed ECG Signals," *IEEE International Symposium on Medical Measurements and Applications (MeMeA)*, Rome, June 2018, pp. 1-5.

PRE-PRINTS

1. **D. Mitra**, H. Zanddizari, S. Rajan, "Aspect-ratio Preserving Compressive Sensing and Recovery of 2-D Signals," 2019.

WORKSHOP PAPERS	1. **D. Mitra** and A. Khisti, "Distributed Stochastic Gradient Decent with Quantized Compressive Sensing," *EDGE Intelligence Workshop*, Montreal, Canada, March 2020. **(Best paper award)**

GRANTS AWARDED	• Chair's Commendation for Three Minute Thesis Presentation	2022
	• Graduate Scholarship, McMaster University.	2020 - 2024
	• Best Paper Award, EDGE Intelligence Workshop, Montreal, Canada.	2020
	• ECE Student Fellowship, University of Toronto	2019-20
	• Carleton University Senate Medal for Outstanding Master's Thesis (Nominated)	2019
	• CMC Electronics Inc. Bursary in Electrical Engineering	2017-18
	• GSA Travel Grant, Carleton University	Jun. 2018
	• Carleton University, Systems and Computer Engg. Dept. Scholarship	2017- 19

RELEVANT SKILLS	High Level Languages: C++, Python, C, Java Simulation Softwares: MATLAB, PSIM Hardware Exposure: Arduino, Microsoft Kinect, Novelda Xethru radar

VOLUNTEER EXPERIENCE	Represented Faculty of Engineering and Design of Carleton University at the annual event of Data Day 5.0

PROFESSIONAL MEMBERSHIPS	• IEEE Graduate Student Member	Nov. 2017- present
	• IEEE Signal Processing Society Student Member	Nov. 2017- present
	• Ontario Society of Professional Engineers - Student Member	Dec. 2017- present
	• IEEE YPAG, Ottawa Section	Nov. 2017- present