ARCHAN RAY

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EDUCATION

University of Massachusetts, Amherst MA. Ph.D. in Computer Science. *expected* September 2023
Thesis: Sublinear Algorithms for Matrices: Theory and Applications. *Advised by* Cameron Musco

Indian Statistical Institute, Kolkata. M.Tech. in Computer Science. July 2015
Thesis: Estimation of Facial Emotions for Emotion Synthesis. *Advised by* Dipti Prasad Mukherjee

Jalpaiguri Government Engineering College, West Bengal. B.Tech. in Computer Science. June 2013

RESEARCH EXPERIENCE

Graduate Research Assistant, University of Massachusetts, Amherst, MA May 2017 - *present*

- Compare sublinear matrix-vector methods for eigenvalue approximation (in preparation). *Sublinear Algorithms.*
- Approximate symmetric matrices in their spectral norm using deterministic algorithms. Applications include PSD testing, singular value and singular vector approximations (in submission [link to arxiv]). *Sublinear Algorithms.*
- Approximate all eigenvalues of symmetric matrices using random sampling (published at ICALP 2023 [link to arxiv]). *Sublinear Algorithms, Randomized Algorithms.*
- Approximate matrices, with applications to real world datasets arising in NLP (published at AAAI 2022 [link to arxiv]). *Sublinear Algorithms, NLP.*
- Create a database of annotated historical maps. Detect and recognize texts in historical maps (published as technical reports [link to tech report 1], [link to tech report 2]). *Computer Vision.*

Applied Research Intern, Amazon Web Services, New York, NY Summers 2019, 2020

- Perform pseudo semi-supervised learning for short texts. *Unsupervised Learning, NLP.*
- Visual question answering using transformer architecture. *Computer Vision, NLP.*

Visiting Research Scholar, Indian Statistical Institute, Kolkata, India August 2015 - August 2016

- Detect and recognize objects from planogram images (published at ECCV 2018 [link to paper], patented in 2020 [link to patent]). *Computer Vision, Graph Theory.*

Research Intern, TCS Innovation Labs, Gurgaon, India Summer 2014

- Classify images of human faces according to the emotions displayed. *Computer Vision, Support Vector Machines.*

Research Intern, Indian Space Research Organization (RRSC-E), Kolkata, India Summer 2012

- Identify distinct signals (spectral unmixing of endmembers) in a hyperspectral image. *Game Theory, Signal Processing*

LEADERSHIP EXPERIENCES

University of Massachusetts, Amherst MA August 2016 - *present*

- **Graduate Teaching Assistant**. Representing, Storing, and Retrieving Information (CS145), *Spring '21*; Algorithms for Data Science (CS514), *Spring '20*; Graduate Computer Vision (CS670), *Fall '19*; Graduate Machine Learning (CS589), *Spring '19*; Graduate Machine Learning (CS589), *Spring '17*; Introduction to Algorithms (CS311), *Fall '16*.
- **Mentor**. CARE PhD Application Support Program; Undergraduate Research Volunteers; Masters students at the Computer Vision Lab.
- **Co-organizing/Stewardship**. Machine Learning and Friends Lunch at UMass; Graduate Employee Organisation.

TECHNICAL STRENGTHS

Computer Languages & Tools Python, Matlab®, PyTorch, Tensorflow, LibSVM.

HONORS AND ACHIEVEMENTS

Dissertation Writing Fellowship Award, Manning College of Information and Computer Sciences, University of Massachusetts Amherst Spring 2023

AAAI-22 Student Scholarship, 36th AAAI Conference on Artificial Intelligence January 2022

Best Dissertation in M.Tech. Computer Science, Indian Statistical Institute, Kolkata July 2015