ARCHAN RAY

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EDUCATION

University of Massachusetts, Amherst MA. Ph.D. in Computer Science.   May 2024
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 - June 2024

· Compared sublinear matrix-vector query methods for eigenvalue approximation (in preparation). *Sublinear Algorithms.*
· Approximated symmetric matrices in their spectral norm using deterministic algorithms. Applications include PSD testing, singular value and singular vector approximations (in ITCS 2024 [link to arxiv]). *Sublinear Algorithms.*
· Approximated all eigenvalues of symmetric matrices using random sampling (extended abstract in ICALP 2023 and full paper in Algorithmica 2024 [link to arxiv]). *Sublinear Algorithms, Randomized Algorithms.*
· Approximated matrices, with applications to real world datasets arising in NLP (in AAAI 2022 [link to arxiv]). *Sublinear Algorithms, NLP.*
· Created 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.*

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

· Designed an algorithm to detect and recognize objects from planogram images (in ECCV 2018 [link to paper], patented in 2020 [link to patent]). *Computer Vision, Graph Theory.*

WORK EXPERIENCE

Postdoctoral Research Scholar, Sloan Kettering Institute, New York, NY   June 2024 - *present*

· Design algorithms for matrix approximation with applications in clinical data. *NLA, Randomized Methods, Optimization*

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

· Designed an algorithm for pseudo semi-supervised learning for short texts. *Unsupervised Learning, NLP.*
· Designed an algorithm for visual question answering using transformer architecture. *Computer Vision, NLP.*

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

· Designed an algorithm for classification of images of human faces with emotions. *Computer Vision, SVMs.*

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

· Designed an algorithm to identify distinct signals 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 (Over 15000 LOC), C; 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, 36$^{\text{th}}$ AAAI Conference on Artificial Intelligence

January 2022

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

July 2015