Soham Mukherjee

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EDUCATION

Purdue University — West Lafayette, IN, USA
PhD. Student, Advisor: Tamal K .Dey — Aug 2020 –Aug 2022(Expected)

The Ohio State University — Columbus, OH, USA
PhD Student, GPA: 3.94/4.00 — Aug 2017 –Jul 2020
- Transferred to Purdue with Prof. Tamal K Dey

Jadavpur University — Kolkata, India
B.E. in ECE, GPA: 9.51/10.00 — Aug 2013 –Jul 2017
- Thesis: "FPGA Implementation of Stochastic Circuit"

EXPERIENCE

Purdue University — West Lafayette, USA
Graduate Research Assistant — Aug 2020 - Aug 2022 (Expected)
- Deep Graph Generation
- Wasserstein Classifier

The Ohio State University — Columbus, USA
Graduate Research Assistant — Aug 2017 - Jul 2020
- Morse Theoretic Framework for Surface Reconstruction
- Gene-expression classification using persistent cycles

Georg-August Universität Göttingen — Göttingen, Germany
Summer Intern — May 2016 - Jul 2016
- Evaluation of Waspmote Cryptography

Jadavpur University — Kolkata, India
Undergraduate Researcher — Aug 2013 - Jul 2017
- FPGA Implementation of Stochastic Circuits

PUBLICATIONS

[1] T. Dey, S.Mandal, and S.Mukherjee, "Gene expression classification using topology and machine learning", Accepted in APBC 2021.

[2] T. Dey, S.Mukherjee, and Y. Wang, "Morse theoretic framework for surface reconstruction from noisy data", Submitted to DGMM 2021.

Teaching

- **Teaching Assistant** at The Ohio State University   Fall 2018
  Java Basics (CSE 1223)
- **Teaching Assistant** at The Ohio State University   Spring 2019
  Java Basics (CSE 1223)
- **Teaching Assistant** at The Ohio State University   Fall 2019
  Computer Architecture (CSE 3421)
- **Teaching Assistant** at The Ohio State University   Spring 2020
  Java Basics (CSE 1223)

Skills

- **Machine Learning:** Machine Learning on Graphs, Neural Networks
- **Data Analysis:** Topological Data Analysis, Morse Theory
- **Code:** C++, Python, Matlab
- **Skill Group:** PyTorch, PyTorch-Geometric, Tensorflow, Keras

Projects

- Surface Reconstruction from Noisy Data
  (Discrete Morse Theory, 2020)

  Denoising a noisy data is a fundamental task in this data-driven world. In this paper we provide a persistence-guided discrete Morse theoretic denoising framework. We then discuss the results applying our framework in the field of surface reconstruction from noisy point samples and also extracting surfaces from noisy 3D grayscale images. Our paper is a synergy between classical surface reconstruction and recent findings of Topological Data Analysis.

- Wasserstein Classifier
  (ML,Persistence Homology, 2020)

  Mass cytometry enables us to measure proteins that a single cell is made of. Thinking them as an n-dimensional point cloud we developed a classifier that takes account of Wasserstein distance between persistence diagram of two categories and obatined high accuracy on Covid-19 Data.

Scholarships and Awards

- OSU CSE Departmental Fellowship   2017–2018
- University Bronze Medal   2017
- DAAD Scholarship   2016

Extracurricular Activities

- Joint President of Buckeye Bengalis   2019–2020
  Enhancing cultural diversity at OSU by introducing a glimpse of Bengali culture.
- Member at Kaleidoscope   2017–Present
  Voice actor in this performing arts group
- Member of Science Club at Jadavpur University   2014–2017