Adrish Dey

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Education:

Netaji Subhash Engineering College (NSEC) *July 2017 - July 2021*
Bachelors of Technology in Computer Science and Engineering
Kolkata, India

Research Interests:

Geometric and Topological Deep Learning, Optimal Transport, Topological Data Analysis, Generative Models, Implicit Layers

Accepted Publications:

- **(Spotlight)** Topo Sampler: A Topology Constrained Noise Sampling for GANs; **Adrish Dey***, Sayantan Das; Neural Information Processing Systems (NeurIPS) 2020 Workshop on Topological Data Analysis and Beyond.
  - [Link to Report]

Research Presentations:

- **(Spotlight Talk**) Topo Sampler: A Topology Constrained Noise Sampling for GANs; To appear at Neural Information Processing Systems (NeurIPS) 2020 Workshop on Topological Data Analysis and Beyond.
  - [Link to Video]
  - [Link to Slides]

Research Service:

- Reviewer at ICLR 2021 Workshop on Geometry and Topology in Representation Learning.

Research Experience:

Massachusetts Institute of Technology (MIT) | CSAIL *July 2021 - August 2021*
Title: Summer Research Fellow (Summer Geometry Institute)
Mentored By: *Prof. David Bommes(University of Bern), David R. Palmer(MIT), Prof. Justin Solomon (MIT)*

- Implemented an OpenFlipper extension for optimizing folded-over quad-meshes via locally injective maps (with Prof. David Bommes, University of Bern)
- Explored continuous label switching in Bayesian Rotation Synchronization Problem (with David R. Palmer, MIT)
- Implemented proof-of-concept experiments for a novel riemannian gradient descent based approach to alleviate continuous label switching (with David R. Palmer, MIT)
  - [Link to Report]
- Exploring anisotropic schrödinger bridges on discrete manifolds. (with Prof. Justin Solomon, MIT)

Bachelors Thesis *April 2021 - July 2021*
Title: "Discrete Non-Euclidean Convolutions: Signal Processing and Random Walk on Simplicial Complexes'"
Mentored By: *Dr. Bastian Rieck (ETH Zurich, TUM Germany), Prof. Shilpi Bose (NSEC)*
Contributions: Explored a novel algorithm for simplicial diffusion convolution.

Independent Research | Remote *September 2020 - October 2020*
Mentored By: *Dr. Bastian Rieck (ETH Zurich)*

- Studied Disconnected Manifold Learning in GANs, using Persistent Homology.

- Implemented Experiments, Authored a NeurIPS Workshop Submission.
  - [Link to Report]

Opaltech.ai | Remote *May 2020 - August 2020*
Title: Research Engineering Intern
Mentored By: *Dr. Shahrouz Ryan Alimo (NASA Jet Propulsion Lab)*

- Explored and Implemented a RGBD SLAM based 3D Scene Reconstruction Framework.
- Implemented a Raytracing based Simulator for synthetic data generation

Rephrase.ai | Bangalore, Karnataka, India *December 2019 - February 2020*
Title: Applied Research Intern

- Designed a data pre-processing unit, for stream lining audio-splitting / filter-bank generation.
- Explored and implemented a sparsity-optimized version of a hessian-free second-order optimizer.
- Contributed to Generative Adversarial Network (GAN) driven domain translation of face expressions.

Open Source:

Google Summer of Code (TensorFlow) *May 2019 - August 2019*
Title: Open Source Student Developer
Mentored By: *Sachin Joglekar (Google), Vojtech Bardiovsky (Google)*

- Implemented Enhanced Super Resolution Generative Adversarial Network (ESRGAN) and published the trained model to TensorFlow Hub.
  - [Link to Github]
  - [Link to Pretrained Model] **(OVER 2K+ Downloads)**
- Implemented GAN Distillation Framework for ESRGAN generator. Achieved **~628x compression factor** with minimal drop in reconstruction quality. Capable of running **near-real-time** video frame super resolution on Pixel 3 CPU.
  - [Link to Github]
- Added Support for displaying AutoGraphed tf.functions, with TensorFlow `saved_model_cli`.
  - [Link to Github]