

ADRISH DEY

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RESEARCH INTERESTS

Geometric and Topological Deep Learning, Optimal Transport, Topological Data Analysis, Generative Models, Implicit Neural Networks. Widely, I am interested in explaining problems arising in machine learning, statistics, geometry processing and computer vision with differential geometry and topology.

EDUCATION

Netaji Subhash Engineering College – GPA 8.1 / 10.0 07/2017 - 07/2021

Bachelor in Technology (B.Tech) in Computer Science and Engineering.

EXPERIENCES

Massachusetts Institute of Technology

07/2021 - 08/2021

SUMMER GEOMETRY INSTITUTE (SGI) RESEARCH FELLOW

1. Implemented an [OpenFlipper](#) extension for optimizing folded-over quad-meshes via locally injective maps (with Prof. David Bommes, University of Bern)
2. Explored continuous label switching in Bayesian Rotation Synchronization Problem (with David R. Palmer, MIT)
3. 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](#)]
4. Exploring Anisotropic Schrödinger Bridges on discrete manifolds. (with Prof. Justin Solomon, MIT)

Bachelor's Thesis

04/2021 - 07/2021

Title: “Discrete Non-Euclidean Convolutions: Signal Processing and Random Walk on Simplicial Complexes”

Advisors: Dr. Bastian Alexander Rieck (ETH Zürich, currently Technische Universität München, Germany); Prof. Silpi Bose (Netaji Subhash Engineering College, Kolkata)

Contributions: Explored a novel method for defining simplicial diffusion convolution neural networks.

Independent Research

08/2020 - 10/2020

Mentored By: Dr. Bastian Alexander Rieck, ETH Zürich

1. Studied Disconnected Manifold Learning in GANs, using Persistent Homology.
2. Implemented Experiments and co-authored a NeurIPS Workshop Submission. [[Link to Report](#)]

Opaltech.ai

05/2020 - 08/2020

RESEARCH ENGINEERING INTERN

1. Explored and Implemented a RGBD SLAM based 3D Scene Reconstruction Framework with Dr. Shahrouz Ryan Alimo, NASA Jet Propulsion Lab
2. Implemented a Raytracing based Simulator for synthetic data generation

Rephrase.ai

12/2019 - 02/2020

RESEARCH INTERN

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

Google

05/2019 - 08/2019

GOOGLE SUMMER OF CODE STUDENT – TENSORFLOW

1. Implemented Enhanced Super Resolution Generative Adversarial Network (ESR-GAN) and published the trained model to TensorFlow Hub.
[\[Link to Github\]](#)
[\[Link to Pretrained Model\]](#) (2K+ **downloads**)
2. 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.
[\[Link to Github\]](#)
3. Added Support for displaying AutoGraphed tf.functions, with TensorFlow `saved_model_cli`. [\[Link to Github\]](#)

CONFERENCE PUBLICATIONS

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. **Spotlight presentation**

SERVICE

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