# Sagnik Ghosh

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## Education

**Indian Institute of Technology Madras** **Aug. 2019 – May 2023**
*Bachelor of Technology in Electrical Engineering (9.51/10)* *Chennai, India*

## Research Experience

**Lensless Stereo Imaging** **Guide: Prof. Kaushik Mitra**
*Computational Imaging Lab, IIT Madras* *March 2022 – May 2022*

- Lensless imaging allows us to design ultra-thin light-weight cameras by replacing the lens with a thin optical mask. Due to the absence of a focussing element, lensless images are highly multiplexed.
- Designed an end-to-end neural network that takes in a stereo pair of lensless measurements and estimates the disparity map.
- The network consists of two modules trained end-to-end - inversion module (to bring the lensless measurement to the intermediate image space) and the disparity estimation module.
- Performed experiments with cropped lensless measurements as input to the network by using trainable inversion layer and obtained reasonable disparity estimates for larger crop sizes.

**Dehazing Night-Time Images** **Guide: Prof. Kaushik Mitra**
*Computational Imaging Lab, IIT Madras* *July 2021 – February 2022*

- Worked on a data-driven method for joint dehazing and enhancement of hazy night-time images.
- Such images suffer from glow and glare due to multiple scattering of light rays from light sources and also suffer from low visibility and noise.
- Generated a synthetic dataset for night-time dehazing by simulating weather conditions on a game engine.
- Explored domain adaptation methods to improve generalization on real night-time hazy images.
- Implemented methods from dehazing literature, ran experiments with new loss functions, network architectures and training paradigms.

## Professional Experience

**NeuroPixel.AI Labs** **Bengaluru, India**
*Deep Learning Engineer* *December 2021 - January 2022*

∗ Part of the team working on Virtual Try-On required by fashion e-commerce websites.
∗ Performed tests, debugged and streamlined the process of obtaining segmentation masks and pose estimates required as inputs to the main network.
∗ Generated a dataset of apparels and corresponding images of humans wearing them from an e-commerce website, using a web scraper.

**Tathya Earth** **Mumbai, India**
*Image Processing Intern* *June 2021 - August 2021*

∗ Worked as part of the team responsible for processing and analysis of satellite images.
∗ Performed Relative Radiometric Normalization on time series satellite images by fitting transformations on Pseudo Invariant Features, followed by deblurring.
∗ Demonstrated the effectiveness of deblurring and radiometric normalization as a preprocessing step for higher-level tasks like semantic segmentation, which improved its accuracy significantly.

## Projects

**Music Recommender System** | *Pattern Recognition and Machine Learning Project* **April 2021 – May 2021**

∗ Worked on building a Music Recommender System, which predicted ratings for unseen pairs of customers and songs based on customer behaviour and song attributes.
∗ Implemented a Latent Matrix Factorisation Model from scratch to extract customer features and song features from the ratings of given pairs of customers and songs to predict ratings of unseen pairs.

## Relevant Coursework

- Fundamentals of Deep Learning
- Computational Photography
- Applied Programming Lab
- Information Theory
- Pattern Recognition and Machine Learning
- Digital Signal Processing
- Probability Foundations for Electrical Engineers
- Linear Algebra

## Scholastic Achievements

* Awarded Kishore Vaigyanik Protsahan Yojana Fellowship (KVPY-2018) with an All India Rank of **607**
* Secured an All India Rank of **2570** (out of 150,000+ candidates) in the Joint Entrance Examination Advanced (JEE Advanced), 2019
* Secured an All India Rank of **3920** (out of 1,300,000+ candidates) in the Joint Entrance Examination Mains (JEE Mains), 2019

## Technical Skills

**Languages**: Python, C++
**Frameworks**: PyTorch, Tensorflow
**Libraries**: OpenCV, NumPy, Scikit Learn, SciPy, Pandas
**Others**: Git, MATLAB

## Leadership

**Electronics Club** **March 2020 – March 2021**
*Coordinator* *Indian Institute of Technology Madras*

* Responsible for conducting technical sessions which witnessed participation of 200+ students
* Responsible for Public Relations and attracting a number of students towards the events conducted by the club
* Coordinated with different coordinators and project members on multiple projects