Moni Shankar Dey

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EDUCATION

IIT Bombay — Mumbai, India
M.Tech. Geo-Informatics | CPI - 9.58 — Aug 2020

Presidency University — Kolkata, India
M.Sc. Physics | CPI - 7.21 — Aug 2017

WORK EXPERIENCE

Rakuten Mobile, Japan — Nov 2020 - Present
Software Engineer

- Part of 30+ member iOS team responsible for developing **Link**, Rakuten Mobile's flagship app
- Entrusted with developing POC & features for **Voicemail, Greetings** and **Call** sections of the application.
- Identified and implemented test cases to increase **code quality** of the codebase from 8.9% to **17.1%**

Indian Statistical Institute, Kolkata — May 2019 - Aug 2019
Machine Learning Research Intern

- Investigated classical image processing operations and ways to incorporate them in learning based frameworks.
- Developed morphological network in **Tensorflow** for **style transfer** & **pencil sketch** on *MIT Adobe Dataset*
- Implemented **DMNN** for **crowd strength estimation** & achieved **18.3 %** improvement in accuracy over **M-CNN.**

SustLabs, Mumbai — Dec 2018 - Jan 2019
Data Science Intern

- Responsible for building **dataset** of 30+ home and industrial appliances for non intrusive load monitoring (**NILM**)
- Detected individual **appliance signature** from smart meter aggregate load data using Scikit & Pandas

KEY PROJECTS

Dual Morph-UNet (DPM-UNet) for Road & Building Segmentation from Satellite Images — Jul 2020 - Aug 2021
Research Project at CSRE, IIT Bombay

- Designed novel **DPM-UNet** for aerial object segmentation based solely on their **morphological features**.
- Incorporated residual and dense path in a UNet architecture resulting in reduced redundancy & small model size
- Achieved **SOTA** on road & building segmentation while having **10x less parameters** (**0.45 mil.**) than competitors

Image Restoration by Learning Morphological Opening-Closing Network — Aug 2019 - Sep 2020
Research Project jointly with ISI Kolkata

- Designed and implemented **ASF** based morphological network in Keras for **de-raining** and **de-hazing** images,
- Reconstructed de-hazed image by estimating **airlight** and **transmittance** map using joint DSSIM loss.
- Achieved **SOTA** on *O-HAZE, D-HAZY,* and *Rain* dataset for de-hazing & de-raining tasks respectively.

PUBLICATIONS

- **Dey, M. S.**, Chaudhuri, U., Banerjee, B., & Bhattacharya, A. (2021). **Dual-Path Morph-UNet for Road and Building Segmentation From Satellite Images**. *IEEE Geoscience and Remote Sensing Letters* (2021).
- R. Mondal, **M. S. Dey**, and B. Chanda, "**Image Restoration by Learning Morphological Opening-Closing Network**," *Mathematical Morphology-Theory and Applications*, vol. 4, no. 1, pp. 87–107,2020.

TECHNICAL SKILLS

- **Languages:** Python, Swift, C
- **Frameworks:** Tensorflow, Keras, CoreML, MapKit, RxSwift