Moni Shankar Dey

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Education

Indian Institute of Technology, Bombay — Aug 2020
M.Tech. in Geo-Informatics — CPI - 9.58

- Thesis: Attention Morph-UNet for Linear Structure Extraction from Satellite Images
- Key Courses: Machine Learning for RS, Deep Learning, Geospatial Data Analysis, Advanced Image Processing

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

- Thesis: Simulating Foregrounds for Redshifted HI 21 cm Signal Study of Epoch of Reionization (EoR)
- Key Courses: Computational Physics, Radio Astrophysics, Gravity & Cosmology, Quantum Field Theory

Experience

Rakuten Mobile — Nov 2020 - Present
Software Engineer — Tokyo

- Part of 30+ member iOS team responsible for developing **Link**, Rakuten Mobile's flagship app
- Entrusted with developing Proof of Concepts (**PoC**) & **features** for Voicemail, Greetings and Call sections
- Implemented unit **test case** for code robustness, including edge cases, usability & general reliability
- Collaborating closely with cross-cultural product & UI teams across the time zones under **agile** methodologies

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

- Investigated classical **image processing** operations and ways to incorporate them in learning based framework
- 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 — Dec 2018 - Jan 2019
Data Science Intern — Mumbai

- 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

Major Projects

DPM-UNet for Road & Building Segmentation from Satellite Images — Sep 2021

- Designed novel DPM-UNet for aerial object **segmentation** based solely on their **morphological** features.
- Incorporated **residual** and **dense** path in 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 — Sep 2020

- 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.

Skills

Python | Swift | C | Tensorflow | Keras | Scikit | TfLite | CoreML | MapKit | RxSwift | VIPER | Git | Agile | Scrum