Nafis Sadik Nihal

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LinkedIn GitHub

RESEARCH EXPERIENCE

Semantic Segmentation of Strong Gravitational Lensing Features Using Neural Networks
June 2024 — Present
Supervisor: Dr. Anowar J. Shajib, KICP and Einstein Fellow at The University of Chicago

- Utilized LENSTRONOMY to simulate images and labels of strong lensing systems with five distinct segmentation levels: Central deflector, Quasar host, Quasar, Satellite galaxy, and Background.
- Designed and implemented a **U-Net architecture** for semantic segmentation of the simulated data, developed for two systems: galaxy-quasar lenses and galaxy-galaxy lenses.
- Trained the model on simulated datasets, ensuring accurate identification and classification of lensing components.
- Validated the model using **real-life telescope data**, demonstrating robustness and practical applicability in real-world scenarios.
- Co-authored the paper *"DOLPHIN: AN ARTIFICIALLY INTELLIGENT LENS MODELER"* (in progress), summarizing the simulation, training, and validation process.

EDUCATION

Islamic University of Technology, Gazipur, Bangladesh 2018 — 2022
Bachelor of Science - Electrical and Electronic Engineering

- **CGPA**: 3.29/4.00: **Average GPA in Upper Division Lecture Classes**: 3.66/4.00
- **Thesis**: Finding Optimal Locations for Electric Vehicle Charging Stations Based on Genetic Algorithm.
- **Relevant Physics Courseworks**: Engineering Physics I, Engineering Physics II, Semiconductor Devices, Basic Mechanical Engineering (Thermodynamics), Engineering Materials (Quantum Mechanics), Electromagnetic Fields and Waves, Numerical Methods.

STANDARDIZED TESTS

TOEFL

Test Date: November 13, 2024

Section	Reading	Listening	Speaking	Writing
Score	28	26	25	24

Total Score: 103

GRE

Test Date: September 14, 2023

Section	Verbal Reasoning	Quantitative Reasoning	Analytical Writing
Score	145	162	4.00

Total Score (V + Q): 307

PROJECTS

Finding Optimal Locations for Electric Vehicle Charging Stations Based on Genetic Algorithm *Undergraduate Thesis* 2022

- Implemented a mathematical model to find optimal locations for EVs using Genetic Algorithm.
- Simulated the model and identified 5 locations in the Banani, Dhaka area using MATLAB.

Light Curve Analysis of Tabby's Star and Exoplanet Detection *Undergraduate Project* 2021

- Examined the light curve of Tabby's Star and highlighted its distinctive features.
- Utilized data from TESS and Kepler satellites, analyzed using Lightkurve and Astropy libraries.
- Illustrated the transit method employed in the detection of exoplanets.

EXTRACURRICULAR ACTIVITIES & OUTREACH

Team Draco – International Astronomical Search Collaboration (Certificate) May 2024
Contributor to NASA-supported Pan-STARRS Project

Speaker – CODING & TYPESETTING: An Intro to MATLAB and LaTeX(Poster) October 2023
Presented a talk on "Basics of Performing Calculus and Modeling Problems on MATLAB"
Event arranged by the Symmetry: Club of Physical Sciences, Independent University, Bangladesh

PROFESSIONAL EXPERIENCE

MARC Architects and Engineers Limited *Dhaka, Bangladesh*
Electrical Engineer November 2022 – September 2024

- Proficiently employed AutoCAD in electrical design work, producing accurate and intricate drawings, schematics, and layouts.

SKILLS

- **Python Tools:** Lightkurve, Astropy, Lenstronomy, TensorFlow, Keras.
- **Software:** SAOImageDS9, AstroImageJ, Stellarium, Photoshop, MATLAB.
- **Others:** Tableau, LaTeX, Microsoft Office Suite, Visual Studio Code.

CERTIFICATIONS

- **Neural Networks and Deep Learning** – Coursera (Certificate).
- **Improving Deep Neural Networks: Hyperparameter Tuning, Regularization, and Optimization** – Coursera (Certificate).
- **Structuring Machine Learning Projects** – Coursera (Certificate).