

MEGHNA RAJBHANDARI

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EDUCATION

Drexel University – Philadelphia, PA

Anticipated graduation - June 2025

Master of Science in Computer Science, GPA 4.00

Relevant Courses: Data Structure and Algorithms, System Basics, Software Design, Database Management, Data Analysis and Visualization, Applied Artificial Intelligence, Applications of Machine Learning

Kathmandu University – Dhulikhel, Nepal

June 2022

Bachelor of Technology in Environmental Engineering

Relevant Courses: Calculus, Linear Algebra, Differential Equations, Object Oriented Programming, Numerical Methods, Statistics, Environmental Modeling, GIS and Remote Sensing, Water and Wastewater Treatment, Air Pollution Control, Fluid Dynamics, Heat Transfer, Thermodynamics

RESEARCH/ WORK EXPERIENCES

Research Assistant

August 2022 – June 2023

Department of Environmental Science and Engineering, Kathmandu University — Dhulikhel, Nepal

- Developed and optimized a two-stage anaerobic digester model using Python with simultaneous laboratory experiment. The simulated model led to a 20% increase in methane production efficiency
- Facilitated weekly meetings and supervised undergraduate projects, resulting in successful project completions and publications
- Organized an inception seminar attended by key ministers and international delegates, enhancing project visibility

Internship – Environment Officer

June 2022 – August 2022

Project Implementation Directorate, Kathmandu Upatyaka KhanePani Limited, — Kathmandu, Nepal

- Supervised and monitored under-construction drinking water distribution networks and wastewater treatment plants
- Preparation of Environment Monitoring Plan, Bill of Quantity (BOQ)

PROJECTS

Effluent Water Quality Prediction – Philadelphia, PA

- Conducted statistical analysis on raw data to identify trends, focusing on effluent BOD, COD, and TSS.
- Analyzed and preprocessed data using Matplotlib, Seaborn, Plotly through histograms, box plots, heatmaps, outlier analysis, and Shapiro-Wilk test for normality
- Developed ML models (GBR, SVR, ANNs, etc.) in Python; fine-tuned parameters using Random Search and HyperOpt
- Evaluated models using metrics such as root mean square error (RMSE), mean absolute error (MAE), and R^2 ; identifying GBR as best-performing model with an R^2 value of 0.99

BioSortify — Philadelphia, PA

- Fine-tuned VGG16 pre-trained model with 200,000 images, achieving 98.8% accuracy in waste categorization
- Converted the model to TensorFlow.js, enabling a rapid inference speed of approximately 16ms
- Designed the application's front end using HTML, CSS, and JavaScript for engaging user experience
- Enabled real-time classification system on the website that processes each video frame with inference speed under 100ms

Modeling and Simulation of ASP — Dhulikhel, Nepal

- Developed and calibrated an activated sludge model (ASM1) using Python and AQUASIM, achieving 97.6% efficiency
- Conducted sensitivity analysis and optimization and validated the model using statistical analysis, improving accuracy and reliability
- Utilized Matplotlib for clear visualization of model parameters and results

Characteristic Behavior of concrete and its effect on Urban Heat Island – Dhulikhel, Nepal

- Simulated the effect of temperature rises due to concrete and the effects on urban heat island using Energy 2D

SKILLS

Programming Languages: Python, C, C++, Java, JavaScript, HTML/CSS, MATLAB

Software: ArcGIS, AutoCAD, AQUASIM, Energy2D, QGIS, MS-Office

Tools and Frameworks: GitHub, Excel, TensorFlow, PyTorch, FastAPI, OpenCV, SQL Developer, AWS, Jira/Agile

AWARDS

Dean Scholarship, Drexel University, awarded for academic excellence

Jan. 2024 – Present

Merit-Based Scholarship, Kathmandu University, received 100% scholarship for achieving the top position in the department

June 2020- Aug. 2021

EXTRACURRICULAR

Forum for Environmental Conservation and Management, Member

Aug. 2020 - June 2021

Annual Philly Hackathon, Contestant

Apr. 2024

Python for Engineering Workshop, Participant

June 2021

MANUSCRIPT/ ONGOING RESEARCH PAPER

Prediction of Wastewater Treatment Plant Effluent Water Quality Using Machine Learning Algorithms: A case study of Guheshwori Wastewater Treatment Plant