Bodruzzaman Khan

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EDUCATION

Master of Science, Agricultural Construction and Environmental Engineering, **Feb. 2024**
Sylhet Agricultural University, Sylhet

- **3.962/4 CGPA**
- **Thesis Title: Design of Sylhet City as A Sponge City to Control Flood Water**
  - Implemented machine learning models for land use and land cover (LULC) classification using satellite imagery over three decades (2003–2023).
  - Analyzed hydrological parameters and design storm events.
  - Conducted geospatial analysis to understand spatial patterns and trends.
  - Simulated urban runoff and assessed potential flooding scenarios.
  - Examined the effect of LULC change on stormwater runoff and drainage systems.
  - Evaluated the performance of existing and projected stormwater drainage systems.
  - Assessed the performance of sponge/Low Impact Development (LID) facilities in efficiently managing urban flooding.
  - Designed a modified stormwater drainage system to control floodwater.
  - **Tools employed:** *Google Earth Engine, Python, Machine learning, Ensemble learning, Artificial Neural Network, Pandas, Matplotlib, Numpy, Seaborn, EPA SWMM 5.2, MOLUSCE, ArcMap, QGIS, Grass GIS, Google Earth Pro, Google Earth, Microsoft Excel*
- **Coursework:** *Advanced AutoCAD, Advanced Environmental Modeling And GIS, Advanced Engineering Mathematics, Design of Hydraulic and Foundation Structure, Construction Management, Soil Engineering, Advanced Statistics, Advanced Concrete Technology, Water and Wastewater Treatment, Packaging and Storage Structure Engineering*

Bachelor of Science, Agricultural Engineering and Technology, **Jan. 2022**
Sylhet Agricultural University, Sylhet

- **3.846/4 CGPA**
- **Project Title: Effect of soil texture on the performance of agricultural machinery in Sylhet**
  - Field and laboratory-based research on the performance of agricultural machinery on various land types.
  - Gathered relevant qualitative and quantitative data and samples from different agricultural fields in Sylhet, Bangladesh.
  - Interpreted soil textural classes in terms of machine performance.
  - Implemented a Python program for soil textural classes using the Pandas module, the getTexture library, and the spreadsheet application.
  - Developed a user-friendly graphical user interface (GUI) for the classification of soil textural classes
  - **Machines and Tools employed:** *Combine harvester, Hydrometer analysis, Python, Pandas, Tkinter, Custom Tkinter*
- **Coursework:** *Engineering Mathematics, Differential Equations, Vector calculus, Numerical analysis, Computer Programming (C, HTML, CSS), DBMS, AutoCAD, Engineering Mechanics, Electrical Engineering, Agricultural Power, Agricultural Machinery, Agricultural Mechanization, Strength of Materials, Materials and Cost Estimation, Soil Mechanics, Foundation Engineering, Environmental Engineering, Fluid Mechanics, Irrigation and Drainage Engineering, Groundwater Engineering, Hydraulics, Meteorology, Soil Science, Economics, Statistics, Food Science and Engineering*

WORK EXPERIENCE

Research Assistant **July 2019–Feb. 2024**
Sylhet Agricultural University - Agricultural Construction and Environmental Engineering Lab

- Pioneered the establishment of hydrological information and comprehensive geographic shapefiles for Sylhet City, addressing a significant gap in the region's information infrastructure.
- Designed an environmentally friendly landscape plan for Sylhet city, meticulously addressing the potential challenges within its drainage system.
- Implemented sustainable flood mitigation strategies by incorporating various green infrastructure concepts to adeptly manage urban flooding in Sylhet.
- Employed supervised classification in the development of land cover models, integrating indices such as EVI, NDVI, NDBI, and MNDWI.
- Established a robust forecasting system for climatic parameters through time-series analysis.
- Conducted an in-depth analysis of soil physical properties, including soil texture, porosity, bulk density, moisture content, and soil bearing capacity, to assess their impact on the performance of agricultural machinery. Utilized laboratory methods to accurately

identify these soil attributes and subsequently correlated them with machine performance. Identified and addressed challenges hindering effective machinery operation in Sylhet, Bangladesh.

PUBLICATIONS

Bayesian Optimized Multimodal Deep Hybrid Learning Approach for Tomato Leaf Disease Classification
Scientific Reports (nature.com) *Under Revision*

PROJECTS

***Plant leaf disease classification* system** **March 2023**
Coded a custom CNN model from scratch in Python to develop intuitive and highly functional classification systems. Rigorously validated these models using diverse evaluation metrics and loss curves, facilitating a reliable identification process for potential plant diseases.

Automated soil texture identification system
Developed a user-friendly UI in Python for the Windows operating system, enabling accurate calculation of soil particles and textural classes. Incorporated various calibration measures to enhance precision. This development is expected to significantly contribute to the research community by automating the identification of soil properties, ultimately streamlining and expediting the research process.

EXTRACURRICULAR ACTIVITIES

Volunteer Experience BADHAN-A Volunteer Blood Donor's Organization, Sylhet Agricultural University Unit, Sylhet, Bangladesh • *Joint Convener* October 23rd, 2020–October 23rd, 2021at Abdus Samad Azad Hall, Sylhet Agricultural University, Sylhet, Bangladesh • Performed free blood grouping campaign

Sylhet Agricultural University Photographic Society, Sylhet Agricultural University, Sylhet, Bangladesh • *Vice-President* (December 31st, 2021–May 25th, 2023) • Arranged 3rd National Photography Exhibition and Competition

SKILLS & INTERESTS

Languages and Programming: Python, HTML/CSS, SQL, C, JavaScript, Object Oriented Programming
Tools: Numpy, Pandas, Seaborn, SciPy, Matplotlib, Plotly, Jupyter Notebooks, GitHub, Power BI, Office Suite
Data science and Artificial Intelligence: Machine Learning (Supervised & Unsupervised Learning), Ensemble Learning, Deep Learning (TensorFlow, Keras), Computer Vision (OpenCV), Image Processing
Remote sensing and GIS: Google Earth Engine, ArcGIS, QGIS, Grass GIS, Google Earth Pro, Google Earth
Design and Engineering application: EPA SWMM, AutoCAD, SketchUp
Internet of Things: Arduino
Graphics Software: Adobe Photoshop, Adobe Illustrator
Soft Skills: Problem Solving, Critical Thinking, Communication, Creativity, Team work, Project Management, Writing skill, Leadership, Analytical skill
Language Skills: Bengali and English Language (Proficient in Reading, Writing, Listening, and Speaking)
Interests: Exploring new things daily, Programming, Mathematical problem solving, Designing, Traveling

ACHIEVEMENTS & CERTIFICATIONS

National Science and Technology Fellowship 2022–2023, Ministry of Science and Technology, Government of the People's Republic of Bangladesh.
Supervised Machine Learning: Regression and Classification
Excel Skills for Business: Intermediate II
Excel Skills for Business: Intermediate I
Excel Skills for Business: Essentials

REFERENCE

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