

FERDOUS SYEDA NYMA

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INTERESTS

- **Machine Learning:** Deep learning, Computer vision, Person re-identification, Adversarial learning, Object detection

PROGRAMMING SKILLS

- **Platforms:** PyTorch, Tensorflow, PyCharm, MATLAB, Linux, Unity, and GIT.
- **Languages:** Python, C#, C/C++, SQL, Java, PHP, Javascript

PROJECTS

- **Domain Translation:** Developed a framework for transferring target from MW to LW and LW to MW images using deep learning techniques. Then quality of the extracted targets are explored comparing the performance of the recognition framework on real and synthetic targets.
- **UAV based Object Re-identification:** Proposed a multi-scale adaptive feature fusion approach utilizing a fairly recent architecture, pyramid vision transformer to perform object re-identification for UAV-based scenario.
- **Joint Optimization for Super-resolution and Object Detection:** Implemented a model for object recognition in aerial imagery based on jointly optimized deep learning framework using generative adversarial network (GAN) and object detection technique.
- **Deep Fingerprint Matching from Non- Contact to 2D Legacy Rolled Fingerprints:** Developed a deep fingerprint conditional generative adversarial network to estimate the ridge pattern from finger photos given the corresponding fingerprints.
- **A Semantic Content based News Recommendation System for Cross-lingual Context:** Applied the concepts of ontology to develop a cross-lingual news recommendation framework for recommending related news in Bengali and English for user.
- **Randomized Energy-based AODV Protocol for Wireless Ad-hoc Network:** Designed and implemented energy efficient modified wireless Ad-Hoc protocol to prevent congestion problem.
- **Biomass Sustainability Prediction:** Developed an efficient deep ensemble model to predict different biomass sustainability indicators.
- **Green House Gas Forecasting:** Proposed a novel model for green house gas forecasting. Also, studied importance of different features using machine learning techniques for this task.

EXPERIENCE

- **West Virginia University** Morgantown, WV
Graduate Research Assistant Aug. 2018 - Present
 - Object detection in Aerial Imagery: Designed methods to perform object recognition in aerial imagery using deep learning techniques.
 - Joint optimization for Super-resolution and Object Detection: Developed a jointly optimized architecture for object recognition in super resolved aerial imagery.
 - Domain Transfer from MWtoLW and LWtoMW: Designed an architecture for transferring MW to LW and vice versa.
 - Facial Expression Recognition: Performed experimentation with different deep learning models such as ResNet, VGG to assess face recognition performance. Also, performance of classical feature extractors have been investigated.
 - Contactless to Contact based Fingerprint Matching: Registering fingerphoto to the corresponding fingerprint is performed. Ridge structure of the fingerprint is estimated from fingerphoto using conditional GAN. A matching score is computed based on the generated fingerprint and ground truth fingerprint minutia matching.
 - Object ReID using Pyramid Vision Transformer: A transformer based architecture that exploits multi-scale feature space has been explored. Experimental results on two aerial surveillance datasets support the proposed idea.
 - Biomass sustainability indicator prediction: Performed machine learning analysis and developed a robust deep ensemble based model for biomass sustainability prediction.
- **American International University** Dhaka, Bangladesh
Lecturer January. 2018 - Jul. 2018
 - Conducted classes on Data Structure as instructor.
- **Bangladesh University of Engineering and Technology** Dhaka, Bangladesh
Research Assistant April 2016 - December 2017
 - Developed a model that will help cross-lingual news recommendation.
- **Daffodil International University** Dhaka, Bangladesh
Lecturer January. 2017 - August 2017
 - Conducted classes on Wireless Programming, Computer Networks. Also, worked as an instructor for Unity-3D game development framework.

Bangladesh University of Business and Technology

- **Lecturer**

- Conducted classes on C++ as instructor.

Dhaka, Bangladesh
June 2014 - November 2015

EDUCATION

- **West Virginia University**

- *Doctor of Philosophy in Computer Engineering (Deep /Machine Learning)*

Morgantown, WV
Aug. 2018 – May 2024 (exptd.)

- **Bangladesh University of Engineering and Technology**

- *M.Sc In Computer Science And Engineering*

Dhaka, Bangladesh
October 2014 – June 2017

- **Military Institute of Science and Technology**

- *B.Sc In Computer Science And Engineering*

Dhaka, Bangladesh
Jan 2010 – Jan. 2014

PUBLICATIONS

- **SN. Ferdous, M. M. Ali:** Issues in entry creation for an educational institution and searching in semantic web, ICCIE, 2015.
- **SN. Ferdous, M.S Hossain:** Randomized Energy-Based AODV Protocol For Wireless Ad-Hoc Network, iCEEICT, 2016.
- **SN. Ferdous, M.M. Ali:** A Semantic Content Based Recommendation System for Cross-Lingual News, icIVPR, 2017.
- **SN. Ferdous, M. Mostofa, N. M. Nasrabadi:** Super resolution-assisted deep aerial vehicle detection, SPIE Defense+Commercial Sensing,2019.
- **SN. Ferdous, M. Mostofa, N. M. Nasrabadi:** Target classification in infrared imagery by cross-spectral synthesis using GAN, SPIE Defense+Commercial Sensing, 2020 (**Best Paper**)
- **M. Mostofa, SN. Ferdous, N. M. Nasrabadi:** A joint cross-modal super-resolution approach for vehicle detection in aerial imagery, SPIE Defense+Commercial Sensing, 2020.
- **SN. Ferdous, A. Dabouei, J. Dawson and N. M. Nasrabadi:** Super-resolution Guided Pore Detection for Fingerprint Recognition, ICPR, 2020.
- **M. Mostofa, SN. Ferdous, N. M. Nasrabadi,:** Joint-SRVDNet: Joint Super Resolution and Vehicle Detection Network, IEEE Access, 2020.
- **SN. Ferdous, X. Li, S. Lyu:** Uncertainty Aware Multitask Pyramid Vision Transformer for UAV-based Object Re-Identification, ICIP 2022.
- **SN. Ferdous, X. Li, K. Sahoo, R. Bergman:** Toward sustainable crop residue management: A deep ensemble learning approach, Bioresource Technology Reports 2023.
- **SN. Ferdous, X. Li:** Robust Person Re-Identification via Self-Supervised Learning with Occlusion Handling, IEEE Transactions on Biometrics, Behavior, and Identity Science(Under Review).
- **SN. Ferdous, JP. Ahire, R. Bergman, X. Li, J. Wang:** A Machine Learning Model using Snapshot Ensemble Approach for Forecasting Soil Respiration of Deciduous Forest in Oak Ridge National Laboratory, Science of the Total Environment (Under Review).

LEADERSHIP

- **Reviewer:** IEEE Access, Pattern Recognition Letter