# Tashnim Jabir Shovon Chowdhury

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## Summary

Possess over **4 years of experience** in designing and developing **machine learning and deep leaning** models and a strong foundation in **software engineering**, with **3 years of experience** in using **C++, Python, C#**. Proficient in ML frameworks such as **PyTorch, OpenCV, scikit-learn, and pandas**. Skilled in **computer vision (semantic segmentation, object detection), generative AI, natural language processing (NLP) (Intel, Comcast), and large language models (LLM) (Comcast)**

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## Skills

**Programming Languages & Tools:** C, C++, C#, Visual Basic, Python, PyTorch, Tensorflow, OpenCV, Scikit-Learn, Pandas, Numpy, Docker, MATLAB, R, MySQL, .NET, Visual Studio, AWS (EC2).

## Professional Experience

**Machine Learning Graduate Research Intern :** **Comcast** June 2023 – August 2023

- Performed prompt engineering research on different foundation models (LVLM/LLM) (MiniGPT-4, LLaVA, Flamingo) to get optimum performance based on text and image prompts.
- Designed and implemented feature alignment of a smaller model based on a bigger models to achieve better distillation performance based on foundation model MiniGPT-4. (using **Python, PyTorch, Docker**)
- Designed large vision language model (MiniGPT-4, LLaVA) based knowledge distillation network.

**Graduate Software Engineer Intern :** **Intel** May 2022 – August 2022

- Implemented unsupervised text clustering algorithms for paging classification. Several preprocessing steps were applied on and the results were analyzed based on a paging dataset.
- Implemented an automatic paging message classification system. The system communicates with different databases and compares among texts using Regular Expressions to classify different paging messages (using **Python, MySQL**).

**Software Development Engineer II:** **Fluence Automation** July 2018 – December 2019

- Designed and developed software for automated dumper and unloader system for books sorting (using **C++**).
- Developed software for mail processing sorting machine which uses mechanical divert including test bed for the mechanical divert to test the life expectancy of the divert (using **C++**).
- Implemented three machine vision algorithms in Parcel Detection System (using **C++**).
- Created several test beds for different sorting machines to test the life cycle of different machine components, debug software issues, and customer support.
- Developed softwares for several portable mail sorting machines and corresponding user interfaces (UI) (using **C++, C#**)

**Software Engineer:** **POST-IS** Mar 2017 – June 2018

- Optimized and developed tools for automating mail processing system. I was involved in adding new features in the system as well as making it dynamic. This software has interfaces with camera, scale, and a Linux control board (using **C++**).
- Developed tools on Linux environment to control light intensity based on sensor's data in mail sorting system (using **C++**).
- Developed tools to implement data plotting, logger, and message exchanging test tool (using **C#**).
- Created a data truthing tool that allows the user to verify system's decision, and make true decision based on captured images (using **Visual Basic**).

## Academic Research Experience

**Graduate Research Assistant:** **UMBC** January 2020 – Present

- Developed **self-attention** based semantic segmentation techniques, and implemented on aerial imagery for natural disaster damage assessment.
- Developed consistency regularization based **semi-supervised** method for aerial image segmentation.
- Developed two semantic segmentation datasets named FloodNet and RescueNet.
- Currently working on **probabilistic semi-supervised** segmentation method.

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## Education

University of Maryland, Baltimore County (UMBC) — Baltimore, Maryland, USA
**PhD in Information Systems (pursuing)** — *January 2020 – May 2024 (expected)*

The University of Toledo — Toledo, Ohio, USA
**MS in Electrical Engineering** — *August 2014 – December 2016*

Chittagong University of Engineering & Technology — Chittagong, Bangladesh
**BSc. in Electrical & Electronic Engineering** — *2008 – 2012*

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## Selected Publications (h-index: 7):

- **Tashnim Chowdhury**, Colin Elkin, Vijay Devabhaktuni, Jared Oluoch, and Danda B. Rawat,"*Advances on Localization Techniques for Wireless Sensor Networks: A Survey*," Computer Networks, Elsevier, 2016 (**Citation:179**).
- Maryam Rahnemoonfar, **Tashnim Chowdhury**, Argho Sarkar, Debvrat Varshney, Masoud Yari, and Robin Murphy,"*Floodnet: A high resolution aerial imagery dataset for post flood scene understanding*," in IEEE Access, vol. 9, pp. 89644-89654, 2021, doi: 10.1109/ACCESS.2021.3090981 (**Citation:134**).
- **Tashnim Chowdhury**, Maryam Rahnemoonfar, Robin Murphy, and Odair Fernandes,"*Comprehensive semantic segmentation on high resolution uav imagery for natural disaster damage assessment*," 2020 IEEE International Conference on Big Data (Big Data) (**Citation:23**).
- **Tashnim Chowdhury**, and Maryam Rahnemoonfar,"*Attention For Damage Assessment*," ICML 2021 Workshop Tackling Climate Change with Machine Learning (**Citation:4**).
- **Tashnim Chowdhury**, and Maryam Rahnemoonfar,"*Attention Based Semantic Segmentation on UAV Dataset For Natural Disaster Damage Assessment*," 2021 International Geoscience and Remote Sensing Symposium (IGARSS) (**Citation:12**).
- **Tashnim Chowdhury**, and Maryam Rahnemoonfar,"*Self Attention Based Semantic Segmentation on A Natural Disaster Dataset*," 2021 IEEE International Conference on Image Processing (ICIP) (**Citation:6**).
- Maryam Rahnemoonfar, **Tashnim Chowdhury**, and Robin Murphy,"*RescueNet: A High Resolution UAV Semantic Segmentation Dataset for Natural Disaster Damage Assessment*," Scientific data (*Nature*) 10.1 (2023): 913 (**Citation:23**).

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## Graduate Projects:

- Attention Based Sentiment Analysis in Natural Language Processing.
- Semantic Segmentation Of CT Scans To Detect COVID-19.
- Unsupervised semantic segmentation on UAV images.
- Implementation of Causal Inference for Semantic Segmentation.

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## Extra-Curricular Activities:

- Organizer of two computer vision challenges in EARTHVISION2021 (CVPR) and in AIHRD2023 (ICLR).
- Served as a paper reviewer for: ICTAI 2021, AIHARDW Workshop 2021(organized in conjunction with NIPS 2021), AAMAS 2021, OJVT Journal, NIPS Dataset and Benchmark Conference 2022, 2023.