

Work Experience

Huawei Noah's Ark Lab

Senior Computer Vision Researcher

TORONTO, CANADA

Feb '22 – present

- **Multi-modal Learning:** Developing artificial intelligence system that learns concepts shared across video, audio, and text (multi-modal representation learning, meta-learning, online adaptation).
 - **Generative AI:** Developing scalable generative models (efficient diffusion model, text-to-image generation, knowledge distillation, efficient fine-tuning).
 - **3D Gaze Estimation:** Developed and implemented deep learning models for accurate 3D gaze estimation from face and eye images or video sequences (self-supervised learning, domain adaptation and generalization, robust representation learning).
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Education

Ryerson University

Ph.D. in Computer Science

TORONTO, CANADA

Sep 2017 – Jan 2022

- Advisors: Dr. Neil Bruce & Dr. Kosta Derpanis
- Governor General Gold Medal for outstanding dissertation and academic excellence

University of Manitoba

M.Sc. in Computer Science

WINNIPEG, CANADA

Sep 2015 – Jun 2017

- Advisors: Dr. Yang Wang & Dr. Neil Bruce
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Publications & Preprints

1. **M. A. Islam**, M. Kowal, K. G. Derpanis, and N. Bruce. **SegMix: Co-occurrence Driven Mixup for Semantic Segmentation and Adversarial Robustness**. *International Journal on Computer Vision (IJCV)* 2023.
2. **M. A. Islam**, M. Kowal, P. Esser, B. Ommer, K. G. Derpanis, and N. Bruce. **Maximizing Mutual Shape Information**. In *British Machine Vision Conference (BMVC)*, 2022.
3. M. Kowal, M. Siam, **M. A. Islam**, N. Bruce, R. Wildes and K. G. Derpanis. **A Deeper Dive Into What Deep Spatiotemporal Networks Encode: Quantifying Static vs. Dynamic Information**. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.
4. **M. A. Islam**, M. Kowal, S. Jia, K. G. Derpanis, and N. Bruce. **Global Pooling, More than Meets the Eye: Position Information is Encoded Channel-Wise in CNNs**. In *IEEE International Conference on Computer Vision (ICCV)*, 2021.
5. **M. A. Islam**, M. Kowal, S. Jia, K. G. Derpanis, and N. Bruce. **Simpler Does It: Generating Semantic Labels with Objectness Guidance**. In *British Machine Vision Conference (BMVC)*, 2021.
6. **M. A. Islam**, M. Kowal, P. Esser, S. Jia, B. Ommer, K. G. Derpanis, and N. Bruce. **Shape or Texture: Understanding Discriminative Features in CNNs**. In *International Conference on Learning Representations (ICLR)*, 2021.
7. S. Aich, J. Vianney, **M. A. Islam**, M. Kaur, and B. Liu. **Bidirectional Attention Network for Monocular Depth Estimation**. In *IEEE International Conference on Robotics and Automation (ICRA)*, 2021.
8. Z. A. Nazi, F. R. Mashrur, **M. A. Islam**, and S. Saha. **Fibro-CoSANet: Pulmonary Fibrosis Prognosis Prediction using a Convolutional Self Attention Network**. *Physics in Biology and Medicine*, 2021.
9. **M. A. Islam**, M. Kowal, K. G. Derpanis, and N. Bruce. **Feature Binding with Category-Dependant MixUp for Semantic Segmentation and Adversarial Robustness**. In *British Machine Vision Conference (BMVC)*, 2020 (Oral Presentation, Selected one of the Best Papers).
10. **M. A. Islam**, Sen Jia, and N. Bruce. **How much Position Information Do Convolutional Neural Networks Encode?**. In *International Conference on Learning Representations (ICLR)*, 2020 (Spotlight Presentation).

11. Rezaul Karim, **M. A. Islam**, and N. Bruce. **Distributed Iterative Gating Networks for Semantic Segmentation**. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2020.
12. M. Kalash*, **M. A. Islam***, and N. Bruce. **Relative Saliency and Ranking: Models, Metrics, Data and Benchmarks**. *IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI)*, 2019.
13. Rezaul Karim, **M. A. Islam**, and N. Bruce. **Recurrent Iterative Gating Networks for Semantic Segmentation**. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2019.
14. **M. A. Islam**, M. Kalash, and N. Bruce. **Semantics Meet Saliency: Exploring Domain Affinity and Models for Dual-Task Prediction**. In *British Machine Vision Conference (BMVC)*, 2018.
15. **M. A. Islam**, M. Kalash, and N. Bruce. **Revisiting Salient Object Detection: Simultaneous Detection, Ranking, and Subitizing of Multiple Salient Objects**. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018 (**Oral Presentation**).
16. **M. A. Islam**, M. Rochan, S. Naha, N. Bruce, and Y. Wang. **Gated Feedback Refinement Network for Coarse-to-Fine Dense Semantic Image Labeling**. arXiv Preprint, 2018.
17. Rezaul Karim*, **M. A. Islam***, N. Mohammed, and N. Bruce. **On the Robustness of Deep Learning Models to Universal Adversarial Attack**. In *IEEE Canadian Conference on Computer and Robot Vision (CRV)*, 2018 (**Oral Presentation**).
18. **M. A. Islam**, M. Rochan, N. Bruce, and Y. Wang. **Gated Feedback Refinement Network for Dense Image Labeling**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017.
19. **M. A. Islam**, M. Kalash, M. Rochan, N. Bruce, and Y. Wang. **Salient Object Detection using a Context-Aware Refinement Network**. *British Machine Vision Conference (BMVC)*, 2017.
20. **M. A. Islam**, S. Naha, M. Rochan, N. Bruce, and Y. Wang. **Label Refinement Network for Coarse-to-Fine Semantic Segmentation**. arXiv preprint, 2017.
21. **M. A. Islam**, N. Bruce, and Y. Wang. **Dense Image Labeling Using Deep Convolutional Neural Networks**. *IEEE Canadian Conference on Computer and Robot Vision (CRV)*, 2016. (**Oral Presentation**)

Under Review:

1. **M. A. Islam**, M. Kowal, S. Jia, K. G. Derpanis, and N. Bruce. **Position, Padding and Predictions: A Deeper Look at Position Information in CNNs**. Under review at *International Journal on Computer Vision (IJCV)* 2023.
2. M. Kowal, M. Siam, **M. A. Islam**, N. Bruce, R. Wildes and K. G. Derpanis. **Quantifying and Learning Static vs. Dynamic Information in Deep Spatiotemporal Networks**. Under review in *IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI)*, 2023.

Research Experience

Ryerson Computer Vision Lab

Graduate Research Assistant

TORONTO, CANADA

May '18 – present

- **Human-Centric AI:** Understanding various human-centric properties of current AI models beyond their accuracy such as explainability, interpretability, generalization, fairness and bias. [IJCV 2022, BMVC 2022, CVPR 2022, ICCV 2021, ICLR 2021, arXiv 2021, BMVC 2020, ICLR 2020]
- **Feedback and Gating:** How can information be gated, selected and routed through deep neural networks? [WACV 2019, WACV 2020]
- **Learning with Weak Supervision:** Developed a weakly/semi supervised approaches for producing pixel-level mask for any object-like regions. [BMVC 2021]

Huawei Noah's Ark Lab

Research Intern

TORONTO, CANADA

June '20 – Sep '20

- **Video Object Segmentation:** Implemented a weakly supervised method to segment objects of interest from videos.

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Research Intern

TORONTO, CANADA

May '19 – Oct '19

- **Visual Perception for Autonomous Driving:** Implemented a uncertainty aware feedback network for 3D object detection from point clouds.
- **Monocular Depth Estimation for Autonomous Driving:** Collaborated with a multidisciplinary team of researchers and engineers to develop a bidirectional attention mechanism for estimating depth from a single image. [ICRA 2021]

University of Manitoba, Computer Vision Lab

Graduate Research Assistant with Dr. Yang Wang & Dr. Neil Bruce

WINNIPEG, CANADA

Sep '15 – Apr '18

- **Relative Saliency and Ranking Salient Objects:** Generalize the problem of salient object detection to salient object ranking and introduced a novel method for saliency ranking. [CVPR'18, BMVC'18, TPAMI'19]
- **Semantic Labeling:** Developed end-to-end models for dense labeling problems (e.g., semantic segmentation, semantic object part parsing, salient object detection/segmentation)? [arXiv'18, CVPR'17, BMVC'17, arXiv'17, CRV'16]

Skills

- **Deep Learning Frameworks:** PyTorch, Caffe, Tensorflow2.0.
- **Languages:** Python, MATLAB, C++ **Others:** Docker, Linux, Vim, VSCode, Eclipse, tmux, Latex

Honors & Awards

- The Governor General Gold Medal, Governor General of Canada, 2022.
- Vector Institute Postgraduate Affiliate/Fellowship Award, Vector Institute for AI, Toronto, 2021-2022.
- Outstanding Reviewer, CVPR 2021.
- Ryerson Graduate Development Award, Ryerson University, 2020-2021.
- Outstanding Reviewer, ECCV 2020.
- Ontario Graduate Scholarship (OGS), Ryerson University, 2019-2021.
- Vector Institute Postgraduate Affiliate/Fellowship Award, Vector Institute for AI, Toronto, 2019-2021.
- Ryerson Graduate Fellowship (RGF), Ryerson University, 2018-2021.
- Ryerson Entrance Scholarship (Domestic level tuition), Ryerson University, 2018-2021.
- University of Manitoba Graduate Fellowship (UMGF), University of Manitoba, 2018-2021.
- Computer Science Entrance Awards, University of Manitoba, 2017 - 2021.
- International Graduate Student Scholarship (IGSS), University of Manitoba, 2017-2018.
- Faculty of Science Graduate Studentship Scholarship, University of Manitoba, 2015 - 2017.
- International Graduate Student Entrance Scholarship (IGSES), FGS, UofM, 2015 - 2016.

Academic Service

- **Conference Reviewer:** BMVC 2022, ECCV 2022, ICCV2021, CVPR 2021, NeurIPS 2020, ECCV 2020, WACV 2020, CVPR 2019, WACV 2019
- **Journal Reviewer:** IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI), Computer Vision and Image Understanding (CVIU)