Matthew Kowal, B.A.Sc, M.Sc, Ph.D Student

Computer Vision Researcher

matt2kowal@gmail.com @MatthewKowal9

https://mkowal2.github.io/

https://www.linkedin.com/in/mkowal2/

Education

2020 – Present **Ph.D. Computer Science, York University** Deep Learning for Video Analysis.
Supervisor: Dr. Kosta G. Derpanis

2018 – 2020 **M.Sc. Computer Science, Ryerson University** Deep Learning and Computer Vision.
Thesis title: *An Evaluation of Modalities for Action Recognition*.
Supervisors: Dr. Kosta G. Derpanis and Dr. Neil Bruce

2013 – 2017 **B.A.Sc. Applied Mathematics and Engineering, Queens University**
Capstone title: *Region Tracking in an Image Sequence: Preventing Driver Inattention*.
Awarded Keyser Award for best capstone project in discipline.

Selected Experience

2023 – Present **Research Intern @ Toyota Research Institute - Machine Learning Team (Palo Alto)** - Worked with a multidisciplinary team proposing, conducting, and transferring cutting-edge research in Machine Learning with a focus on video understanding.

2021 – Present **Technical Lead @ Vector Institute** - Leading a team of industry data-scientists in a computer vision project for video understanding in collaboration with Intact Insurance, RBC, and Thomson Reuters.

2020 – 2022 **Lead Scientist in Residence @ NextAI** - Lead technical consultant for AI-based startups. Provided support on the implementation of state-of-the-art deep learning algorithms for various industry applications.

2020 – 2021 **Organizing Chair @ OWCV** - Co-founder and organizing chair of the Ontario Workshop on Computer Vision, a student-focused workshop for computer vision researchers in Ontario. OWCV Website.

2018 – Present **Teaching Assistant** - TA support (e.g., marking, supervised course projects, helped with lectures) for the following classes: Machine Learning, Reinforcement Learning, Computer Vision, Advanced Algorithms, Big Data.

2018 – 2018 **Research Assistant @ Baylor University** - Assisted in research on relativistic properties of temperature, heat conduction, thermal diffusivity.

2017 – 2018 **Mechanical Engineer in Training (EiT) @ Morrison Hershfield** - Analysis and design of mechanical systems: controls, electrical, HVAC, hydro, fire protection.

2015 – 2016 **Structural Assistant @ Morrison Hershfield** - Conducted bridge inspections in office and on site. Half-cell testing, coring, and deformation analysis. Soffit, deck, and abutment mapping.

Volunteer Service - Reviewer for conferences and journals: CVPR, ICCV, NeurIPS, CVIU.

Research Publications

Journal Articles

1. Kowal, M., Siam, M., Islam, A., Bruce, N., Wildes, R., & Derpanis, K. (2022b). Quantifying and Learning Static vs. Dynamic Information in Deep Spatiotemporal Networks. *Arxiv PrePrint*. Retrieved from https://arxiv.org/abs/2108.09929
2. Islam, A., Kowal, M., Derpanis, K., & Bruce, N. (2021). SegMix: Co-occurrence Driven Mixup for Semantic Segmentation and Adversarial Robustness. *The International Journal of Computer Vision (IJCV)*. Retrieved from https://arxiv.org/abs/2108.09929
3. Islam, A., Kowal, M., Jia, S., Derpanis, K., & Bruce, N. (2021b). Position, Padding and Predictions: A Deeper Look at Position Information in CNNs. *Arxiv pre-print*. Retrieved from https://arxiv.org/abs/2101.12322

Conference Proceedings

1. Islam, A., Kowal, M., Esser, P., Ommer, B., Derpanis, K., & Bruce, N. (2022). Maximize Mutual Shape Information. In *British Machine Vision Conference (BMVC)*.
2. Kowal, M., Siam, M., Islam, A., Bruce, N., Wildes, R., & Derpanis, K. (2022a). A Deeper Dive into what Spatiotemporal Models Encode: Static vs. Dynamic Information. In *Conference on Computer Vision and Pattern Recognition (CVPR)*. Retrieved from https://arxiv.org/abs/2206.02846
3. Islam, A., Kowal, M., Esser, P., Jia, S., Ommer, B., Derpanis, K., & Bruce, N. (2021). Shape or Texture: Understanding Discriminative Features in CNNs. In *International Conference on Learning Representations (ICLR)*. Retrieved from https://arxiv.org/abs/2101.11604
4. Islam, A., Kowal, M., Jia, S., Derpanis, K., & Bruce, N. (2021a). Global Pooling, More than Meets the Eye: Position Information is Encoded Channel-Wise in Cnns. In *International Conference on Computer Vision (ICCV)*. Retrieved from https://arxiv.org/abs/2108.07884
5. Islam, A., Kowal, M., Jia, S., Derpanis, K., & Bruce, N. (2021c). Simpler Does It: Generating Semantic Labels with Objectness Guidance. In *British Machine Vision Conference (BMVC)*. Retrieved from https://arxiv.org/abs/2110.10335
6. Islam, A., Kowal, M., Derpanis, K., & Bruce, N. (2020). Feature Binding with Category-Dependant MixUp for Semantic Segmentation and Adversarial Robustness. In *British Machine Vision Conference (BMVC) (Oral)*. Retrieved from https://arxiv.org/abs/2008.05667

Skills

Coding	Python, Bash, MATLAB, LaTeX.
Frameworks	PyTorch, NumPy, TensorFlow, PIL, OpenCV, SciPy.
OS	Linux, MacOS, and Windows.
Communication	Strong ability to communicate technical concepts in an engaging manner.
Misc.	Academic research, consulting, teaching, tutoring.
Hobbies.	In order of skill: calisthenics, baseball pitcher (4 years on varsity team), competitive Super Smash Bros. Melee, close up magic, skateboarding, trail running, meditation, rock climbing, birding, gardening.

Awards and Achievements

2023 **NSERC PGS-D Scholarship** York University, Toronto ($21,000 per year). Accepted.

2021 **Vector Post-Graduate Affiliate (PGA)**, Vector Institute, Toronto ($12,000). Affiliate status for two year term. Accepted.

York Graduate Scholarship (YGS), York University, Toronto ($3,000). Entrance scholarship. Accepted.

2020 **Ontario Graduate Scholarship (OGS)**, Ryerson University ($15,000). Accepted.

2017 **Keyser Award**, Queen's University ($1,000) - Best capstone project in Applied Mathematics and Engineering discipline. Accepted.

2013 **Queen's Excellence Scholarship**, Queen's University ($8,000). Accepted.

References

Available on Request