Toqi Tahamid Sarker

618-203-4959 | toqitahamid.sarker@siu.edu | linkedin.com/in/toqi | toqitahamid.com

Education

Southern Illinois University — Carbondale, USA
Ph.D. Computer Science, Current GPA: 4.0/4.0 — *Aug. 2023 - Present*

BRAC University — Dhaka, Bangladesh
B.S. Computer Science; GPA: 3.31/4.00 — *Sep. 2012 – Dec. 2016*

Research Experience

Graduate Research Assistant — Aug. 2023 – Present
BASE Lab, Southern Illinois University — *Carbondale, USA*

Methane Gas Segmentation | *PyTorch, MMSegmentation, scikit-image* — Aug. 2023 – Mar. 2024

- Livestock methane emission detection is crucial for developing effective mitigation strategies and reducing the environmental impact of livestock farming
- Developed a semantic segmentation architecture that combines a transformer-based encoder and a non-negative matrix factorization-based decoder for accurate methane gas segmentation
- Created two datasets using a FLIR GF77 optical gas imaging camera: a controlled methane release dataset and a dairy cow rumen gas dataset to evaluate the architecture's performance in varied scenarios
- The proposed method outperformed state-of-the-art models, demonstrating its effectiveness in challenging low-contrast scenarios and potential for livestock methane emission monitoring applications

Graduate Research Assistant — Aug. 2018 – Aug. 2019
Panacea Lab, Georgia State University — *Atlanta, USA*

Solar Event Tracking | *Caffe, SunPy* — Mar. 2019 – Aug. 2019

- Accurate solar event location tracking is essential for space weather forecasting and understanding the trajectories of solar phenomena
- Created a large-scale solar dataset comprising over 500,000 images from NASA's Solar Dynamics Observatory, enabling robust training and evaluation of the tracking model
- Applied the GOTURN deep regression network to track solar event locations in future images, addressing the need for continuous event tracking beyond the limitations of existing detection modules with lower cadence
- Validated the model's performance using multiple evaluation metrics, including IoU, IoGT, OTA, and ATB, demonstrating its effectiveness in tracking solar events and potential for enhancing space weather forecasting

Research Publications

Conference Proceedings

[1] T. T. Sarker, M. G. Embaby, K. R. Ahmed, A. Abughazaleh. **Gasformer: A Transformer-based Architecture for Segmenting Methane Emissions from Livestock in Optical Gas Imaging**. In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*. June 2024, pp. 5489–5497.

[2] T. T. Sarker, J. M. Banda. **Solar Event Tracking with Deep Regression Networks: A Proof of Concept Evaluation**. In: *2019 IEEE International Conference on Big Data (Big Data)*. IEEE. 2019, pp. 4942–4949.

Technical Skills

Deep Learning Frameworks: PyTorch, MMSegmentation, MMDetection
Computer Vision Techniques: Semantic Segmentation, Image Classification, Object Detection
Languages: Python, JavaScript, Java, C++, LaTeX
Databases: PostgreSQL

Reviewer

IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops Mar. 2024 – Apr. 2024