Muhammad Monjurul Karim

Ph.D. Student

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About Me

I am a Ph.D. student of Civil Engineering at Stony Brook University. I am part of Systems Analytics Laboratory and advised by Dr. Ruwen Qin. I am interested in building computer vision based deep learning models to develop advanced transportation systems and to provide non-contact solutions to civil infrastructure condition assessment.

Academic Information

Stony Brook University, NY — Aug 2020 - Present
Ph.D. Student in Civil Engineering

Missouri University of Science and Technology, MO — Aug 2018 - July 2020
MS in Systems Engineering
Grade: 4.0/4.0
Dissertation: "Vision Data Based Deep Learning Models for creating complex cyber physical systems".

Research Experience

Graduate Research Assistant, Stony Brook University, NY — Aug 2020- Present

- Ph.D. student in the Systems Analytics Laboratory, advised by Dr. Ruwen Qin

Graduate Research Assistant, Missouri University of Science and Tech, MO — Aug 2018-July 2020

- MS student in the Systems Analytics Laboratory, advised by Dr. Ruwen Qin and co-advised by Dr. Zhaozheng Yin

Research Projects

- Bridge inspection video data analysis for data-driven asset management
- Vision sensor based deep neural networks for complex driving scene analysis in support of crash risk assessment and prevention
- Predicting future traffic accidents with vehicle mounted camera
- A driving simulator-based study for evaluating safe development of autonomous truck mounted attenuators vehicle
- Object detection and tracking using mask rcnn and temporal coherence
- Detection and segmentation of concrete cracks using deep learning algorithm
- SoS Meta-Architecture Selection for Infrastructure Inspection System Using Aerial Drones.

Invited Presentation

- 2020 System of Systems Engineering Collaborators Information Exchange (SoSECIE) Webinar organized by MITRE — September 2020

Awards/Honors

- 2nd Place - INSPIRE UTC Graduate Student Poster Competition 2020
- 2nd Place - Intelligent Systems Center Poster Competition - Missouri University of S&T 2019
- 2nd Place - Best Paper Award - Complex Adaptive Systems Conference 2019

Technical Skills

Python, Matlab, SQL, PHP, Pytorch, Tensorflow, OpenCV, Unix, Scikit-learn, Pandas, Numpy

Research Interest

Scene understanding, object detection and segmentation, image and video processing, feature engineering, transfer learning, incremental learning, machine learning

Publications

Journal Papers

1. **Karim M.M.**, Qin R, Yin Z, & Chen G (2020). An assistive intelligence system for detecting and segmenting multiclass objects from bridge inspection videos. *Structural Health Monitoring*. Under review.
2. Li, Y., **Karim, M.M.,** Qin, R., Sun, Z., Wang, Z., Yin, Z. (2020). Crash report data analysis for creating scenario-wise, spatio-temporal attention guidance to support computer vision-based perception of fatal crash risks. *Accident Analysis and Prevention*

Peer-Reviewed Conference Papers

1. **Karim, M.M.,** Li, Y., Qin, R., Yin, Z., (2021, January). A system of vision sensor based deep neural networks for complex driving scene analysis in support of crashrisk assessment and prevention. *The 100th Transportation Research Board(TRB) Annual Meeting.*
2. **Karim M.M.**, Dagli CH (2020, July). SoS Meta-Architecture Selection for Infrastructure Inspection System Using Aerial Drones. *In Proceeding of the 15th IEEE International Symposium on System of Systems Engineering (SoSE 2020). Budapest, Hungary*. June 2-4, 2020.
3. **Karim M.M.**, Dagli CH, & Qin R (2019, November). Modeling and simulation of a robotic bridge inspection system. *In Proceedings of the 2019 Complex Adaptive Systems Conference (CAS'19*). Malvern, PA. November 13-15, 2019. **The First Runner-up of the Best Paper Award Competition**
4. **Karim M.M.**, Doell D, Lingard R, Yin Z, Leu MC, & Qin R (2019, August). A region-based deep learning algorithm for detecting and tracking objects in manufacturing plants. *In Proceedings of the 25th International Conference on Production Research (ICPR'19)*. Chicago, IL. August 9-14, 2019.