

# 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**

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

## **Technical Skills**

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

## **Research Interest**

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

## **Publications**

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### **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.