

# UNIVERSITY OF SOUTH FLORIDA

## Defense of a Doctoral Dissertation

Automated Approaches to Enable Innovative Civic Applications from Citizen Generated Imagery  
by

**Hye Seon Yi**

For the Ph.D. degree in Computer Science and Engineering

This dissertation focuses on design, deployment and validation of computer vision technologies to enable novel citizen science applications. Specifically, our focus was on processing images from the San Francisco 311 dataset, which is now a large-scale dataset with tens of thousands of observations from the general public on aspects related to civic use. Across the globe, there are urgent efforts now to rethink governance from the ground up to tackle various challenges including rising populations, keeping them healthy, combating climate change, managing rising floods, ensuring availability of food and water, providing education, and so much more. This dissertation addresses two major problems in the 311 domains, namely detection of garbage and drug use in streets. By adapting transfer learning technologies, several state-of-the-art object detection models were trained with our dataset, and they achieved high performances for garbage and drug-related object detection. Extensive tuning of model parameters also gave us rich insights on performance. The findings of this dissertation can have a broader impact on urban planning and policymaking. We are planning now to demo our technologies to various stakeholders for wider adoption.

### Examining Committee

Fawn Ngo, Ph.D., Chair

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Monday, May 8<sup>th</sup>, 2023

1:00pm ET

Online ([MS Teams](#))

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THE PUBLIC IS INVITED

### Publications

- 1) **Hye Seon Yi**, Tanvir Bhuiyan and Sriram Chellappan. Integrating Computer Vision and Crowd Sourcing to Infer Drug Use on Streets: A Case Study with 311 Data in San Francisco. 4th EAI International Conference on Smart Governance for Sustainable Smart Cities. 2022. (**Best Paper Award**)
- 2) **Hye Seon Yi**, and Sriram Chellappan. "Computer Vision Assisted Approaches to Detect Street Garbage from Citizen Generated Imagery." In Science and Technologies for Smart Cities: 6th EAI International Conference, SmartCity360°, Virtual Event, December 2-4, 2020, Proceedings, pp. 526-541. Cham: Springer International Publishing, 2021. (**Best Paper Award**)
- 3) Loni Hagen, **Hye Seon Yi**, Siana Pietri, and Thomas E. Keller. "Processes, potential benefits, and limitations of big data analytics: a case analysis of 311 data from city of Miami." In Proceedings of the 20th Annual International Conference on Digital Government Research, pp. 1-10. 2019. (**Best Management Paper Award**)

*Robert Bishop, Ph.D.*  
*Dean, College of Engineering*

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