

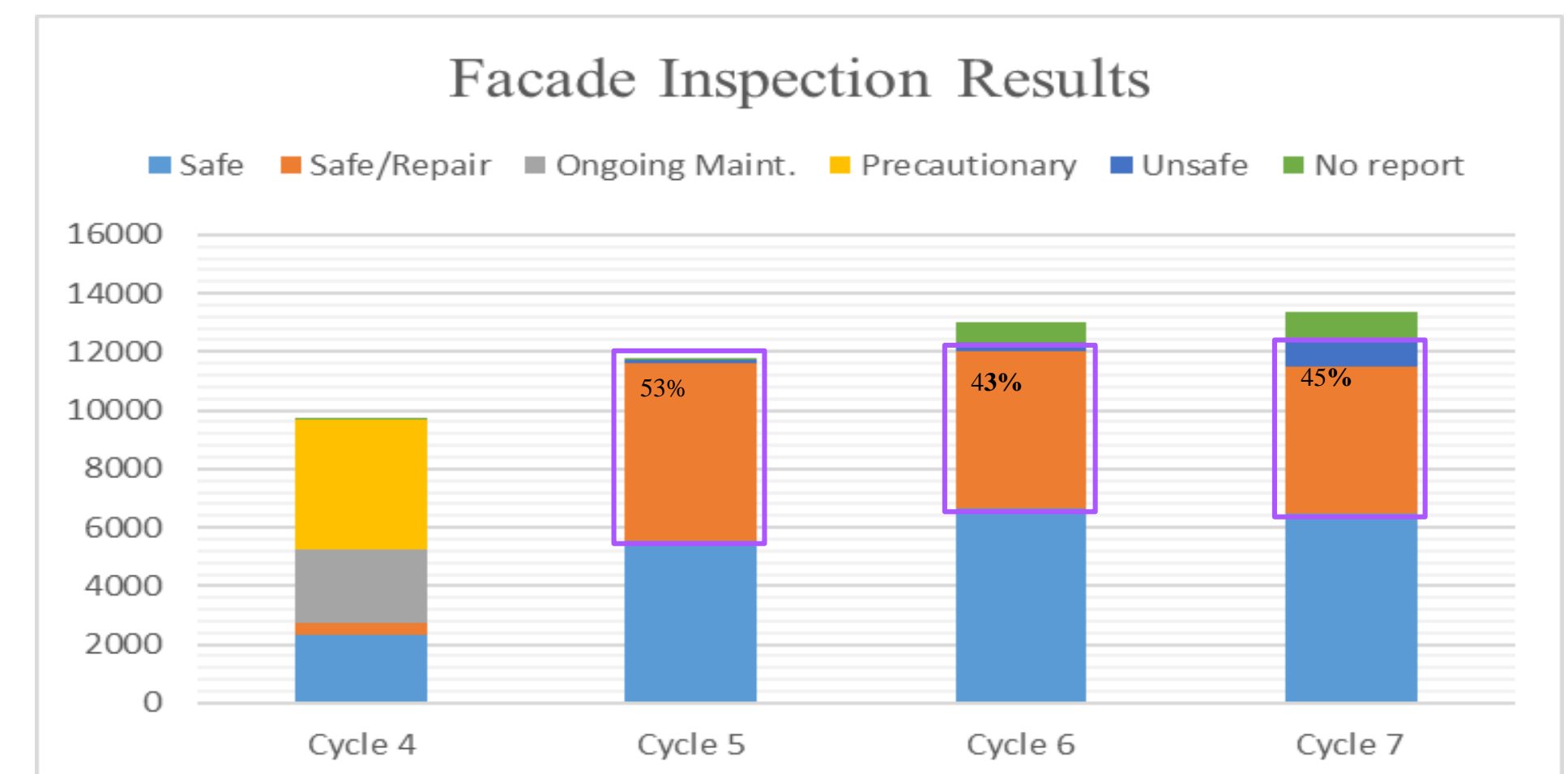
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Motivation & Problem Statement

Inspection is recurrent:

- Façade inspection is mandatory: Every 5 years, buildings more than 6 floors
- More than 10,000 buildings to be inspected in each cycle
- ~ 50% of the buildings in 5 boroughs in NYC are Unsafe or Safe with a repair requirement



Inspection practice is problematic:

- Without a standard set of requirements to check for façade categories
- Disagreement on risk assessment among stakeholders
- No objective dataset captured for risk assessment → only visual inspection, taking photos, and drawing sketches

Objective & Research Approach

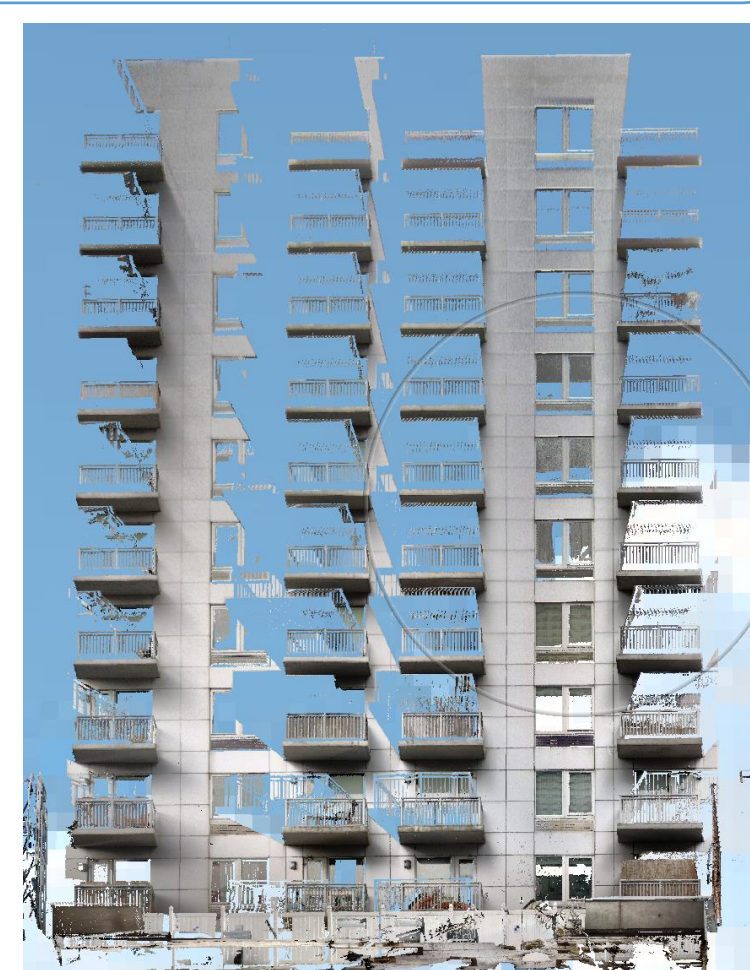
Identify component types, parameters to be checked, and defect types for each façade type

- Natural language processing to analyze the existing 5200 online façade inspection reports
- Shadowing work with façade inspectors
- Focus groups with inspection companies and DOB



Determining required settings for laser scanners to capture the dataset that can supply the granularity needed for each parameter to check

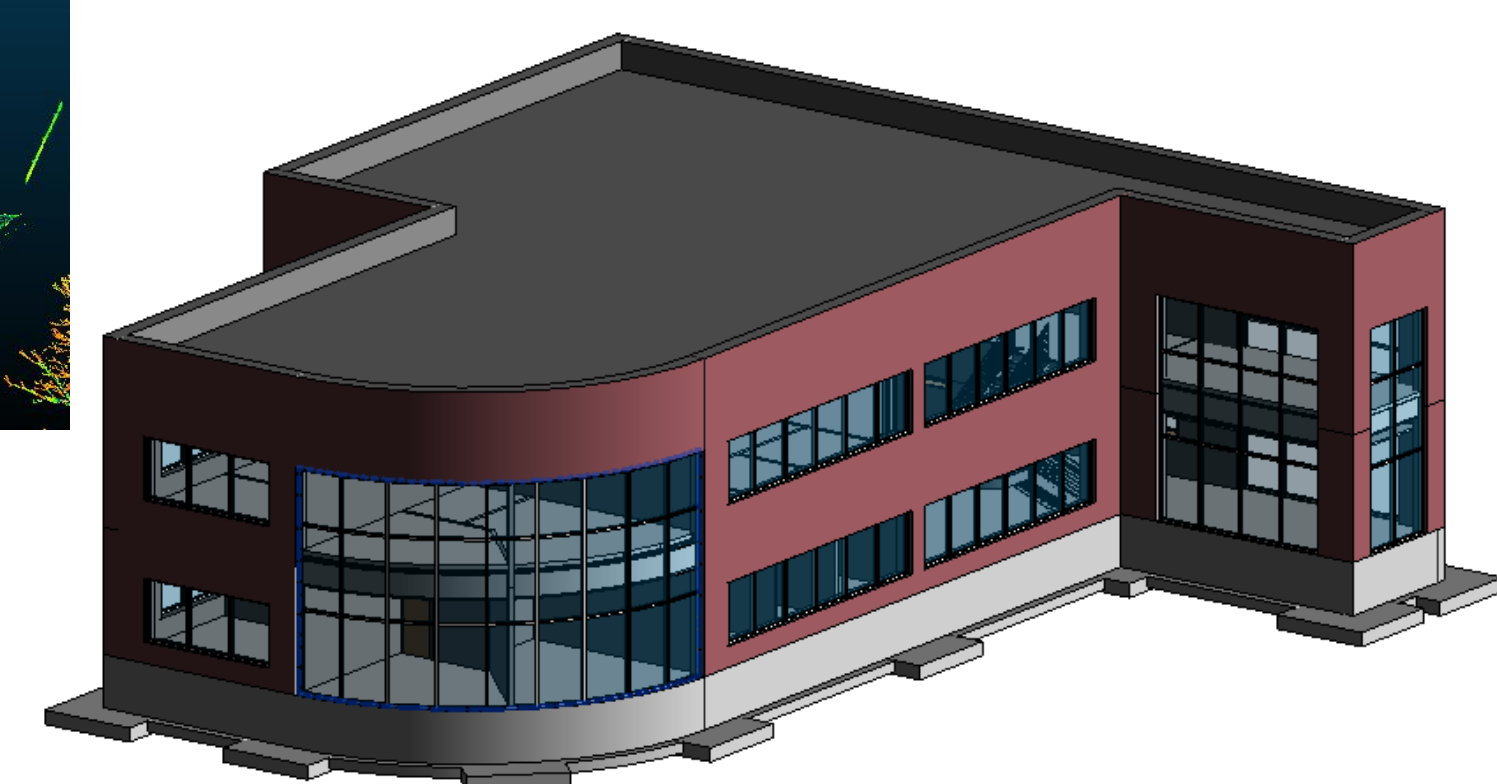
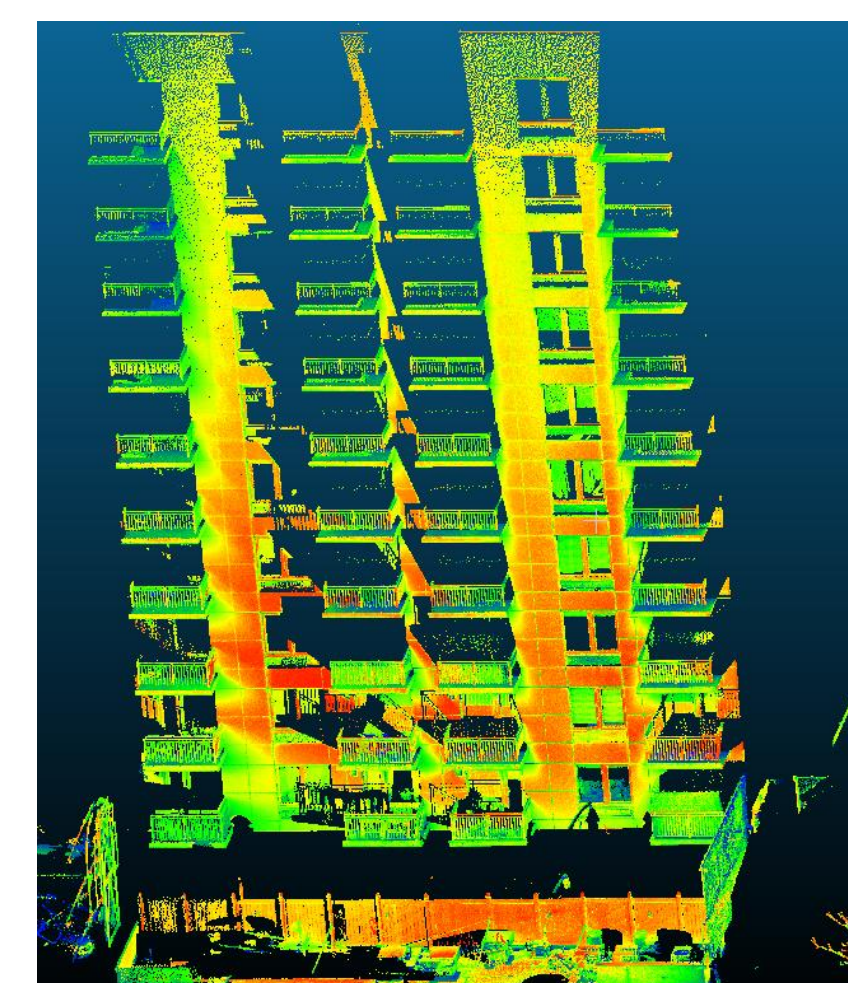
- 3D laser scanning
- Point cloud data generated with 3D reconstruction technology



Develop algorithms to pull data from BIMs

Develop computer vision based approach to label risk categories for components checked in façade (given a type)

- Computer vision
- BIM



Expected Contributions

- Provide a comprehensive list of required components, parameters, and defect types for façade inspection
- A guideline to capture digital dataset for enabling objective façade inspection and risk assessment
- An algorithm to pull data from BIMs to support an exhaustive façade inspection
- A computer-vision based approach to accurately detect risk categories for components being inspected

Publications

1. Shi, Z., and Ergan, S. (2019). "", 4th International Conference on Civil and Building Engineering Informatics, ICCBEI, Sendai, Japan, November 7-8, 2019. (abstract submitted).
2. Shi, Z., and Ergan, S. (2018). "Leveraging point cloud data for detecting building façade deteriorations caused by neighboring construction." 5th International Project and Construction Management Conference (IPCMC), Cyprus, November 16-18, 2018.