FACT SHEET

Improving Pedestrian Infrastructure Inventory in Massachusetts using Mobile LiDAR

PROJECT TITLE

Improving Pedestrian Infrastructure Inventory in Massachusetts using Mobile LiDAR

STUDY TIMELINE

November 2018 - September 2019

INVESTIGATOR

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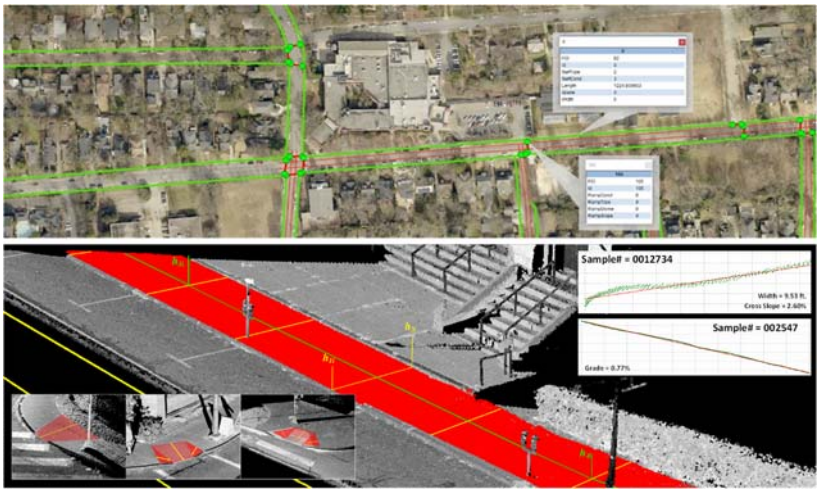
FURTHER RESOURCES

The final report can be accessed at https://www.mass.gov/files/documents/2019/11/13/ImprvngPdstrn_Infrstrct9219updated.pdf

Introduction

This research project sought to demonstrate and evaluate the feasibility of mobile LiDAR as a viable technology to support cost-effective inventory updates and condition assessments for pedestrian infrastructure at the network level. With embedded geolocation and measurement information, the sidewalk and ramp databases derived from the mobile LiDAR were seamlessly integrated with the existing Road Inventory File. It provided MassDOT with accurate information from which to prioritize sidewalk maintenance needs.



Methodology

This research developed an efficient and effective pedestrian infrastructure inventory and condition assessment methodology consisting of three key algorithms, including 1) an automated LiDAR point cloud segmentation algorithm based on PointNet; 2) an automated sidewalk and curb ramp extraction algorithm based on patterns of the point cloud scanning the pedestrian infrastructures, and 3) an automated sidewalk and curb ramp condition assessment algorithm based on the geometrical properties of the sidewalk and curb ramp.

Conclusions

This study successfully developed a new pedestrian infrastructure inventory and condition assessment method and an end-to-end point cloud processing pipeline for mobile LiDAR. It demonstrated that the method is cost-effective in conducting network-level pedestrian infrastructure analysis through a case study, which covers 271-mile State Route 9 corridor with a total of 85 miles of sidewalk and 1,297 curb ramps automatically extracted.

Broader Impacts and Benefits

With the establishment of the end-to-end LiDAR point cloud data processing pipeline, MassDOT has gained insight into and enhanced processing capability using mobile LiDAR data to cost-effectively conduct inventory and condition evaluations for other critical transportation assets, including pavement marking, signage, and guardrail, etc. These initiatives are currently underway as a result of this project.