

Research in Progress

Development of a Visualization, Sharing, and Processing Platform for Large-Scale Highway Point Cloud Data

Research Need

With the advancement of LiDAR, point cloud data has become widely available and accessible with better quality. High-resolution scans have been leveraged in critical transportation applications with efficiency and effectiveness. The point cloud data will only be beneficial if MassDOT has the means to extract, process, access, and visualize the information. There is a great need for a convenient software platform that can maximize the utilization of valuable point cloud data through easy visualization, sharing, processing, and management

Goals/Objectives

The objective of this study include 1) to develop a convenient data platform with functionalities of visualization, sharing, and processing for large-scale LiDAR point cloud data; 2) to integrate the platform with the typical data sources and spatial analysis tools in MassDOT; and 3) to customize processing pipelines using the platform for MassDOT's critical highway applications, e.g., asset management, safety analysis, bridge management, etc., and demonstrate the feasibility and benefits of the platform. This proposed study will be aimed at delivering two products, including 1) a prototype, web-based platform for point cloud data visualization, sharing, and processing; 2) cases studies that demonstrate the utilization of the customized developed prototype platform for critical highway applications.

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Project Information

This project is being conducted as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

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February 2023

Expected Project Completion Date:

December 2024

Methodology

The platform proposed in this study will help MassDOT to establish a versatile infrastructure for point cloud data visualization, sharing, and processing and significantly improve the utilization of various point cloud data that MassDOT is continuously invested in.

Point Cloud Data Platform: to develop a web-based point cloud data visualization platform based on the octree data structure for better visualization efficiency without compromising the granularity of the point cloud data, using Octree data structure.

GIS Integration: To develop integration plans, prototype geodatabases, and scripts to integrate the existing, relevant spatial database (e.g., RIF) with the point cloud data.

Case Studies: To develop the corresponding case studies to demonstrate the feasibility and efficiency of the developed platform.

