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2023 RESEARCH PROJECT STATEMENT

Research Topic:

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

Research Budget and Timeline:

- \$175,000
- 18 months (of which the final 3 months are for review)

Problem Statement and Objectives

MassDOT recognizes the power of mobile LiDAR and has initiated procurement of a Mobile LiDAR unit with the Pavement Management van this year. Due to the large size and the complex format, the utilization of the data has been burdened with expensive hardware, proprietary software, extensive training, and inflexible workflow. The point cloud data is only beneficial if MassDOT has the means to extract, process, access, and visualize the information. There is a great need for a convenient platform that can maximize the utilization of valuable point cloud data. The objectives of this study include 1) to develop a convenient data platform to enable visualization, sharing, and processing of large-scale point cloud datasets; 2) to integrate the platform with the existing data sources and analysis tools in MassDOT, and 3) to customize processing pipelines using the platform for several MassDOT's critical highway applications and demonstrate the feasibility and benefits of the platform.

Anticipated Outcomes and Deliverables:

Outcomes: 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. The web-based platform will provide much broader and more convenient access to the point cloud data in different offices of MassDOT, which was previously limited due to the hardware/software and technical constraints of the data. With more and routinely collected point cloud data using the new Pavement Management van, the developed tool will establish the critical platform for MassDOT to have better access and utilization of the data.

Deliverables:

- 1) Develop a web-based platform for point cloud data visualization, sharing, and processing; the platform should accommodate the typical data sources (e.g., mobile LiDAR, airborne LiDAR, UAV imagery, etc.)
- 2) Establish an interface with the existing spatial analysis tools at MassDOT
- 3) Compile results from case studies that demonstrate the utilization of the customized point cloud data processing pipeline in the platform for critical highway applications.
- 4) Final presentation
- 5) A final report summarizing research activities, results, and recommendations