

# Machine Learning–Based Transportation Asset Inventory

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## Incorrect Transportation Asset Detection by Current Algorithms

Transportation assets, like retaining walls, rumble strips and guardrails, are important safety hardware and geotechnical structures and need to be inventoried accurately to support asset management and ensure roadway safety. Current methods of transportation asset inventory result in many incorrect object detection outputs, which is mainly because of two reasons. One reason is because of the huge variety of the assets being inventoried and the other is because these assets appear continuous, making it difficult to segment them into individual objects.

## Efficient and Accurate Transportation Asset Inventory

The technology provides an enhanced algorithm that can detect multiple different classes of transportation assets using easy-to-obtain 2-Dimensional images. The model uses a state-of-the-art image segmentation model (Mask Region-Based Convolutional Neural Networks) to detect individual objects. Using this method allows multi-scale features to be used to identify asset types and individual assets in the image. The method may improve the accuracy of asset inventory, increasing the precision on detection and on segmentation. In some examples, the precision on detection is increased by 10% and segmentation by 10.7%.

## Summary Bullets

- The invention performs more intelligent segmentation using advanced computation methods with Artificial Intelligence.
- Makes use of cost-efficient 2-dimensional images of roadways, making it easier to implement on a larger scale.
- Can detect transportation assets and inventory them simultaneously.

## Solution Advantages

- **More Intelligent:** The technology uses more advanced computation methods with Artificial Intelligence.
- **Cost Effective:** The use of low-cost 2-Dimensional roadway images makes the method cheaper to implement on a larger scale.

- **Efficient Multi-tasking:** The methodology can simultaneously detect and inventory multi-class transportation assets efficiently.

### Potential Commercial Applications

- Transportation asset inventory for transportation agencies at the city, county or state levels, and consultant companies.

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### IP Status

<p>Patent application has been filed</p>: US63/386150

### Publications

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### Images



Figure 4: Tracking to Cluster the Same Retaining Walls at Different Roadway Images

Tracking to cluster the same retaining walls at different roadway images.

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<https://s3.sandbox.research.gatech.edu//index.php/print/pdf/node/3986>