Mobile Mapping System for 3D Road Asset Inventory of the Rural Road Network in Thailand

2019 - 2020

Nutvara J
PhD, Department of Civil and Environmental Engineering,
University of Washington

Road Network in Thailand

750,000 km

55,000 km Arterial
(Department of Highway)

50,000 km Collector
(Department of Rural Roads)

600,000 km Local
(Local Government)

*approximate number 2021

▲Thailand's road network

In the past…

Conventional survey method

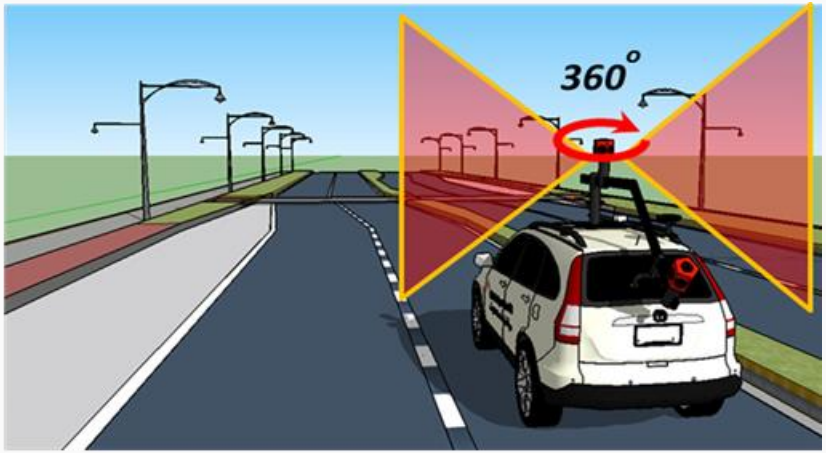
- A number of staff
- Take times, low productivity
- High possibility of human error

Conventional survey

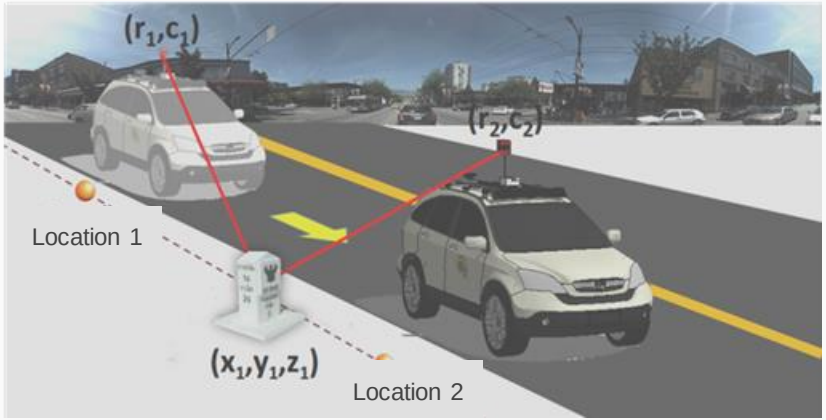
Mobile Mapping System (MMS)

Equipment

- 360 degree camera
- High precision GNSS
- Vehicle



“Image processing”



Mobile Mapping System (MMS)

Issue with
Mobile Mapping System (MMS)

- Takes a lot of human resources to locate assets or objects
- Image processing technology is out of date

Issue with
Mobile Mapping System (MMS)

- Takes a lot of human resources to locate assets or objects
- Image processing technology is out of date

Objects detected by human

"MMS Development"

Manual Asset Detection ⟶ Automatic Asset Detection

- Reduce human resources
- Increase productivity

Issue with
Mobile Mapping System (MMS)

- Takes a lot of human resources to locate assets or objects
- Image processing technology is out of date

Objects detected by human

"MMS Development"

Manual Asset Detection ⟶ Automatic Asset Detection

- Reduce human resources
- Increase productivity

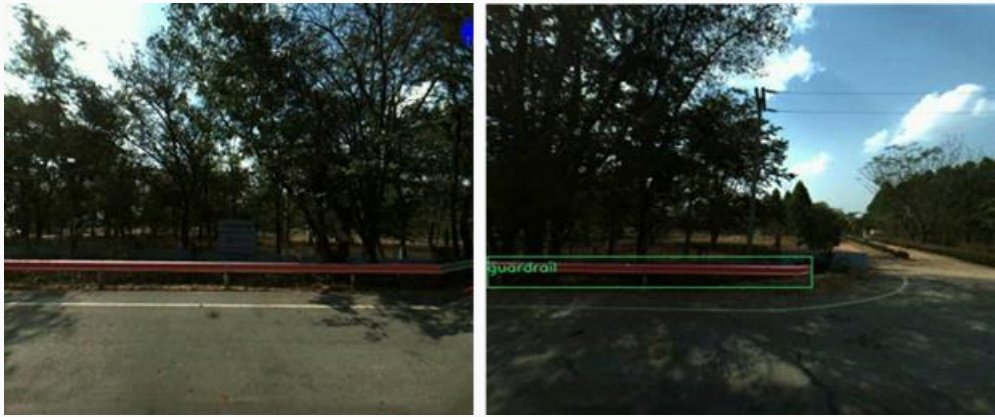
Image processing ⟶ LiDAR

- More accuracy
- Automatically create 3D surfaces or point cloud

Automatic Asset Detection :

Using “Keypoint Detection”

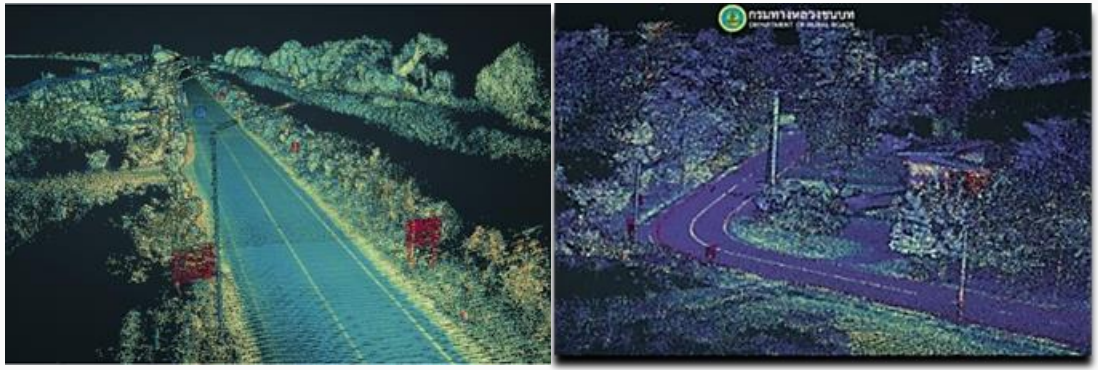
▲ Traffic Light



▲ Guard Rail

LiDAR for creating 3D point cloud

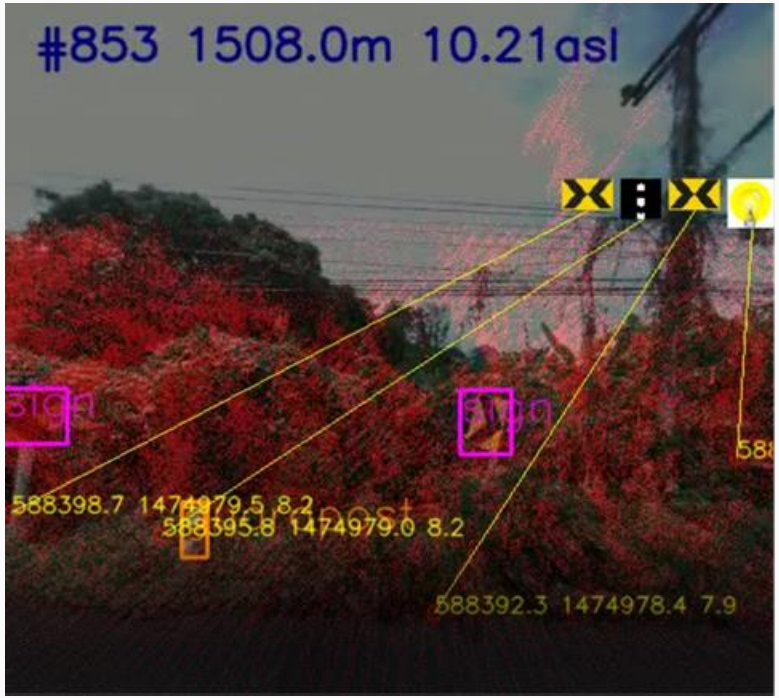
▲ LiDAR sensor

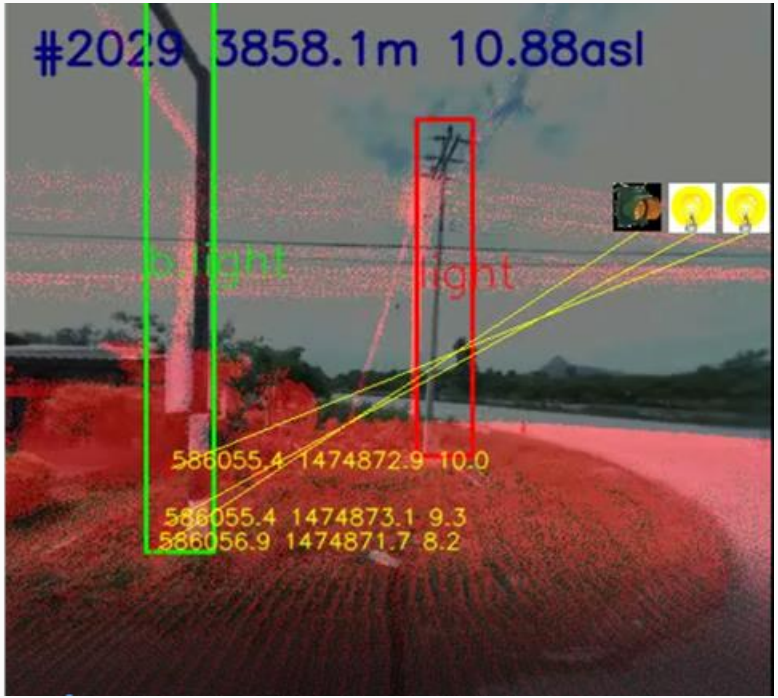


▲ Point Cloud Data

▲ Overlay Point Cloud Data on Image

Automatic Asset Detection : **Calculate Coordinate of Asset**





Future Study

- Improve accuracy of asset detection
- Application of 3D point cloud