

FIG WORKING WEEK 2019

22-26 April, Hanoi, Vietnam

Presented by the FIG Working Week 2019,
April 22-26, 2019 in Hanoi, Vietnam

"Geospatial Information for a Smarter Life
and Environmental Resilience"



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Importance of Image and Point Cloud Matching for road Infrastructure Feature Extraction

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Importance of road infrastructure extraction



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Surveying - Traditional approach

- Classic measurements
- GNSS
- Total stations
- Tophographic maps

Traditional
Approaches in
Surveying



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Surveying - Modern approach

- Terrestrial scanning
- Airborne LiDAR scanning
- Mobile mapping



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GeoSlam



TIMMS Trimble MX7



Trimble MX8



Trimble MX2



Trimble MX9

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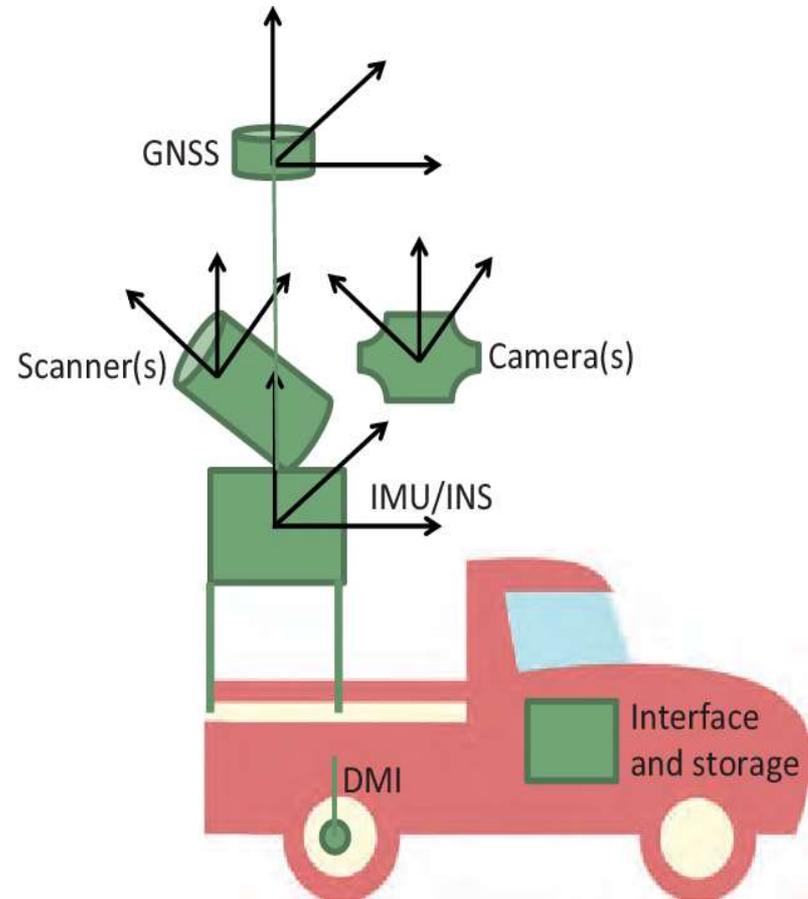
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Mobile mapping

- Multi-component system
- Point cloud
- Application
- MLS advantages



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Mobile mapping systems



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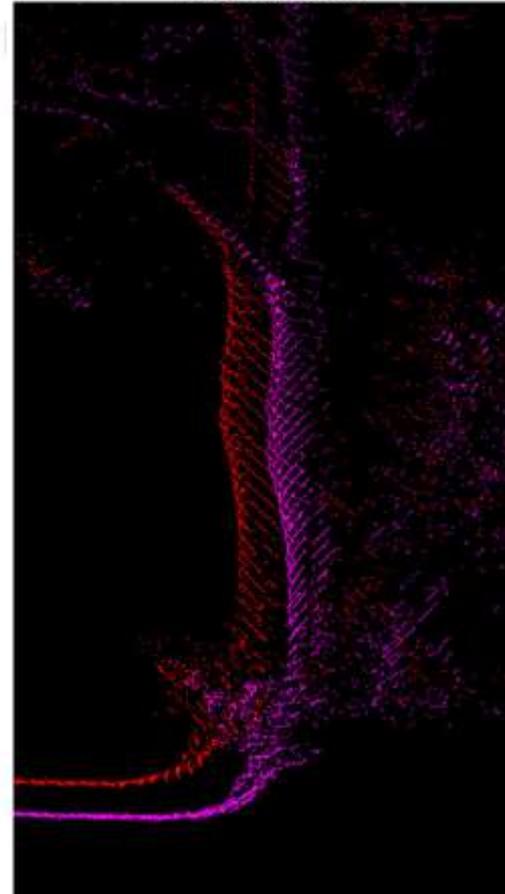
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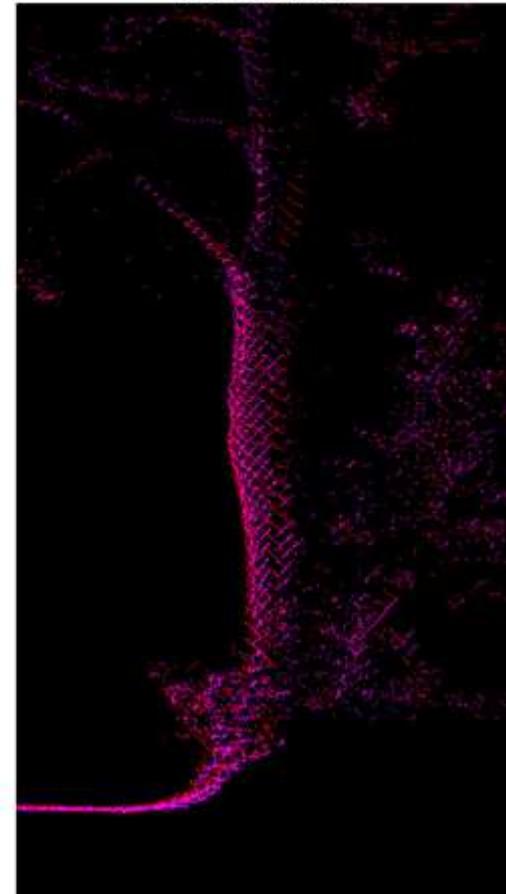
Problem definition

- Point cloud and Imagery matching
- Control points
- Known problems
- Commercial softwares
- Automatic procedures
- Procedures based on AI (artificial intelligence)

Before Matching



After Matching



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Point cloud and Image matching



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Image blurring - Basic information

- Automatic procedures
- Convolutional Neural Networks (CNNs / ConvNets)



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Image blurring - Basic information

- reliability methodology
- fully automatic procedures
- plug and play solution
- user friendly environment



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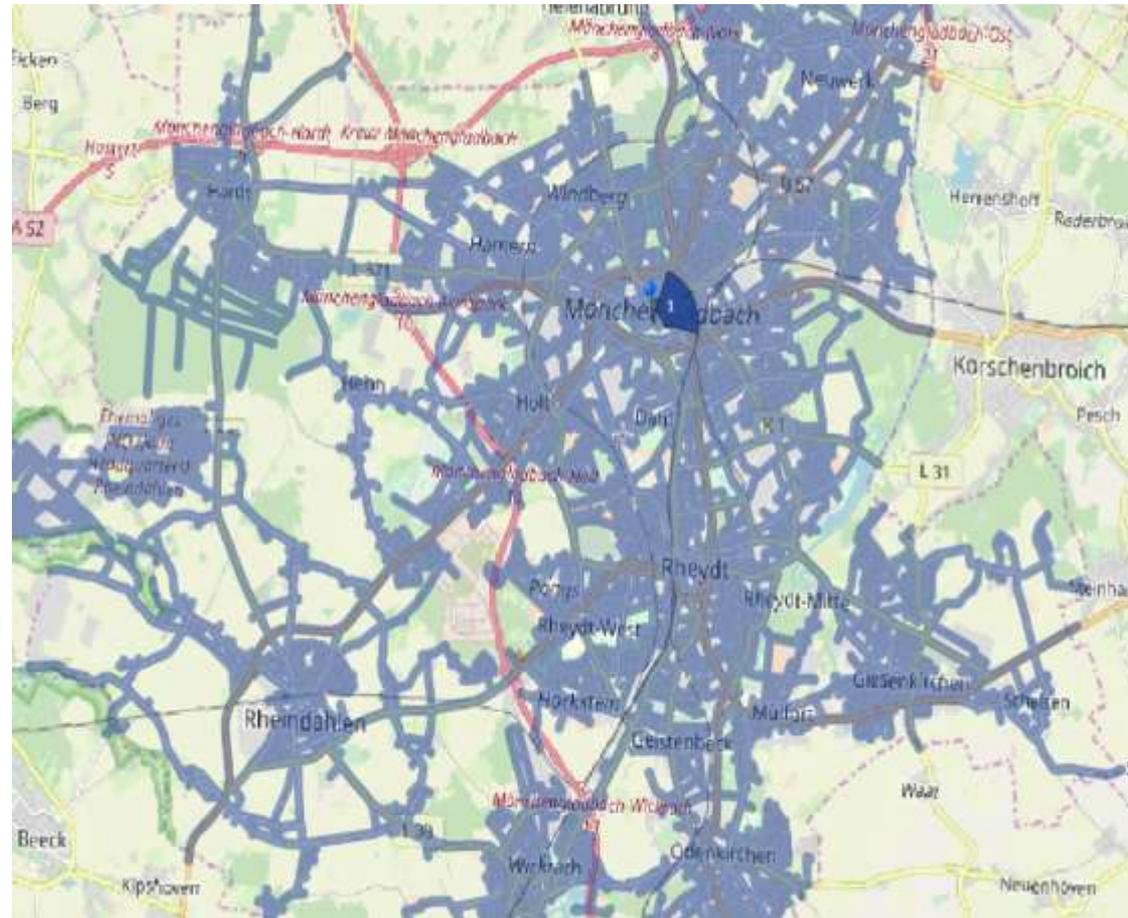
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Image blurring statistics

- City → 1300km of roads
- panorama images capturing every 3m
- result: 450.000 images
- 1 Image → 1s → one machine
- processing time for whole project: 450.000s → 125h → 5 days



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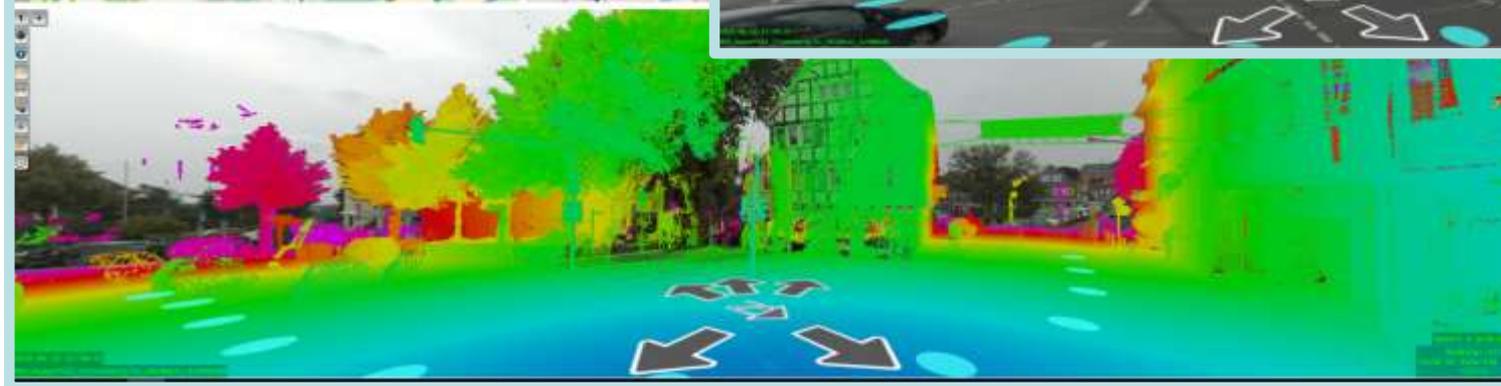
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Data publishing



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Feature extraction

- Previous steps: point cloud and Imagery matching
- Control points
- Known problems
- Commercial softwares
- Automatic procedures
- Procedures based on AI (artificial intelligence)

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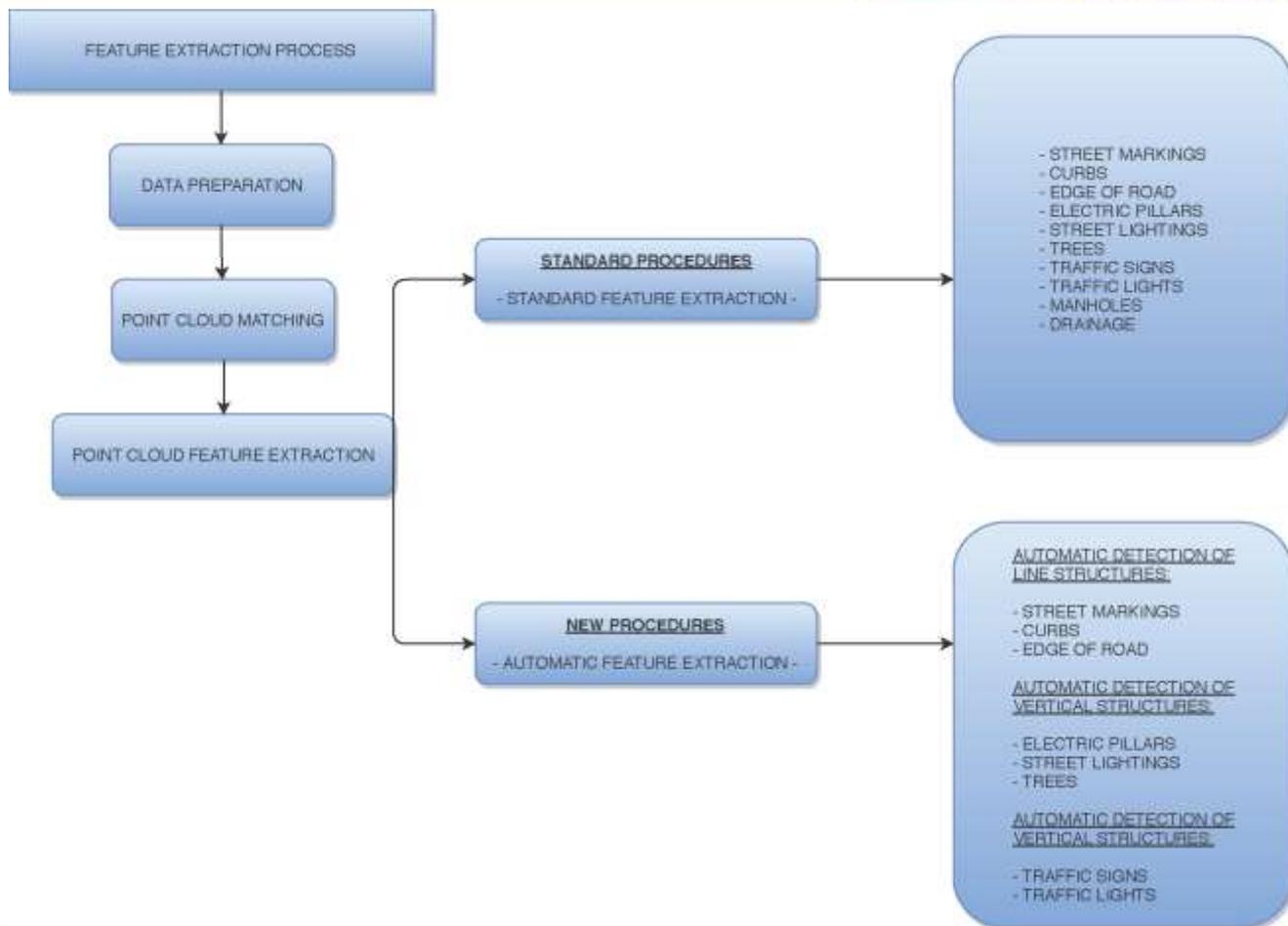
Feature extraction

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Feature extraction



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Feature extraction



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Feature extraction



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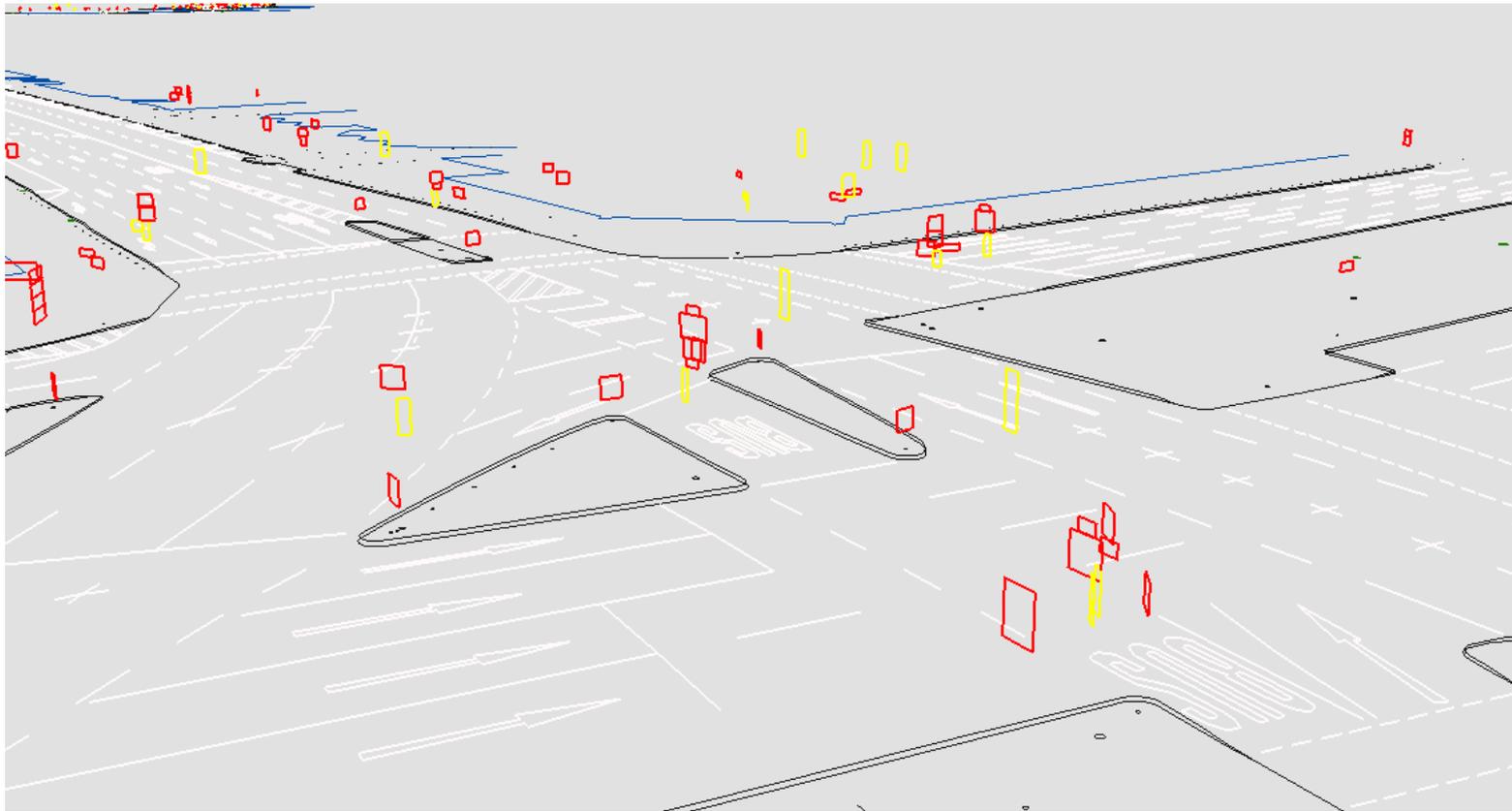
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Feature extraction



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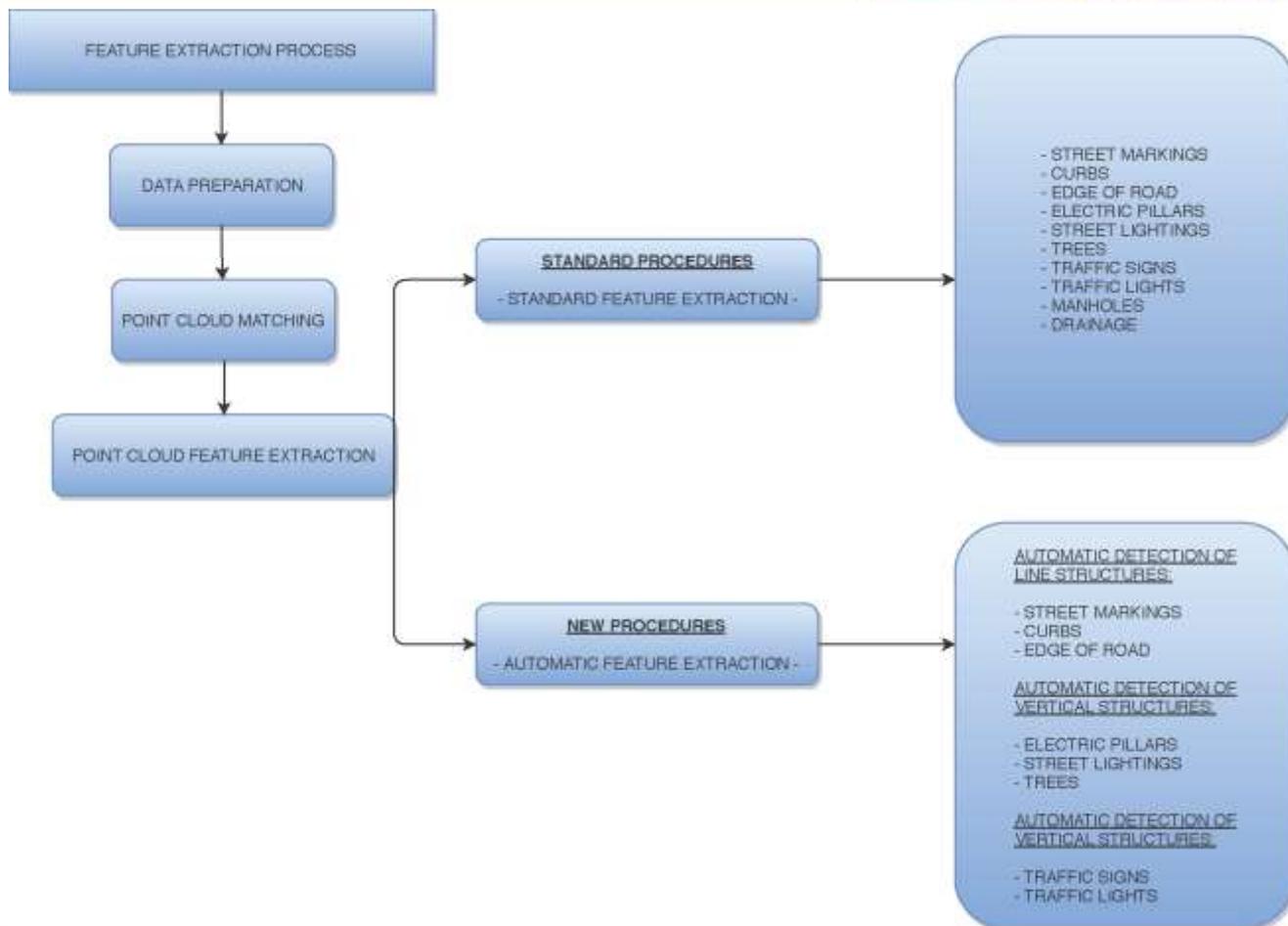
Feature extraction

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Feature extraction



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Conclusion: Importance of road infrastructure extraction

- Mapping of urban and rural areas
- Corridors mapping
- Pover lines mapping
- Highway mapping
- Clearence measurements
- Mapping with combination with other techniques
- Creating of various applications

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Feature extraction - application



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Feature extraction - application



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Feature extraction - application



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Thank you for your attention!

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