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1st Machine Learning meetup

Agenda

1. The Team
2. Objective
3. Overall Process.
4. Some Lessons Learned for future.

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Team

Sana Ullah Khan
Business Analytics
MsC student at DTU.

Charles Maina
MSC Business Management.
Lund University.

Yaser Al-Dammad
MSc in IT,
Student at syddansk.

Majid Khan
Comp-science
Blekinge Institute of tech.

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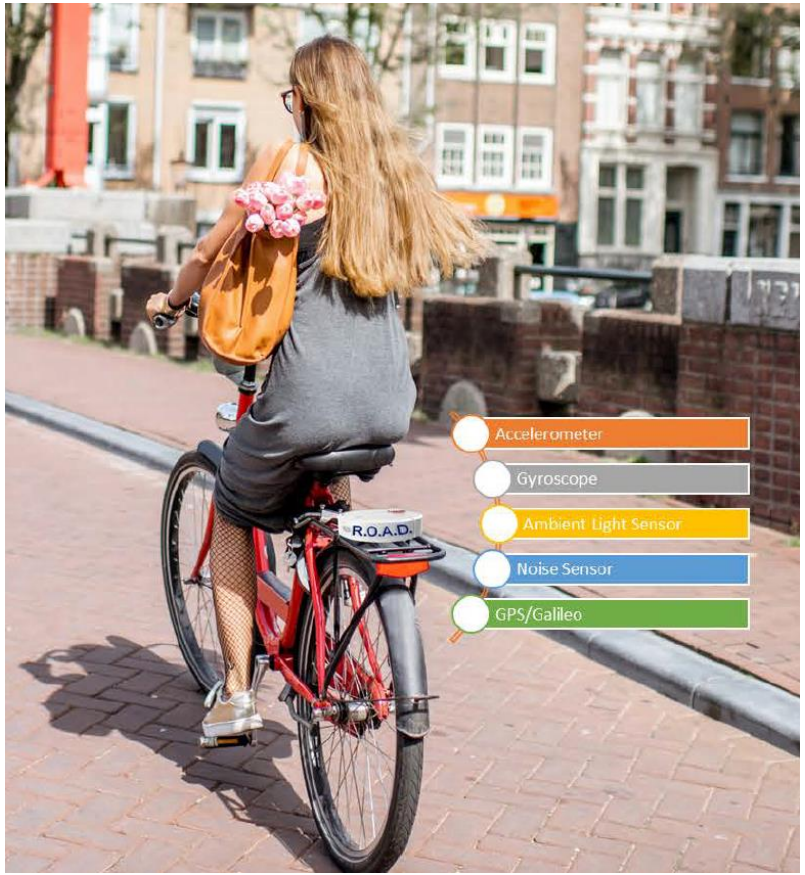
Objective

- The goal of this project is to classify the road issues experienced by cycling (potholes, bumps, concrete expansion joints, and storm drain basins) from the 3D accelerometer and gyroscope data.



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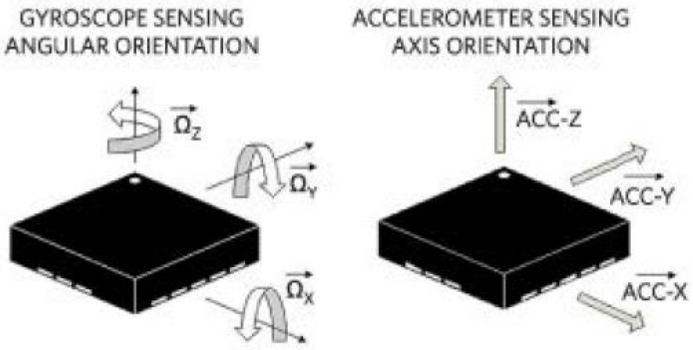
Objective



With our solution we localize and classify road issues

Identify deformation severity of potholes, road cracking, crosswalks and expansion joints, manholes, poor light condition, are essential to improve safety and experience for citizens using the road infrastracture.

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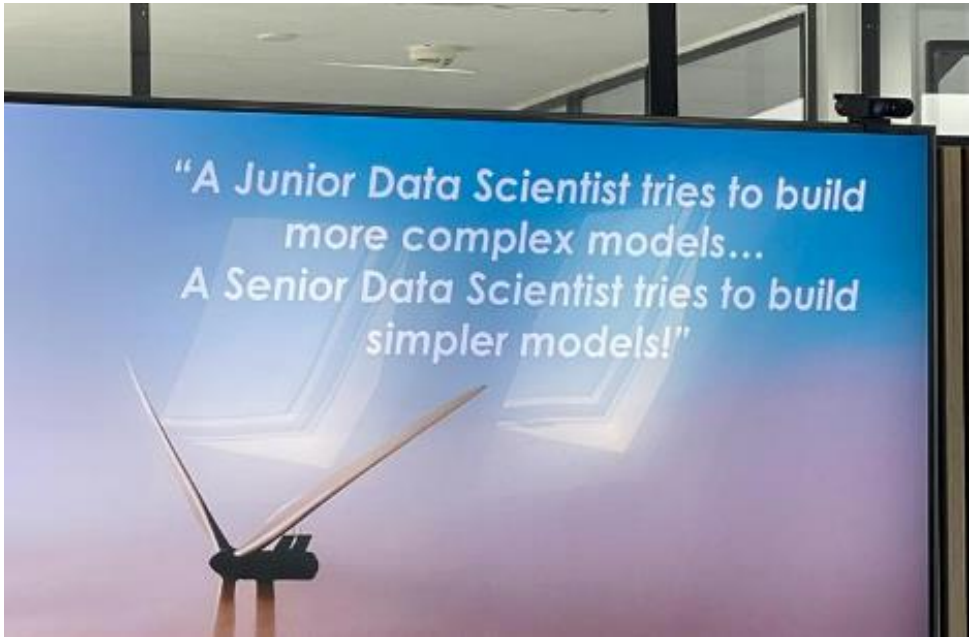
Inspiration:



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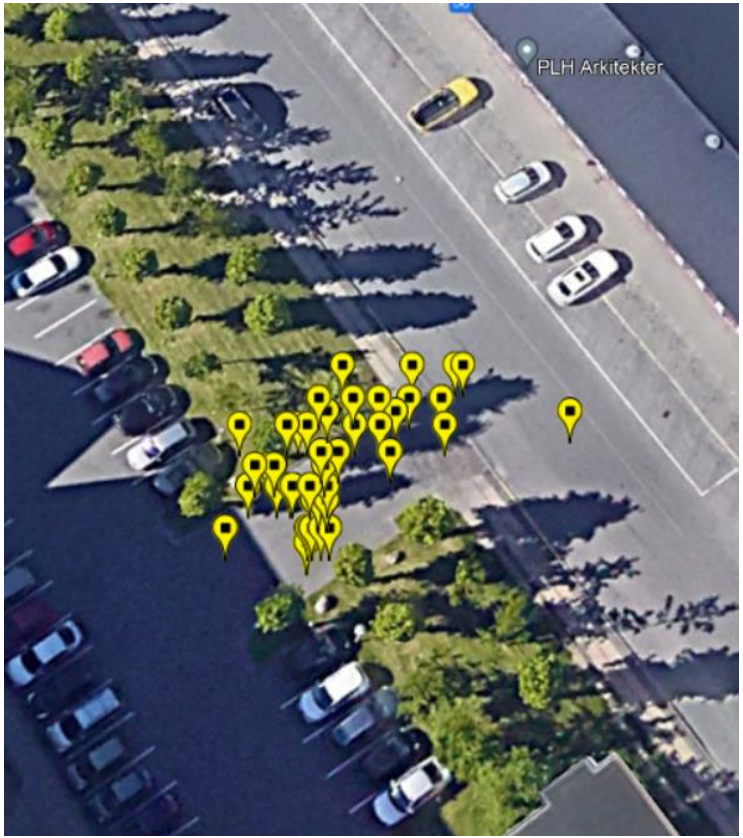
Bricks kml data



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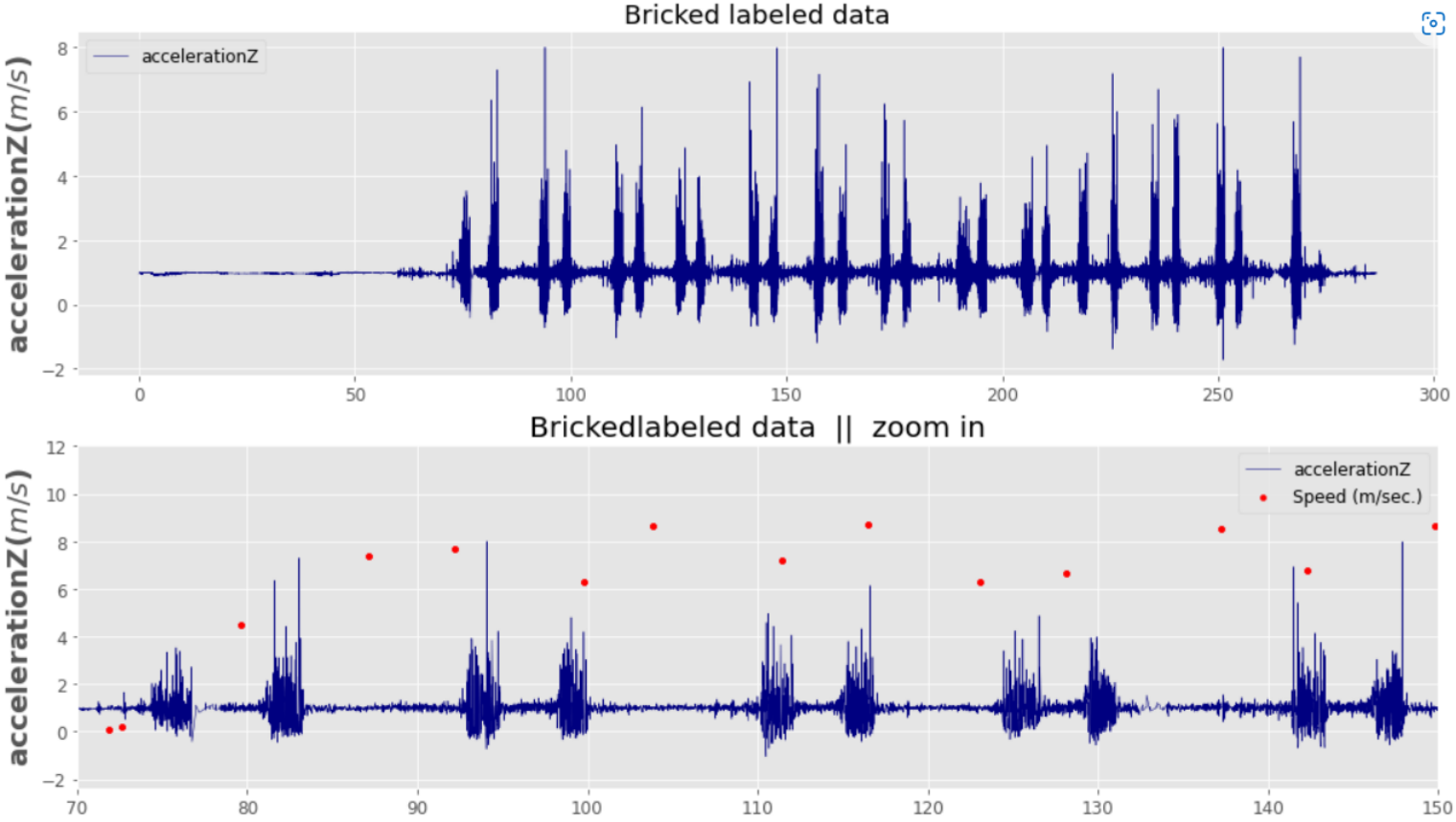
Bricks data plots



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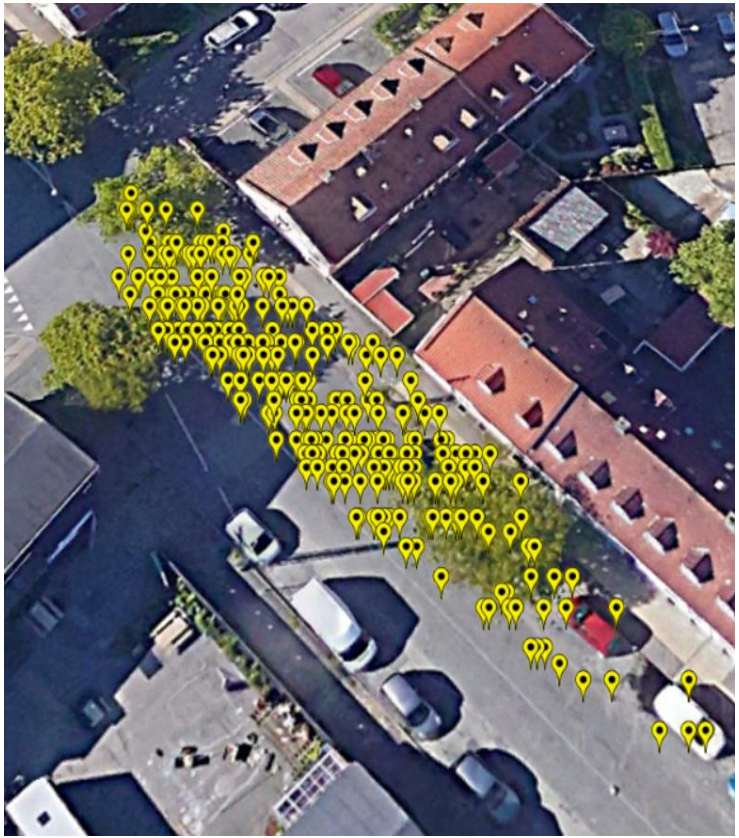
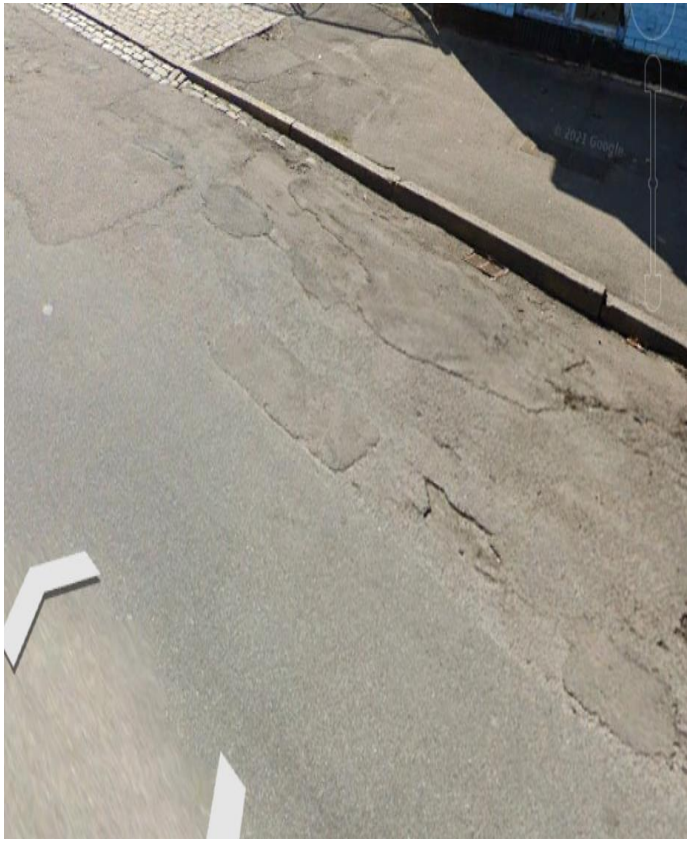
Pothole kml data





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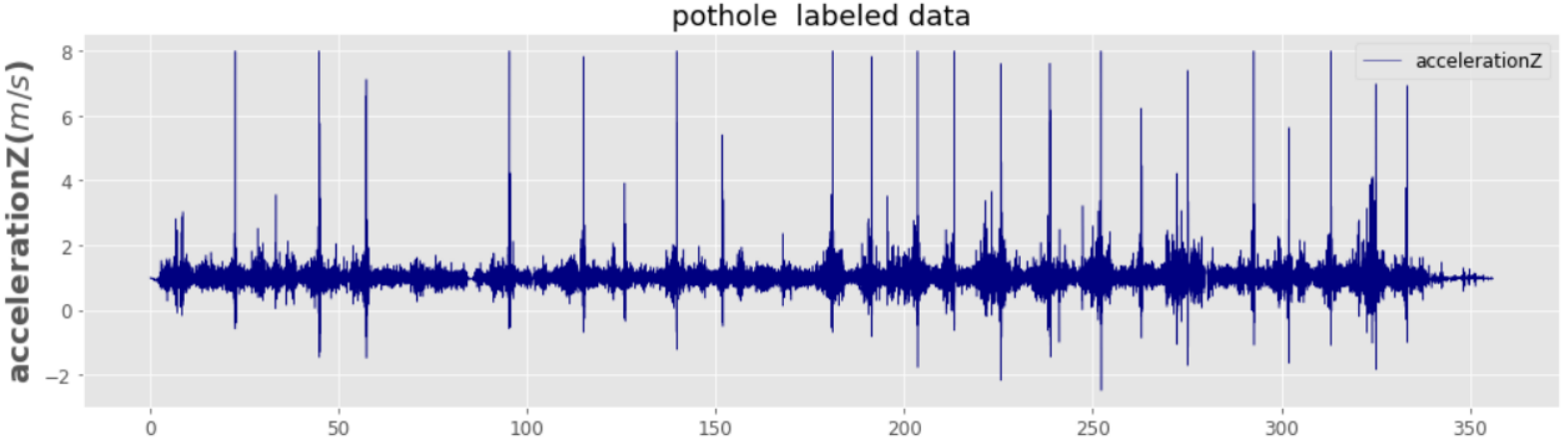
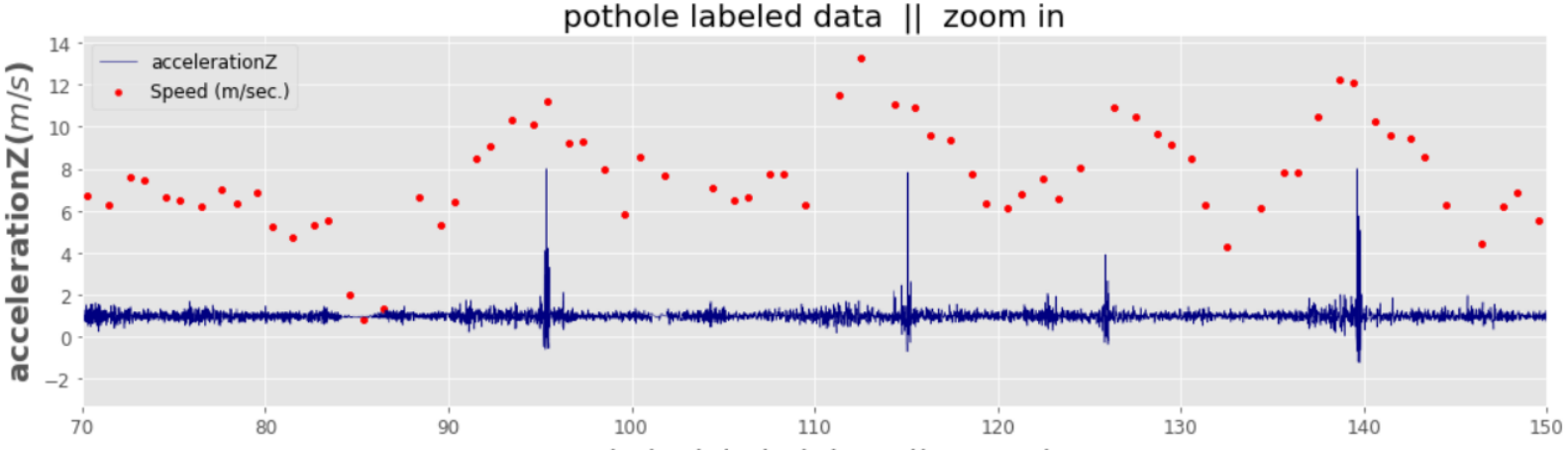
Pothole data plots





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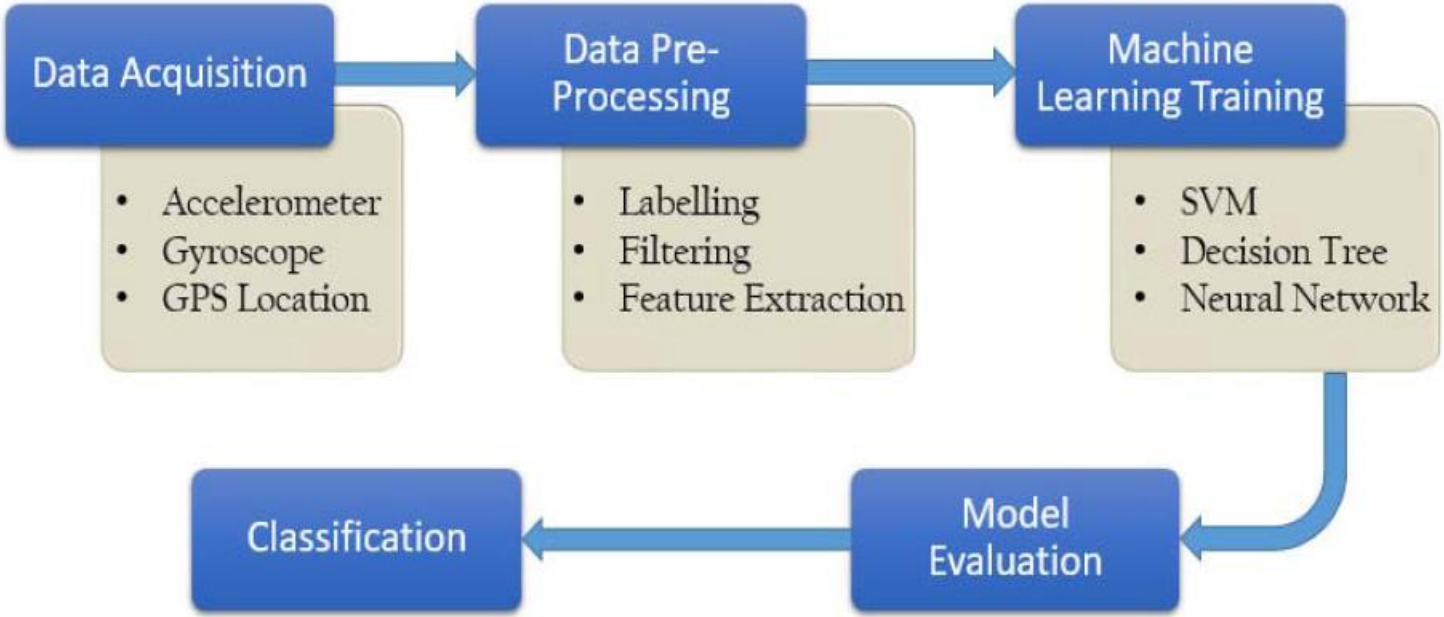
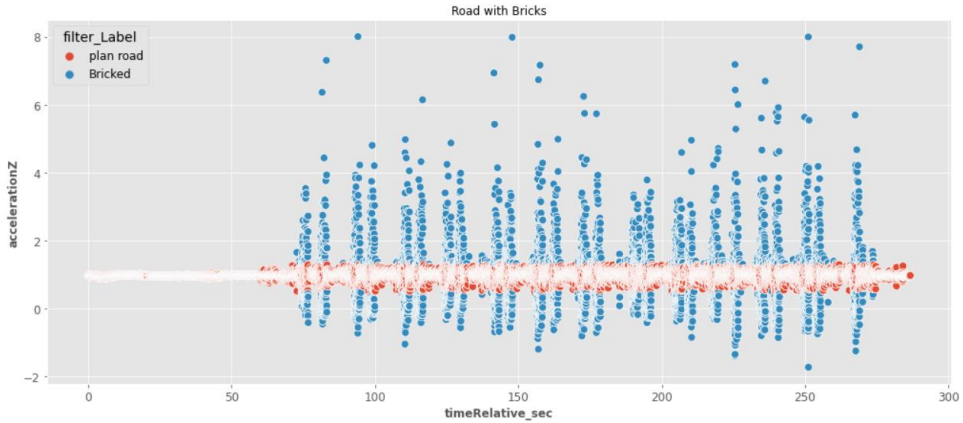
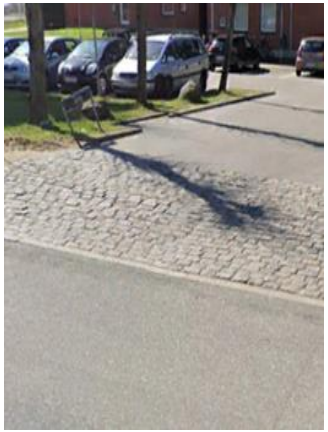
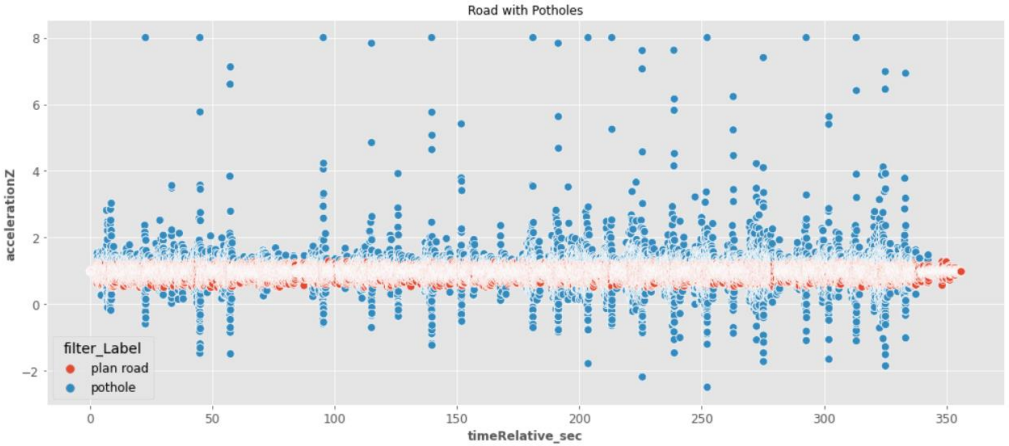
Overall block diagram of the process



Preprocessing







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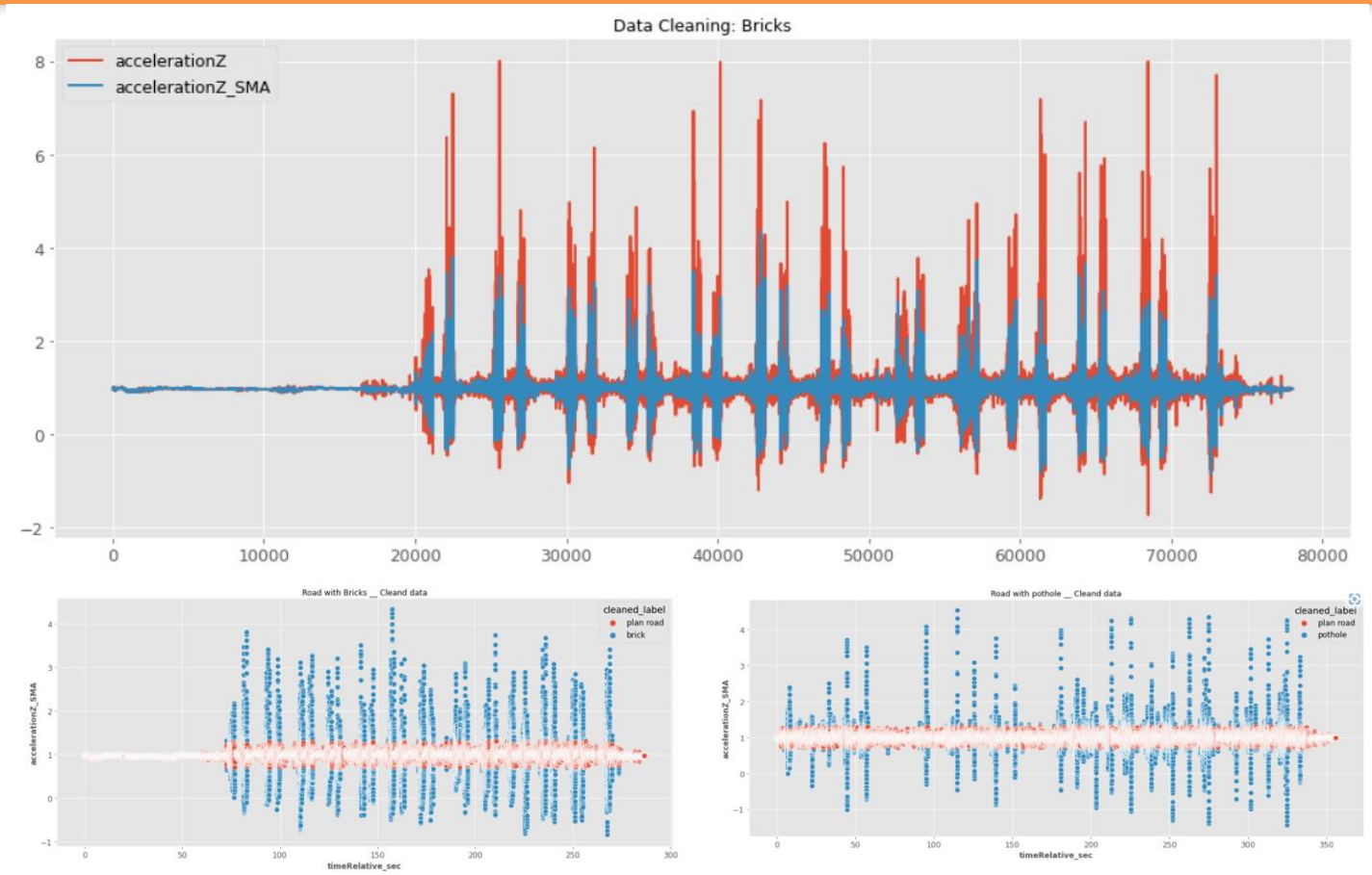
Cleaning with SMA



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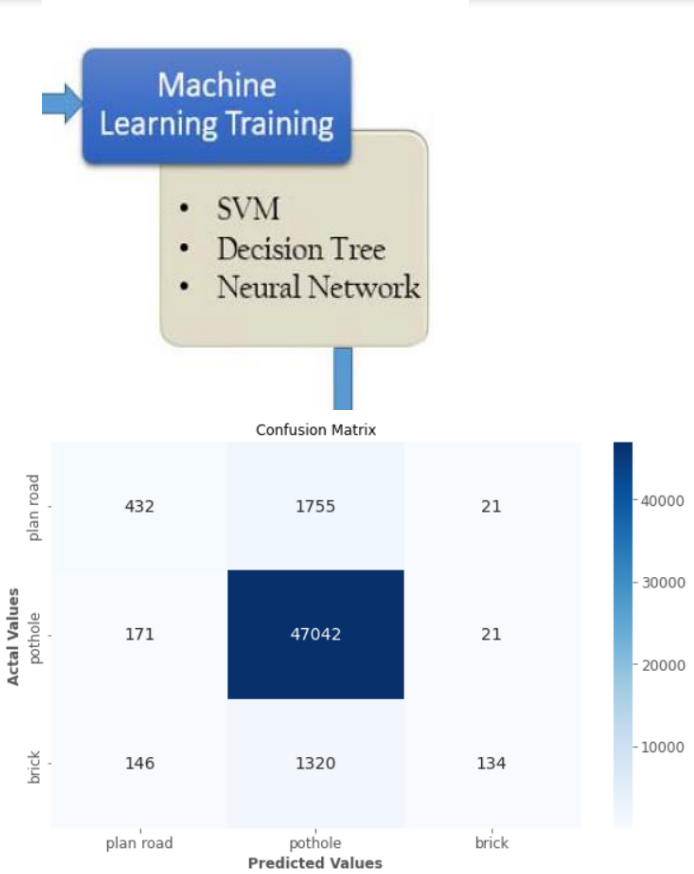
Machine Learning Training.



Model Evaluation

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Confusion Matrix

[[  432  1755    21]
 [  171 47042    21]
 [  146  1320   134]]

Accuracy: 0.93

Micro Precision: 0.93
Micro Recall: 0.93
Micro F1-score: 0.93

Macro Precision: 0.76
Macro Recall: 0.43
Macro F1-score: 0.47

Weighted Precision: 0.92
Weighted Recall: 0.93
Weighted F1-score: 0.91

Classification Report
```

	precision	recall	f1-score	support
Class 1	0.58	0.20	0.29	2208
Class 2	0.94	1.00	0.97	47234
Class 3	0.76	0.08	0.15	1600
accuracy			0.93	51042
macro avg	0.76	0.43	0.47	51042
weighted avg	0.92	0.93	0.91	51042

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Future work:

- **Data collection**
- Data on continuous road.
- Constant speed is ideal.
- Knowledge about anomaly.

- **More advance models.**
- More advance data cleaning techniques. i.e fft and interpolating like scipy.interpolate.splrep().
- More advance feature extraction.

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