Road Condition Monitoring (RCM) Challenge

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Project Introduction

Using an Unlabeled dataset taken from real truck, we are required to identify places where there is road anomalies :

- ***potholes***
- ***speed bumps***
- ***manholes***
- ***cracks in the roads***
- ***etc.***

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AGENDA

1. *Dataset loading and Exploration*
2. *Dataset Pre-processing*
3. *Feature engineering*
4. *Build Model*
5. *Anomalies detection and Visualization*

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1- Dataset loading and Exploration

	Perc_road_type (%)
MOTORWAY	72.3%
MAJOR_ROAD_OF_HIGH_IMPORTANCE	16.9%
SECONDARY_ROAD	7.1%
MAJOR_ROAD	1.9%
LOCAL_ROAD_OF_MAJOR_IMPORTANCE	1.2%
CONNECTING_ROAD	0.4%
DESTINATION_ROAD	0.1%

```
time                datetime64[ns]
acc_x                      float64
acc_y                      float64
acc_z                      float64
speed                      float64
latitude                   float64
longitude                  float64
heading                    float64
road_speed_limit             int64
vehicle_make                object
vehicle_model               object
vehicle_type                object
road_type                   object
```

```
Dataset shape: (262443, 13)
```

time	acc_x	acc_y	acc_z	speed	latitude	longitude	heading	road_speed_limit	vehicle_make	vehicle_model	vehicle_type	
2022-09-29 03:46:06.458	-0.030	-0.028	1.009	0.0	43.238934	-2.877811	318.0	40	MAN	TGX	truck	LOCAL_ROAD_OF_MAJOR
2022-09-29 03:46:06.558	-0.032	-0.029	1.008	0.0	43.238934	-2.877811	318.0	40	MAN	TGX	truck	LOCAL_ROAD_OF_MAJOR
2022-09-29 03:46:06.658	-0.029	-0.027	1.008	0.0	43.238934	-2.877811	318.0	40	MAN	TGX	truck	LOCAL_ROAD_OF_MAJOR
	-0.028	-0.029	1.009	0.0	43.238934	-2.877811	318.0	40	MAN	TGX	truck	LOCAL_ROAD_OF_MAJOR

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2- Dataset Pre-processing

- The dataset we have is coming from physical sensor installed in a Truck.
- In order to deal this work with our dataset, we should pay attention to the following points:
  - Calibrate the sensors and identify axes
  - Change values in respect to Physical Units
  - Remove noise

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3- Feature engineering

- In this section, we concentrate on:
  - Explore and understand the domain
  - Search for references
  - Find new features to enrich our model
  - Look at features inter-connection (correlation, …)

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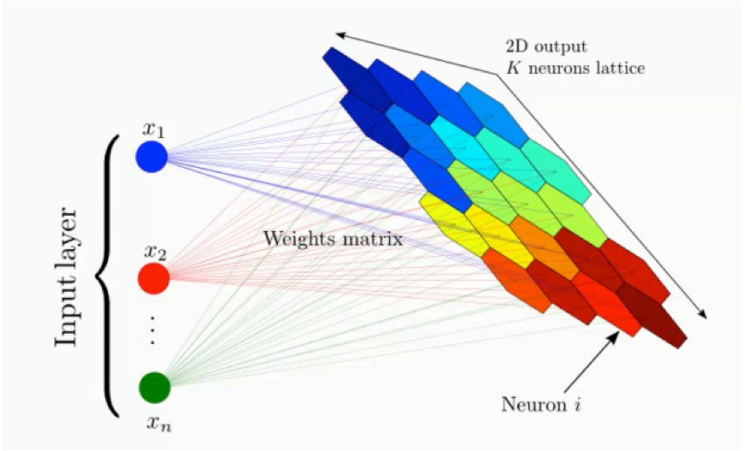
4- Build Model

1. We will use Self-Organizing Map (SOM) to build the model
2. Prepare the data to match model input
3. Train the model



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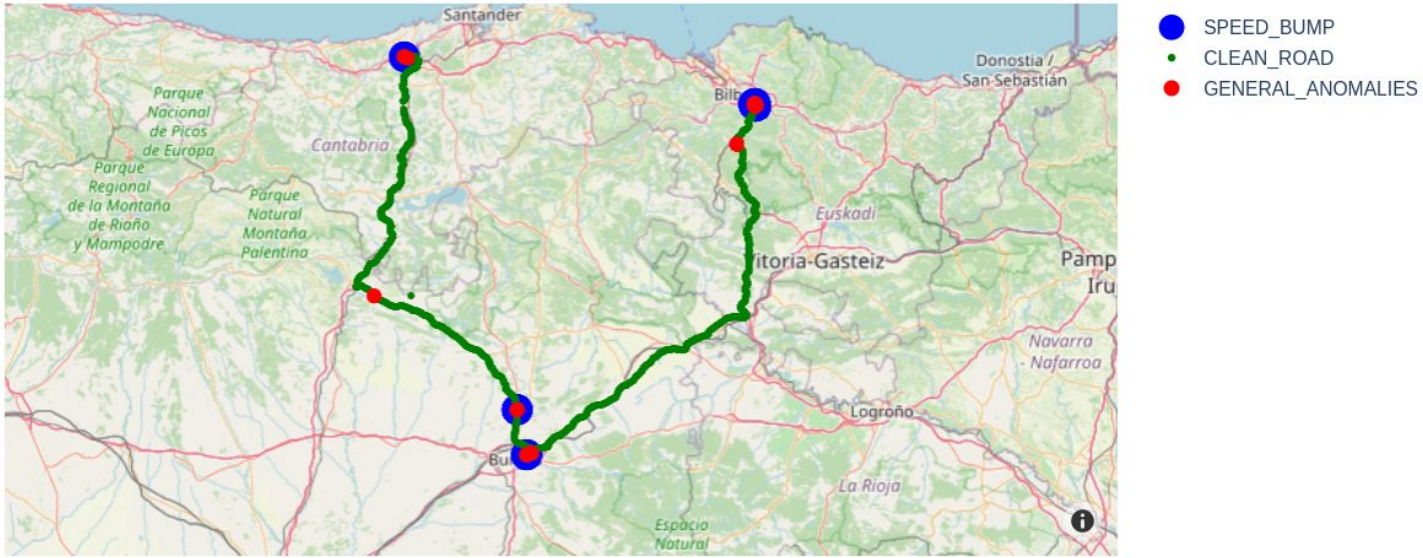
5- Anomalies detection and Visualization

Road Condition Monitoring



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Thank you :-)

__ Wish I won the Position __