Machine Learning Exercise: Event Prediction with Python

# Objective

The objective of this exercise is to develop a machine-learning model in Python that can predict whether the occurrence of an event (harsh cornering, harsh braking or harsh acceleration) can be deduced based on [OpenStreetMap](https://www.openstreetmap.org/) (OSM) related attributes.

Enclosed is an events.csv file. Each row within this file corresponds to a GPS point that has been logged, potentially indicating an event such as harsh cornering, harsh braking, or harsh acceleration. These GPS points have been matched to links within the OSM network.

Your objective is to construct a machine-learning model using Python that can predict whether an event (it does not matter which event) occurred based on attributes derived from OSM data. These attributes are already included in the CSV file.

This task involves leveraging the rich information provided by OSM, encompassing various attributes such as road type, speed limit, and more. By harnessing this data, your model can discern patterns associated with driving events and make informed predictions.

# Data explanation

Information about OSM-related attributes can be found on the [OSM Wiki](https://wiki.openstreetmap.org/).

Additional columns that need explanation are:

* IIA (Intersection Influence Area)
  + Indicates the distance between the GPS point and a potential crossroad, but only if the crossroad was within a 200-meter distance of the GPS point.
* length
  + The length of the OSM segment to which the GPS point was matched.
* buildings
  + The number of building that can be found at the side of the road corresponding to the OSM segment.
* build.density
  + The number of buildings per meter length of the OSM segment.
* roundabout
  + 0 = GPS point not logged on a roundabout
  + 1 = GPS point logged on a roundabout

# Evaluation Criteria

Your submission will be evaluated based on the following criteria:

* Readability of the code
* Structure of the code
* Quality of the code
* Justification for model Selection
* Comparison with alternatives
* Alignment with problem requirements
* Demonstration of understanding
* Potential for improvement

You will be expected to explain your model and results during the interview (**max. 10 minutes**). Ensure your notebook contains clear explanations and insights into your approach and findings.

# Submission

You need to submit your assignment by email to [tom.bellemans@uhasselt.be](mailto:tom.bellemans@uhasselt.be) and [jan.vuurstaek@uhasselt.be](mailto:jan.vuurstaek@uhasselt.be) before Monday March 18, 9am CET. Please ensure your code is runnable and demonstrates the functionality of your model.