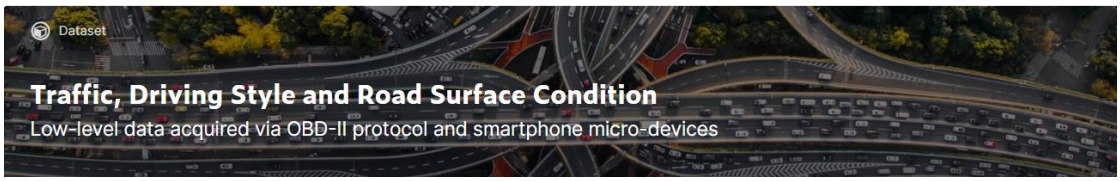

利用车载诊断系统和手机传感器收集的数据推测路面情况和驾驶风格

要求:

1. 使用逻辑回归推测路面情况
2. 使用高斯概率生成模型推测驾驶风格是否为“AggressiveStyle”
3. 使用 Python 编程语言
4. 数据预处理，数据集划分，性能评价指标需在实验报告中说明
5. 提交实验报告和代码文件，代码应有注释

数据说明：

“Raw data have been retrieved and stored on different routes: suburban, urban and mixed ones, with medium and long distances. An average of five traces per route have been recorded, sampling OBD-II parameters and smartphone data at 1 Hz frequency. About 10,000 records have been collected on average for each route, taken on different days, in various traffic conditions and with different cars (and drivers): a Peugeot 207 (two routes) and an Opel Corsa (two routes). During the dataset creation, each driver who collected a trace has been asked to label manually the records with the event characteristic for each of the above categories.” [1]

Data attributes [2]

✧ 14 numeric features:

- Altitude change, calculated over 10 seconds;
- Current speed value; average speed in the last 60 seconds;
- Speed variance in the last 60 seconds;
- Speed variation for every second of detection;
- Longitudinal acceleration, measured by the smartphone accelerometer and pre-processed with a low-pass filter;
- Engine load, expressed as a percentage;
- Engine coolant temperatures in celsius degree;
- Manifold Air Pressure (MAP), a parameter the internal combustion engine

uses to compute the optimal air/fuel ratio;
- Revolutions Per Minute (RPM) of the engine;
- Mass Air Flow (MAF) Rate measured in g/s, used by the engine to set fuel delivery and spark timing;
- Intake Air Temperature (IAT) at the engine entrance;
- Vertical acceleration, measured by the smartphone accelerometer and pre-processed with a low-pass filter;
- Average fuel consumption, calculated as needed liters per 100 km.

✧ 3 target attributes
- Road surface condition class:
  - SmoothCondition
  - FullOfHolesCondition
  - UnevenCondition;
- Traffic congestion condition class:
  - LowCongestionCondition
  - NormalCongestionCondition
  - HighCongestionCondition;
- Driving style class:
  - EvenPaceStyle
  - AggressiveStyle.

[1] M. Ruta *et al.*, "Machine learning in the Internet of Things: A semantic-enhanced approach," Semantic Web, vol. 10, no. 1, pp. 183-204, 2019.
[2] https://www.kaggle.com/gloseto/traffic-driving-style-road-surface-condition