### Background
- Driving efficiency evaluation
- Extremely significant in road safety
- Identify driving risk parameters
- Quantify their influence on traffic risk
- Several methodologies proposed for driving behavior data collection and analysis.
- Most significant parameters associated with driving risk:
  - Speeding (SP)
  - Mobile phone usage (MU)
- Driver's efficiency on a microscopic level has not been studied by making use of DEA techniques.

### Main objective
- Provide a solid framework for the comparative evaluation of driving efficiency based on Data Envelopment Analysis (DEA).

### Methodology
- Input-oriented DEA:
  - Inputs minimization (recorded driving metrics)
  - Maintain the number of outputs (recorded distance)
- Drivers are considered Decision Making Units (DMUs).
- Provide a relative efficiency measure (EΩ) to compare different drivers based on driving performance.
- All variables are considered and quantitative.
- Drivers should reduce their mileage and the frequency of driving risk characteristics.
- Python coding:
  - Data aggregation
  - DEA models development.

### Results
- **Table 1:** Variables recorded during the experiment
- **Table 2:** Driving characteristics of efficiency groups per road type and overall

### Conclusions - Discussion
- Most efficient drivers lie on the efficiency frontier and act as peers for the rest.
- Classification of the driving sample based on drivers' comparative efficiency.
- Methodology to estimate the optimal level of inputs and outputs for each driver to become efficient.
- Most common inefficient driving practices are identified (aggressive, risky driving etc.).
- Results could be exploited:
  - By a smartphone app to provide feedback on the driving characteristics of each driver.
  - For insurance pricing based on driving usage and characteristics.
  - Center around larger driving samples.
  -克服DMUs sensitivity to outliers and drivers with zero input attributes. Compare results of per trip and per driver analysis of each driver.

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