

ADVANCED INSTRUMENTS AND METHODS FOR STREET ACCIDENT ANALYSIS

RESEARCH GROUP: Alfonso Micucci, Mattia Strangi
 KEYWORDS: road accident reconstruction and prevention

The recent introduction of street murder crime, as established by the law n. 41 of March the 23rd 2016, has raised the need of more accurate security force surveys, on the one hand, and of suitable instruments and methods for a more reliable reconstruction of street accidents, on the other hand.

In order to achieve this goal, the group of Forencis Engineers at DICAM has been engaged in a well-structured study concerning:

- a) the definition of best practices for the survey execution directly on the accident place and the writing of a specific handbook for Judicial Police agents, that outdoes the considerable limits of the norm UNI 11472;
- b) the experimental survey, based on direct observation techniques, of cyclist modalities, with evaluation of the observance degree of generic and specific Traffic Laws, recognition of the most problematic situations and quantitative evaluation of cinematic parameters. These consist in speed and average acceleration (cfr. Fig. 1) relative to the operation typology (crossing, turning right, turning left), track typology (reserved or public track, in the second case with low or high interference probability with respect to further vehicle streams), as well as age range;

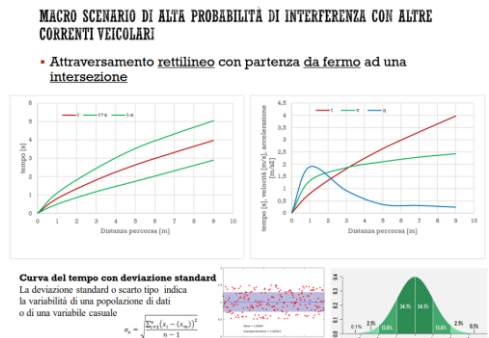


Fig. 1. Cinematic parameters concerning cyclist motion in a given situation.

- c) the experimental survey, based on simulation techniques, of car driver perception of pedestrian and cyclists in the most problematic conditions, with quantitative evaluation of

perception distance and time of reaction (cfr. Fig. 2);

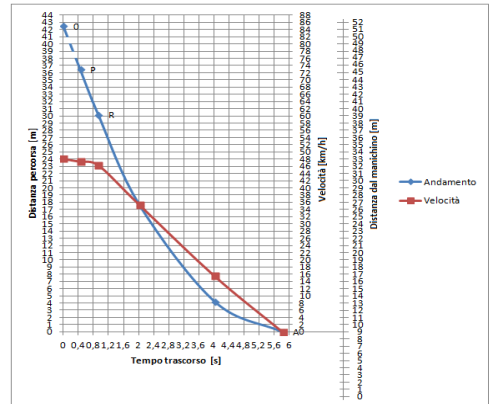


Fig. 2. Diagram of experimental survey of driver perception of pedestrian standing in the middle of the lane.

- d) the study and the design of algorithms and numerical methods aimed at supporting the driving behavior analysis for car driver profiling (cfr. Fig. 3);

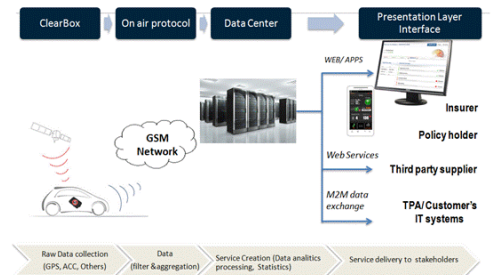


Fig. 3. Logical scheme of data elaboration for driving behavior analysis (from OctoTelematics).

- e) the experimental survey, based on computational simulation techniques, on the perception of direction change indicators of a given vehicle by bikers coming from the opposite direction or in the process of overtaking that vehicle;
- f) the investigation about the typology of information processed by OBD-II drives (On

Board Diagnostic, cfr. Fig. 4) of car vehicles and motorbikes, as well as about their acquisition and analysis methods;



Fig. 4. Common OBD-II port.

- g) the analysis concerning the reliability of our elaborated models through model checking techniques developed in mathematical logic

for the evaluation of the security degree of those models and the recognition of possible critical situations..

MAIN PUBLICATIONS

1. Micucci A., Strangi M., Prove di avvistabilità de-gli utenti deboli della strada in condizioni dinamiche – Egaf Edizioni, 2016
2. Micucci A., Strangi M., Analisi sperimentali della circolazione del ciclista – Egaf Edizioni, 2014
3. Micucci A., Strangi M., Determinazione sperimentale del tempo tecnico e della decelerazione in frenate d'emergenza – Egaf Edizioni.

LINKS AND CONTACTS

alfonso.micucci@unibo.it
mattia.strangi@gmail.com