

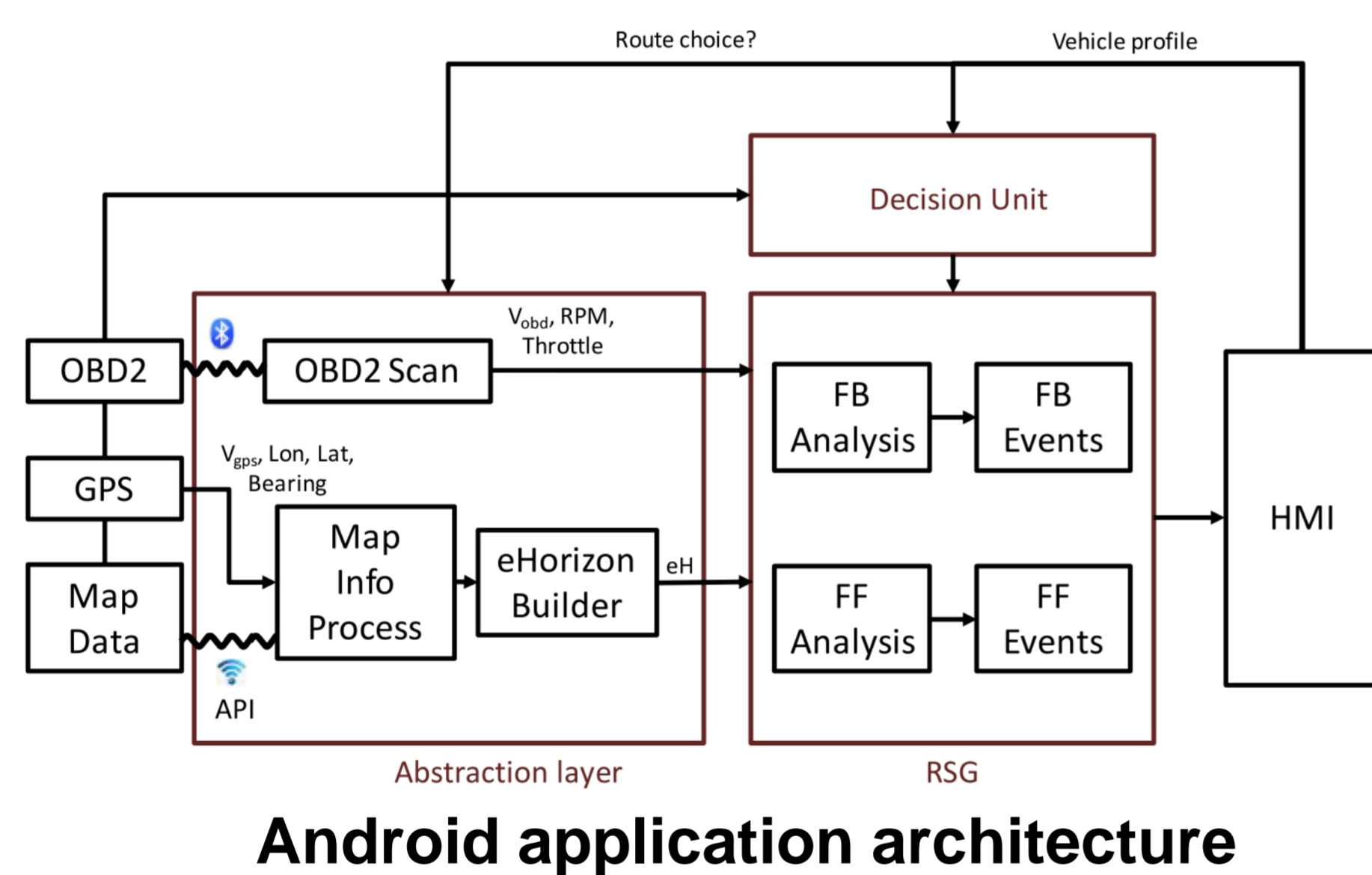
Introduction

Ecodriving assistance systems can be found on a wide variety of systems. On cars, gear shift indicators, eco-level indicators or more complete ecodriving systems are termed embedded systems. A more and more common support for ecodriving are nomadic devices such as smartphones. It enables any driver who possess such an equipment to start learning ecodriving.

Here, a more complete ecodriving application is proposed in order to enhance all main features already existing (eco-level estimation, fuel modeling, gear shift indicator) and to complete them by adding feedforward features relying on a real time electronic horizon construction. Knowing the road in advance is assumed to increase the potential savings of fuel use.

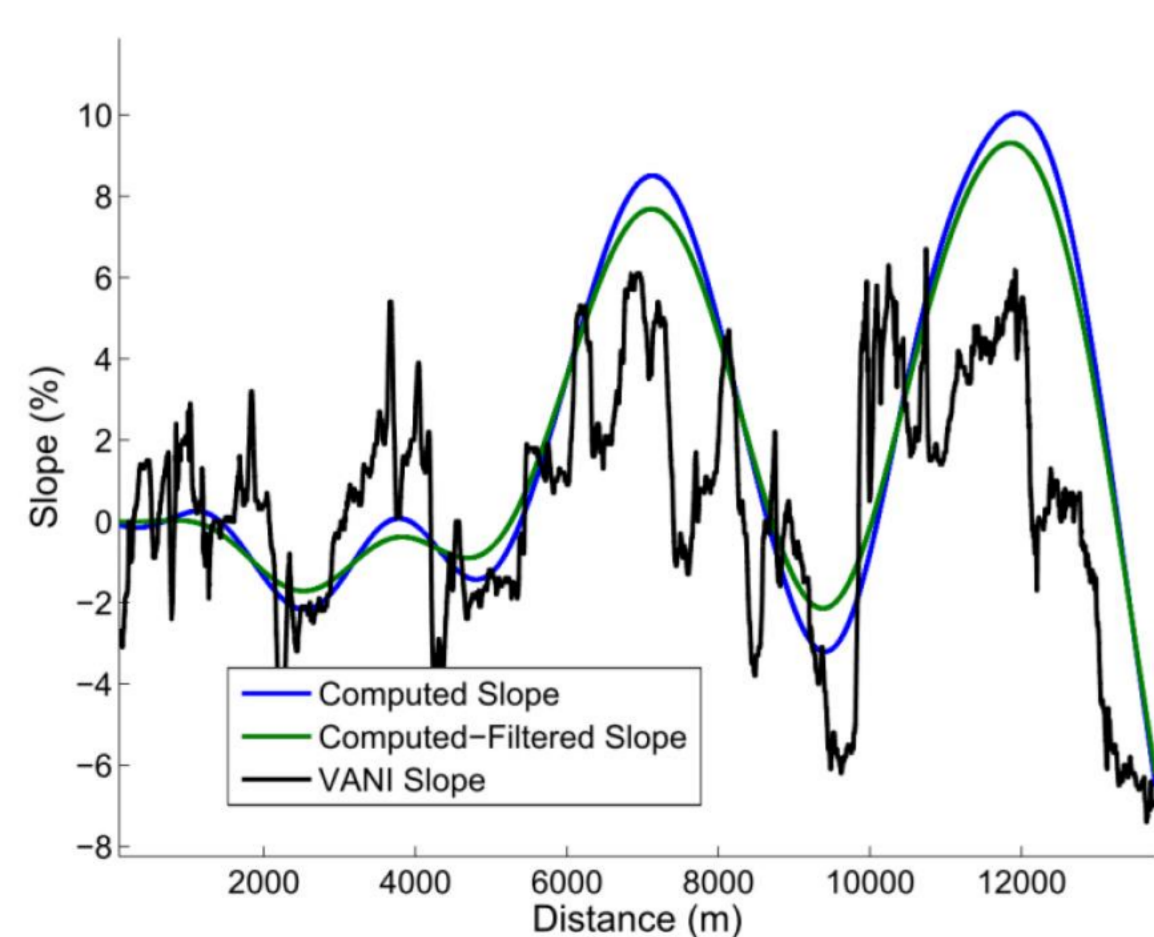
Technical achievements

One of the original tasks of the Android application consists of building an electronic horizon describing the upcoming road infrastructure with an access to a free map database. Open Street Map has been selected as it is not limiting the access to data. Map Quest web services have been used as an API provider.

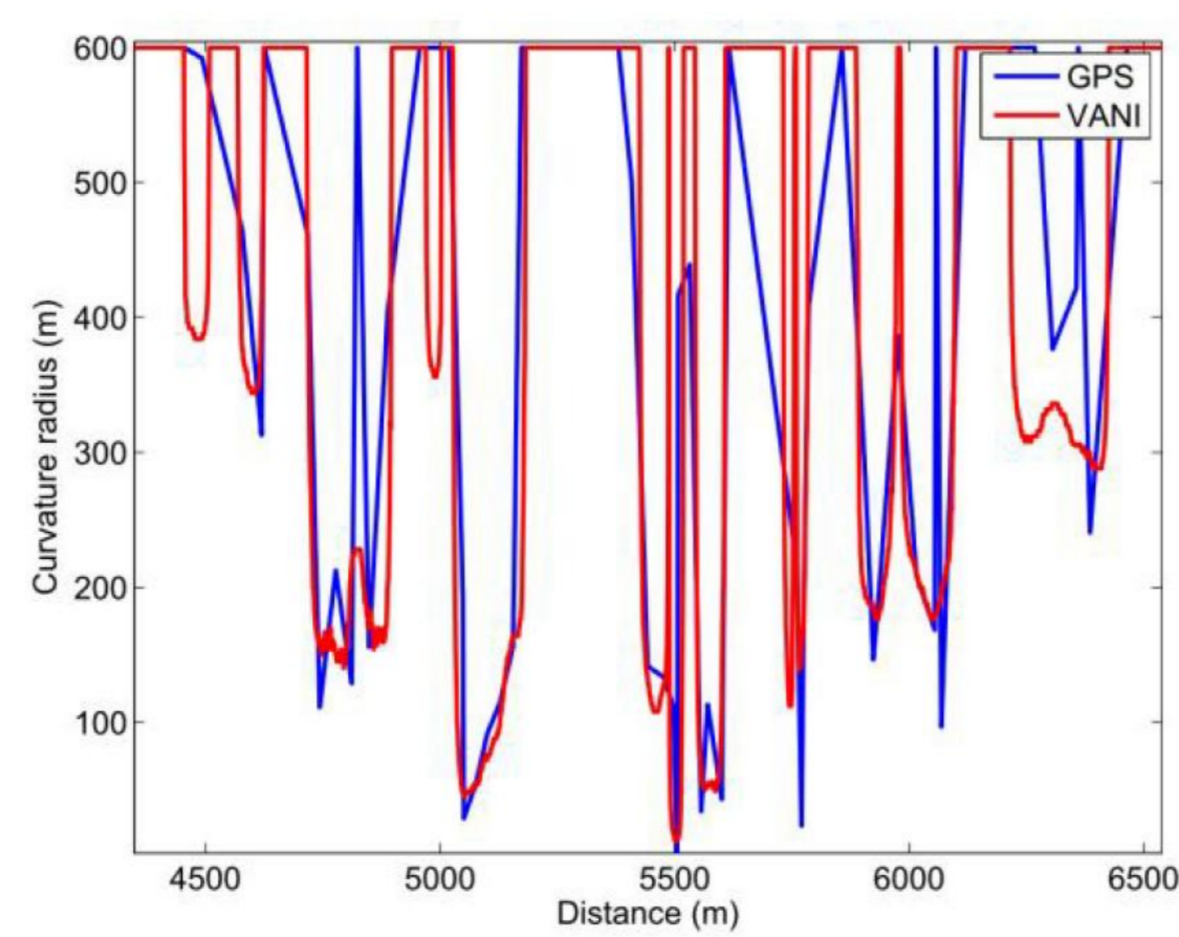


Information gathered are:

- Road grade: From the elevation derived and filtered with a running average
- Road junctions: Directly available in the nodes information. Give Ways are generally not available.
- Road speed limits: Directly available in the ways information or extracted from the road category.
- Road curvature: Extracted from nodes position.



Road slope estimated compared to the measured one (from VANI Vehicle)



Road radius of curvature estimated and measured

HMI graphics

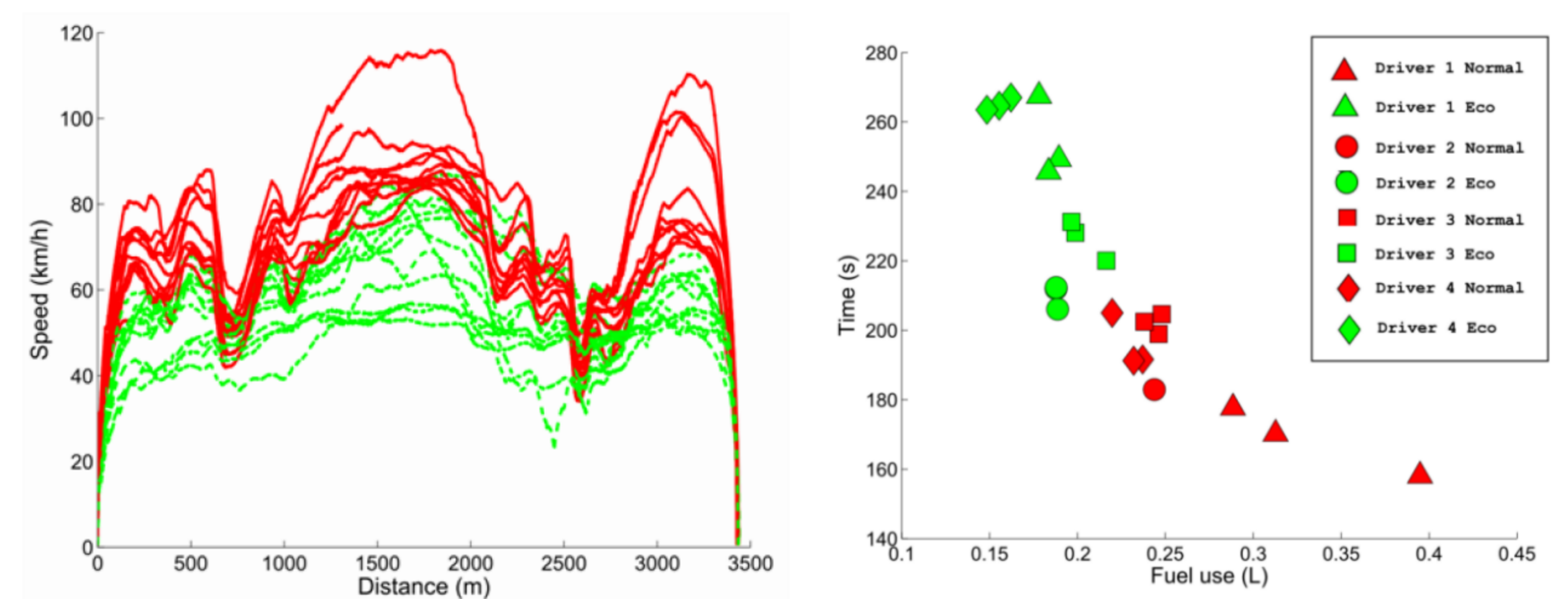
HMI graphics have been developed to achieve several requirements: provide a simple and user friendly appearance while displaying enough advice to help the driver to reduce energy consumption. Furthermore, the driver should be in safe driving conditions and to fulfill this requirement, HMI buttons are disabled over a given speed (5 km/h).



Android application HMI graphics

Pre-validation

A pre-validation experiment has been performed on the French Satory test track in Versailles with 4 drivers driving three times with and without the system on a Renault Clio 3 car. Fuel consumption and travel time has been compared in each of the driving conditions.



Pre-validation results

Conclusions

This poster presents an innovative ecodriving android application that has the main advantage to be connected or not to OBD2 connector, to provide feedback and feedforward advice to the drivers. Feedback has been designed from statistical studies while feedforward is mainly relying on optimization procedures.

In the beginning of 2014, real world experiments have started and several drivers in different European countries will drive with this application. All results will be available in the end of 2015.

Acknowledgements

The authors would like to thank the european FP7 ecoDriver project for funding this research.

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