RELIABLE VEHICULAR CONSUMPTION PREDICTION BASED ON MACHINE LEARNING

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Abstract: A robust prediction model is developed for reliably estimating vehicular consumption. This model is distinguished from other models proposed so far for the following reasons: it detects the factors contributing into vehicular consumption, it applies machine learning functionality for approximating the nonlinearities and the specificities between the contributing factors, and it is capable of implicitly adapting to the characteristics of the vehicle, the road network and the contextual conditions through its learning process. The authors validated its efficiency by applying it on measurements collected during a data acquisition campaign, which was performed by a fully electric vehicle (FEV) in an urban road network.

Key words: *MLP, consumption model, context-aware prediction, FEV*

Received: October 23, 2013 **DOI:** 10.14311/NNW.2014.24.019
Revised and accepted: July 18, 2014

1. Introduction

Nowadays, there is a growing interest in reliably estimating a vehicle's energy consumption (either fuel or electrical consumption) towards a specific destination. The pre-trip knowledge of the expected energy consumption along a route may affect the decision of selecting a particular route among the available ones considering the constantly rising price of energy, as well as due to ecological reasons [2, 4, 5]. Furthermore, such knowledge is necessary in order to calculate the reachability of a destination before settling towards it. The outcome of this calculation is very important especially in cases of vehicles consuming alternative fuels, which have limited reserves and certain restrictions regarding their refuelling process. For example, the FEVs' recharging process is significantly time consuming, while the compressed natural gas (CNG) vehicles' refuelling network is very limited. Thus, the accuracy and reliability of the energy consumption estimation is of high significance when planning the routing and refuelling strategies of such vehicles.

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