PROJECT

REDUCTION

Reducing Environmental Footprint based on Multi-Modal Fleet management System for Eco-Routing and Driver Behaviour Adaptation

Funding: European (7th RTD Framework Programme)

Duration: Sep 2011 - Aug 2014

Status: Complete with results

Total project cost: €3,971,742

EU contribution: €2,800,000

Call for proposal: FP7-ICT-2011-7

CORDIS RCN : 100009

Background & policy context:

Reduction of CO_2 emissions is the great challenge of the transport sector nowadays. Despite progress in vehicle manufacturing and fuel technology, additional innovative technologies are needed to address this challenge. According to the International Association of Public Transport, a significant fraction of CO_2 emissions in EU cities is resulting from public transport and other mass transport means, which are commonly organised into multi-modal transport fleets, because their vehicles have, on average, nearly substantial mileage and fuel consumption.

Objectives:

REDUCTION follows an interdisciplinary approach and brings together expertise from several communities. Its innovative, decentralised architecture allows scalability to large fleets by combining both V2V and V2I approaches. Its planned commercial exploitation, based on its proposed cutting-edge technology, aims at providing a major breakthrough in the fast growing market of services for 'green' fleets in EU and worldwide, and present substantial impact to the challenging environmental goals of EU.

Methodology:

The REDUCTION project focuses on advanced ICT solutions for managing multimodal fleets and reducing their environmental footprint. REDUCTION collects historic and real-time data about driving behaviour, routing information, and emissions measurements, that are processed by advanced predictive analytics to enable fleets enhancing their current services as follows:

Optimizsing driving behaviour: supporting effective decision making for the enhancement of drivers education and the formation of effective policies about optimal traffic operations (speeding, braking, etc.), based on the analytical results over the data that associate driving-behaviour patterns with CO_2 emissions

Eco-routing: suggesting environmental-friendly routes and allowing multi-modal fleets to reduce their overall mileage automatically

Support for multi-modality: offering a transparent way to support multiple transportation modes and enabling co-modality

REDUCTION will develop powerful methodologies for providing predictive analytics based on advanced data mining technology, which will reveal patterns and useful information for meeting the objectives of fleet management, such as decision making for driver-adaption, ecorouting, and thus CO_2 emissions control and improved fuel economy. Web-based access will be provided to clients of the provided service, in order to provide explanatory reports, based on graphical visualisations, about the discovered knowledge and for providing rapid alerting information that enables monitoring the performance of the fleets. Finally, the REDUCTION platform will provide appropriate interfaces to intelligent mobile devices

(e.g., smartphones, netbooks) in order to enable public user - for instance, passenger - applications leverage the information residing in the platform.

Parent Programmes:
FP7-ICT - Information and Communication Technologies

Institute type: Public institution

Institute name: European Commission

Funding type: Public (EU)

Lead Organisation:

Stiftung Universitat Hildesheim

Address:
UNIVERSITATSPLATZ 1
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EU Contribution: €450,637

Partner Organisations:

Aarhus Universitet

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EU Contribution: €452,020

Trinite Automatisering B.v.

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EU Contribution: €476,700

Trainose Metafores-Metaforikes Ypiresies Epivaton Kai Fortiou Ae

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Organisation Website:
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EU Contribution: €60,750

Nordjyllands Trafikselskab

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EU Contribution: €99,600

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Organisation Website:
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EU Contribution: €324,000

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EU Contribution: €294,640

Ctl Cyprus Transport Logistics Limited

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1065 Lefkosia
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Organisation Website:
http://www.ctranslog.com

EU Contribution: €106,800

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EU Contribution: €456,100

Gottfried Wilhelm Leibniz Universitaet Hannover

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Germany

Organisation Website:
http://www.uni-hannover.de

EU Contribution: €78,753

Technologies:

Information systems
Sustainable urban mobility planning

Development phase: Research/Invention

Key Results:

The study does not demonstrate any final results yet as it is still ongoing. However, some intermediate results have been released. The main activities in the first year within each workpackage are:

Work package 1 is developing an onboard technology and wireless communication infrastructure. The work on the wireless communications and vehicular networking aspects of REDUCTION during the first year of the project revealed the benefits of the two-layer architecture in combination with a packet scheduling/routing mechanism that guarantees throughput optimality and at the same time strives for low delay in packet dissemination.

Work package 2 is developing predictive analytic models for energy-efficient driving and driver-behavior adaptation. Within this work package all possible requirements were collected, namely:

- GPS data should be collected and stored in a database and in additions the data should be mapped to a digital map.
- CO_2 emission data from CAN-Bus can be collected and stored in database.
- An off-line and on-line advisory feedback should be provided to the driver in response to his driving records.
- An on-line feedback should be given to drivers to prevent events possible in the immediate road neighbourhood in order to achieve safe and time efficient driving.
- Personalized Eco-routing should be provided to deliver personalised route paths that would be eco-friendly by the driver's personal standards.

Additionally, the software architecture has been described and the fundamental and optional elements of the predictive analytics models are analysed. Moreover, an introduction and description is given of the basic predictive models that are planned to be applied.

Within work package 3 a basic prototype for travel-time and eco-route has been implemented. The output of the work so far is a complete digital map with both travel-time and eco-route prediction that is well-suited for a larger IT organisations and a simple web interface that can compute the travel time and eco-value between two points.

So far, within work package 4 an overview of the functionalities from different work packages is given, the requirements of the system integration are collected, the interface of different work packages and how they are merged are described and the software architecture is defined to combine WP2 and WP3 in the central ITS station.

So far, within work package 5 the r

Strategy targets

Innovating for the future: technology and behaviour: Promoting more sustainable development

Documents:
 [VANET Packet Scheduling/Routing and Information Dissemination (Other project deliverable)](#)

STRIA Roadmaps: Smart mobility and services

Transport mode: Road transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Digitalisation, Decarbonisation, Environmental/Emissions aspects

Geo-spatial type: Other