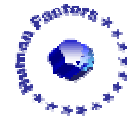




6th Framework Programme
 Priority 2 "Information Society Technologies"
 "HUMAN centred design for Information Society Technologies"

Proposal n° 507 420
 Contract n° 507420



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International workshop on modelling driver behaviour in automotive environments

Minutes

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**Purpose: Minutes of the International Workshop on Modelling Driver Behaviour in
Automotive Environments**

Writer: Cristina Re
Date of the meeting: 25-27, May 2005
Place: Amphitheatre - JRC - 21020 Ispra (VA), Italy

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Distribution list:

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Objective of the workshop

The study of all technological systems in terms of design, safety assessment or training purposes requires that significant attention is dedicated to human perspective. Techniques for user centred design, assessment of user needs and field approaches are normally applied and exploited before implementing new control devices or safety systems that are managed by a user or operator.

This demands that appropriate models of Human Machine Interaction and associated taxonomies for classifying human behaviour are available for theoretical and practical application. This is achieved by coupling models of human behaviour to models of plant response and environment development, in order to consider the dynamic evolution of the "joint" human machine system. Nowadays, in most working contexts, such as road vehicles, aeroplanes, medical systems, control rooms and so forth, these joint human-machine-environment systems can be described by similar and well developed approaches. The formalisation and standardisation of Human Factors methods and approaches has raised the possibility to exchange or borrow criteria and recommendations from different domains of application. However, after an initial enthusiasm, there is now more prudence in transferring technological concepts between different domains.

In the automotive environment, the paradigm of the joint human machine system is called "Driver-Vehicle-Environment" (DVE) model. Several studies have pointed out the uniqueness of this domain, which can refer to minimum standardisation and normalisation of behaviours, contexts and technology. In particular, a large variety of people, from teenagers to elders, including those with physical, sensory or cognitive deficits, can obtain a driver license and receive minimal initial training, often little or no refresher training at all, and no training with specific new vehicles or devices. The acceptable level of intrusiveness or annoyance and tolerance for false alarms in a car is quite high. Moreover, many devices may be aftermarket additions and are not integrated into the original design of the vehicle. There is also an external context, namely roads and traffic, where the rules for traffic management are almost completely left to the decision of drivers rather than a specific traffic management authority, for instance in traffic jam condition. In these contexts, the temporal demands for in-vehicle warning practises are typically much more time-critical than for other applications. Finally, the presence of other passengers in the vehicle means that various driver warnings may be public. Consumer acceptance of an in-vehicle-warning device, or behavioural reactions to the warning, can be influenced in various ways by the social context (e.g. embarrassments, feelings of competence, need to appear daring or competent to peers).

All these aspects require that the model of the DVE system (in particular the Driver) considers a large variety of factors and conditions, in addition to "standard" cognitive, decisional and behavioural processes, typical of human models.

The objective of this Workshop was to present and give a general overview of various factors that contribute to modelling human behaviour in a DVE interaction process. The overall picture derived from the consideration of all these aspects is that the DVE system is very difficult and complicated to model. Moreover, the number and complexity of environmental contexts that generate dynamic conditions and interactions make the representation of critical scenarios even more cumbersome.

In practice, rarely all these aspects have to be considered all together by a designer or safety analyst. However, they contribute to creating the overall picture of the DVE systems and show the scope and dimension of the many different interactions process that may take place and demand modelling consideration. Designers and analysts of automotive systems must be aware of these aspects and should be able to select and apply the most pertinent and necessary ones for the goal and scope of the study being carried out.

General presentation of the meeting

The workshop has been held on 25 - 27 May 2005 at the Joint Research Centre in Ispra. The event was sponsored and supported by Joint Research Centre.

A total 65 people attended the workshop, of which 21 were lecturers and 14 were poster presenters. Apart from logistic, touristic and JRC brochures every person received a copy of the draft version of the proceedings, the programme (see at the end of this document) and the list of participants in order to keep contacts between the researchers and scientists after the meeting.

The event was divided in a total of 10 sessions: 7 lecture topics (Mental Models of Driver was subdivided in two parts due to logistic problems), two open discussion and one poster session. The lecturers had a total time of 45 minutes subdivided in 30-35 minutes for the presentation and the remaining time for the discussion with the audience; moreover round table sessions have been scheduled in order to allow open

debates on crucial points left open during single presentations. All the discussions have been addressed positively and with full reply, in an atmosphere of constructive debate on future progresses of the studies. Many Ph.D. students arouse technical questions as well as many experts exchanged their opinion and their hands-on experience.

The chairpersons have been chosen from the organising committee on the basis of their research experience. The role of the chairpersons was to introduce the lecturer and to coordinate the debate.

The subscription to the meeting was free of charge and JRC sustained the costs of the overall organization, coffee breaks, lunches and transportation of the attendants, allowing large adhesion of Ph.D. students and young researchers.

During the poster session young researchers and students presented their work and received suggestions from the experts on improvements and had occasion to establish contacts.

In order to release the final version of the proceedings, a month has been given to each lecturer/poster author to improve their papers on the basis of the workshop interactions, due to their request. This proposal was considered as an improvement of the quality of the proceedings regarding also the effectiveness of the workshop.

Actually the Proceedings are under printing process and will contain the lecturers as well as the poster presenters papers.

Discussions are being held with Springer in order to publish extended papers provided only by the lecturers in a monograph, edited by JRC.



APPENDIX 1: Programme of the Workshop

Programme of the International Workshop on Modelling Driver Behaviour in Automotive Environments

- JRC, ISPRA (VA), LAKE MAGGIORE, ITALY. 25-27, MAY 2005

Technical Programme Committee: P. C. Cacciabue, (Chairperson), T. Bellet,
E. Davila-Gonzalez, J. Krems, W. Janssen, J. Engstrom, Z. Lentziou, B. Peters, T. Vaa.

25 May 2005

Chairperson:
Cacciabue

□ **International Projects on Driver Modelling**

Papakostopoulos MODELING DRIVER BEHAVIOUR IN EU AND INTERNATIONAL PROJECTS 10:00 – 10:45

COFFEE BREAK 10:45 – 11:00

Chairperson:
Cacciabue

□ **Control Theory Models of the Driver**

Weir REVIEW OF CONTROL THEORY MODELS FOR DIRECTIONAL AND SPEED CONTROL 11:00 – 11:45

Juergensohn CONTROL THEORY MODELS OF THE DRIVER 11:45 – 12:30

• LUNCH 12:30 – 14:15

Chairperson:
Bellet

□ **Modelling Behavioural Adaptation And Motivational Aspects**

Fuller CONTROL AND AFFECT: MOTIVATIONAL ASPECTS OF DRIVER DECISION-MAKING 14:15 – 15:00

Tango	MODELING TRAFFIC AND REAL SITUATIONS	15:00 – 15:45
Parker	DRIVER ERROR AND CRASHES	15:45 – 16:30
	COFFEE BREAK	16:30 – 16:45
Chairpersons: Engstrom, Peters	OPEN DISCUSSION	16:45 – 17:30
Chairperson: Janssen	POSTER PRESENTATION	17:30 – 18:30

27 May 2005

Chairperson: Krems	<input type="checkbox"/> Mental Models of Driver(2)	
Hollnagel Cacciabue	/MODELLING DRIVING PERFORMANCE: A REVIEW OF CRITERIA, VARIABLES AND PARAMETERS	8:30 – 9:15
Engstrom	TOWARDS A CONCEPTUAL FRAMEWORK FOR MODELLING DRIVERS' INTERACTION WITH IN-VEHICLE SYSTEMS	9:15 – 10:00
Summala	TOWARDS UNDERSTANDING DRIVING BEHAVIOUR AND SAFETY EFFORTS	10:00 – 10:45
	COFFEE BREAK	10:45 – 11:00
Cody / Gordon	TRB WORKSHOP ON DRIVER MODELS: A STEP TOWARDS A COMPREHENSIVE MODEL OF DRIVING?	11:00 – 11:45
Chairpersons: Krems, Cacciabue	FINAL DISCUSSION AND CLOSURE	11:45 – 12:30
	LUNCH	12:30 – 14:15

APPENDIX 1: Programme of the Poster Session

Programme of the Poster Presentation Session: 26 May 2005 - 17:30 – 18:30

N. Dapzol	DRIVER'S BEHAVIOR MODELING USING THE HIDDEN MARKOV MODEL FORMALISM
O. Georgeon	DRIVER BEHAVIOUR MODELLING AND COGNITIVE TOOLS DEVELOPMENT IN ORDER TO ASSESS DRIVER SITUATION AWARENESS

A. Doniec	TOWARDS ANTICIPATION IN TRAFFIC SIMULATION AT JUNCTIONS
J. Maroto	SIMULATING DRIVER IN A URBAN TRAFFIC MODEL
T. Wynn	DRIVER PERFORMANCE: THE EFFECT OF SENSATION SEEKING ON RISK-TAKING BEHAVIOURS
S. Thompson	DEVELOPING A PROTOCOL TO ASSES VISUAL DEMAND USING OCCLUSION
B. Bailly	A METHODOLOGY TO ANALYZE DRIVERS' SITUATION AWARENESS
M. Houtenbos	MODELLING INTERACTION BEHAVIOUR: FOCUS ON EXPECTANCY
A. Mogilka	SITUATION AWARENESS IN THE CONTEXT OF DRIVING AUTOMATION
B. Kämpfe	IMPACT OF SKILL ACQUISITION IN INTERACTING WITH HMI ON DRIVERS' SITUATION AWARENESS
C. Turetschek	EFFECT OF ISA-LIKE IST APPLICATIONS ON THE COMMUNICATION BETWEEN ROAD USERS IN URBAN AREAS
E. S. Wilschut	DETECTING DROWSINESS OF DRIVERS WITH A DETERMINISTIC HYPOVIGILANCE DIAGNOSIS MODULE
J. Barbé	USER EXPERIENCE IN TELEPHONING WHILE DRIVING
M. Morel	ATTENTION SHARING BETWEEN DRIVING AND ADDED TASKS: A PHYSIOLOGICAL AND BEHAVIORAL STUDY

List of actions:

End of July: Distribution of the Proceedings to all the workshop attendants.

Middle of 2006 Release of a book printed by Springer in order to publish extended papers provided only by the lecturers in a monograph, edited by JRC.