INTELLIGENT TRANSPORTATION SYSTEMS
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IEEE ITS SOCIETY NEWSLETTER

Vol. 10, No. 3, July 2008 *Editor: Dr. Charles J. Herget, c.herget@ieee.org*

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The IEEE ITS Society Newsletter is published quarterly in January, April, July, and October. The current and all past issues of the Newsletter may be downloaded at no charge from the Society's web site:

www.ieee.org/itss

You may subscribe to or unsubscribe from announcements at the same web site. Announcements are sent to approximately 10,000 ITS professionals from industry, academia, and government.

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Information for Contributors

Announcements, feature articles, book and meetings reviews, opinions, letters to the editor, professional activities, abstracts of reports, and other material of interest to the ITS community are solicited Please submit electronic material for consideration in any of the following formats: Microsoft Word, OpenOffice, plain ASCII, rich text format (rtf), or portable document format (pdf) to the Editor-in-Chief at c.herget@ieee.org.

Society News

From the Editor

by Charles Herget

I attended the Intelligent Vehicles Symposium in Eindhoven, the Netherlands, on June 4-6 of this year. Every year, I find the IV Symposium to be extremely interesting, probably because of my interest in this topic and my interest in cars in general. One of the advantages of attending the symposium instead of just reading the papers is to participate in the discussion that takes place during and after the presentations. I also enjoy attending the social events that occur during the symposium.

Along with the excellent presentations on current research, we had three very interesting plenary sessions. During the plenary sessions, there was discussion about the acceptance by the public of the technology for vehicles that is being developed. There was general consensus that much of the technology for automated vehicles now available will not be implemented soon (or perhaps never) because of the lack of public acceptance. I do not want to discuss all of the issues in the article. I would like to encourage our readers to express their opinions on the subject by sending me an email at c.herget@ieee.org. I have been trying to encourage the submission of Letters to the Editor in the past. I hope the suggestion of this topic will start some discussion on these issues.

The social events at the symposium included an opening reception at the DAF museum and the conference dinner at the VeHIL (Vehicle Hardware in the Loop) facility in nearby Helmond. I enjoy visiting automotive museums, and the DAF museum was certainly well worth the visit.

The symposium also included 35 demonstrations of various aspects of intelligent vehicle technology including live

demos of autonomous vehicles.

I think the organizing committee and the program committee put together an excellent symposium. If you ever have the opportunity to attend one in the future, I would highly recommend doing so.

I have included some pictures from the symposium in this Newsletter.

From
The Editor-in-Chief of the IEEE Transactions on ITS

by Alberto Broggi

Transactions EiC Report
July 1, 2008

Finally the Transactions on ITS website migrated to the new version of the software: from version 1.8. We are now using version 4. It happened on May 27, 2008.

Unfortunately the migration was not without problems: 5 weeks after the migration we are still experiencing problems with the website and its functionality. The report that I run to obtain data that I use to run the Journal is not working anymore as it did before (now provides data which are from 4 to 7 days old); plus all the reviews entered before May 27, 2008 are not automatically forwarded to the authors when I take a decision on a manuscript. Therefore I have to manually copy and paste them, when I edit my decision letter.

Clearly this is unacceptable. Therefore I have stopped working on the website, waiting for someone to fix these problems.

The Journal's website was blocked last May 27, and it is now still blocked. I hope we will move forward in the next weeks.

I am deeply sorry for this inconvenience.
Alberto Broggi

2008 Intelligent Vehicles Symposium

The IEEE Intelligent Transportation Systems Society Intelligent Vehicles Symposium was held on June 4-6, 2008, at the Technical University of Eindhoven in Eindhoven, the Netherlands. The co-general chairs were Prof. Henk Nijmeijer from Eindhoven University of Technology and Prof. Bart van Arem from the University of Twente. The Program Chair was Prof. Bart De Shutter from Delft University of Technology.

Photos from the symposium, taken by the Newsletter Editor-in-Chief Charles Herget, follow. Read more about the symposium and see more photos at www.iv2008.utwente.nl.

Prof. dr. Henk Nijmeijer
Eindhoven
University of Technology
General Co-Chair
opening the symposium

Prof. dr. ir. Jeu Schouten
Vice Rector Magnificus
Eindhoven
University of Technology
welcoming the audience

Prof. dr. Bart van Arem
TNO/University of Twente
General Co-Chair
presenting introductory remarks

Prof. dr. Bart De Schutter
Delft University of Technology
Program Chair

Dr. ir. Carlo van de Weijer
TomTom Eindhoven
Keynote Speaker

Dr. Erik van Merrienboer
City Council Member
City of Eindhoven
welcoming attendees at the opening reception at the DAF Museum

Hans Georg Metzler
Daimler AG
Keynote Speaker

Vehicle from the University of Karlsruhe at the Demos

Dr. Steven E. Shladover
University of California, Berkeley
Keynote Speaker

ITS Conferences

Announcements for the conferences the IEEE ITS Society will sponsor in 2008 can be found on the following pages.

September 22-24, 2008
2008 IEEE International Conference on Vehicular Electronics and Safety
Columbus, Ohio, USA
www.ece.osu.edu/ICVES08

October 12-15, 2008
The 11th International IEEE Conference on Intelligent Transportation Systems
Beijing, China
www.ieeeitsc.org

October 12-15, 2008,
2008 IEEE/INFORMS International Conference on Service Operations and Logistics, and Informatics
Beijing, China
www.ieeesoli.org

October 12-15, 2008
2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications
Beijing, China
www.asmemesa.org

Announcements for the following conferences on ITS are also included.

September 1-3, 2008
International Trade and Freight Transportation Conference
Ayia Napa, Cyprus
feweb.vu.nl/ITFTC

September 4-5, 2008
Infoconnectivity: Intertwined information for interconnected transport networks
Vienna, Austria
www.iiid-expertforum.net

The International Conference on Vehicular Electronics and Safety (ICVES) is an annual meeting sponsored by the IEEE Intelligent Transportation Systems (ITS) Society. It is a forum for researchers from industry and universities to discuss research and applications in vehicle electronics, and vehicle safety systems. Papers dealing with all aspects of vehicle electronics and vehicle safety-related intelligent systems are solicited for this third meeting: ICVES

ORGANIZING COMMITTEE	TOPICS	
General Chair Ümit Özgüner **Program Chair** Sadayuki Tsugawa **Finance** Emily Sopensky **Publications** Tankut Acarman **Registration** Andrea Serrani **Local Arrangements** Keith Redmill	Active and Passive Safety Systems Telematics Vehicular Power Networks X-By Wire Technology System-On-a-Chip Vehicular Sensors Vehicle Bus Sensor Network Embedded Operation System Electro Magnetic Compatibility Inter-Vehicular Network Vehicle Testing Vehicle Hardware/Software Systems	Navigation and Localization Systems Vehicular Measurement Technology Vehicular Signal Processing Micro-electromechanical Systems Image Sensors Vehicle/Engine Control Driver Assistance Driving Systems Adaptive Cruise Control Systems Pattern Recognition for Vehicles Human Machine Interaction Online Diagnostics Virtual/Digital Systems Others

Special Sessions

TOPICS	ORGANIZER(S)
Automated Highway Systems	Sadayuki Tsugawa
ITS for Global Warming Prevention	Shoichi Washino
Plug-in Hybrid Vehicles	Giorgio Rizzoni, E. Marano
Vehicle-to-Vehicle Communication	Eylem Ekici
The DARPA Urban Challenge	Umit Ozguner, Keith Redmill
Traffic Sign Recognition	Alberto Broggi, Pierpaolo Porta

www.ece.osu.edu/ICVES08

The 11th International IEEE Conference on Intelligent Transportation Systems
Beijing, China, October 12-15, 2008

Sponsored by the IEEE Intelligent Transportation Systems Society
Organized by Institute of Automation, Chinese Academy of Sciences
Conference site: www.ieeeitsc.org Email: itsc08@gmail.com

The IEEE Intelligent Transportation Systems Society (ITSS) is sponsoring a conference on basic research and applications of leading advances in communications, computer, control, and electronics technologies related to Intelligent Transportation Systems (ITS). IEEE ITSC 2008 is technical-sponsored by Key Lab for Complex Systems & Intelligence Science (CSIS) in the Chinese Academy of Sciences (CAS).

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Topics

Travel and Traffic Management
Travel Information and Guidance
Ride Matching And Reservation
Traveler Services Information
Traffic Control
Incident Management
Travel Demand Management
Emissions Testing And Mitigation
Highway-rail Intersection
Complex Adaptive Systems for Transportation

Public Transportation Management
Public Transportation Management
En-route Transit Information
Personalized Public Transit
Public Travel Security

Commercial Vehicle Operations
Commercial Vehicle Electronic Clearance
Automated Roadside Safety Inspection
On-board Safety Monitoring
Commercial Vehicle Administrative Processes
Hazardous Material Incident Response
Commercial Fleet Management

Advanced Vehicle Safety Systems
Collision Avoidance
Vision Enhancement
Advanced Safety Systems
Automated Vehicle Operation

Electronic Payment
Electronic Payment Services

ITS Modeling and Analysis
Data Mining and Analysis
Travel Behavior Under ITS
Simulation and Modeling
Traffic Theory for ITS
Statistical Modeling
Optimization and Control: Theory and Modeling
Geographic Information Systems
Hardware in the Loop Simulation
Software in the Loop Simulation
Artificial Transportation Systems

Emergency Management and Transportation Security
Emergency Notification & Personal Security
Emergency Vehicle Management
ITS and National Security
Parallel Management Systems for Transportation Emergency

Other Topics
Imaging and Image Analysis
Multi-Sensor Fusion
Cooperative Psychologies
Intelligent Transportation Space
Agent-based Methods for Traffic and Vehicular Systems
Ad Hoc Networks

IEEE ITSC 2008 will be held together along with the 2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications and 2008 IEEE Intl Conf on Service Operations and Logistics, and Informatics.

2008 IEEE/INFORMS International Conference on Service Operations and Logistics, and Informatics (IEEE/SOLI'2008)

October 12-15, 2008, Beijing, China

http://www.ieeesoli.org

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Conference Scope and Themes Service science, service operations, logistics, and informatics are becoming ever more complex and interdependent. They are playing an increasingly important role in today's world economy. Information and communications technology provides cyber-infrastructure and platforms to achieve more efficient and productive services operations. New types of service offerings are also emerging to meet the needs of customers and consumers. The IEEE/INFORMS Service Operations and Logistics, and Informatics (SOLI) conference series aims to bring together researchers and practitioners to discuss issues, identify challenges and future directions, share their R&D findings and experiences in relative areas.

Conference Proceedings All papers in the Proceedings of IEEE/SOLI are indexed by ISTP and included in the IEEE Xplore.

Areas of Interest Papers relating to Services/Logistics Design, Innovations, Marketing, Operations, and Engineering; Information Technology / Systems, and their specific applications are strongly encouraged. Special sessions on specific service topics are also welcome. Topics include, but are not limited to:

- **Service Design, Engineering, Operations, and Innovations** - Service planning and design ● Service process engineering ● Expedited services and extreme logistics ● Healthcare systems ● Financial services ● Retail and services management ● Quality and customer satisfaction ● Metrics and benchmarks ● Security & safety-related services and management ● Contingency planning ● Operations research ● Production engineering ● Intelligent traffic● Engineering consulting ●Traffic planning ●Integrated transportation ●Service operation
- **Logistics & Supply Chain Management** - ●On-demand delivery ● Logistics planning ● Freight forwarding and customs clearance ● Venue logistics management ● Warehouse and distribution ● Transportation management systems ● Reverse logistics ● Logistics visibility and control ● Procurement ● supply chain collaboration ● supply chain process ● supply chain networks
- **Material Flow（MF）Science and Technology** - ● MF fundamental sciences (MF mathematics, physics, chemistry, biology, etc.) ● Comprehensive MF theory● MF in the natural world ● Material flow in the social world ● Material flow in the economic world ● MF element theory ● MF nature ● MF engineering ● MF Industry • MF Technological economics ● Cycle MF System ● X party material flow (XPMF) ● The MF complexity and emergence ● The MF information and simulation technology ● MF systems and networks ● Financial Measures of MF
- **Service/Event Management & Manufacturing** - Demand forecasting ● Customer relationship management ● Event communication and alerting ● Services training ● Services sustaining ● Services quality ● Services bundling ● E-market for services ● Event management system • Event sponsorship • Event-based production and supply chain • Event-based products and manufacturing • Intelligent manufacturing • Customization
- **Information & Communications Technology and Systems (ICTS)** - ICTS services design and management ● ICTS services standards, locating, composition, and bundling ● Process modeling, augmentation, and automation ● Real time identification & tracking ● Pervasive and ubiquitous computing in logistics ● Decision support systems ● Software agent based systems ● RFID ● data warehousing and data/Web mining ● Business intelligence ● Systems interoperability and integration ● Information security ● IT Project Management● Information Management in construction project
- **Electronic Commerce & Knowledge** - Wireless Communication and mobile commerce ● Mobile services ● Electronic government ● Information resource management ● IT and enterprise innovation management ● IT and strategy for the sustainable development of enterprises ● Semiotics ●Business performance management ● Customer relationship management ● Information economics ● Network culture and harmonious society ● Distributed computing ● Sensor networks

MESA08 --- 2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications

Beijing, China, October 12-15, 2008

http://www.asmemesa.org

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Sensor Networks
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Embedded System Infrastructure and Theory
Martin Horauer, U. of App. Sciences Technikum Vienna, Austria

Mechatronic and Embedded System Applications
Primo Zingaretti, Polytechnic Univ. of Marche, Italy

Development, Verification, Debug Tools for Mechatronic & Embedded Systems
Tianmiao Wang, Beihang University, China

Mechatronics Control and Manufacturing
YangQuan Chen, Utah State University, USA

Mechatronic and Embedded Systems in Education
Zhaoqing Wang, Zhejiang Sci-Tech University, China

Mechatronic Systems
Jian Dai, King's College London, UK

Sensors and MEMS
V. Sundarrajan, Univ of California, Riverside, USA

Machines for Precision Farming
Uriel A. Rosa, University of California, Davis, USA

Robotics and Mobile Machines
Ying Chen, Zhejiang University , China

Robotics for Human Augmentation and Rehabilitation
Sunil Agrawal, University of Delaware, USA

Micro Air vehicles
Xinyan Deng, University of Delaware, USA

Intelligence in Mechatronic and Embedded Systems
Hyo-Sung Ahn, Gwangju Institute of Science and Tech, Korea

Special Topics and Sessions
Hami Kazerooni, Univ. of California, Berkeley, USA
Xudong Hu, Zhejiang Sci-Tech University, China

International Program Committee:
http://www.asmemesa.org

Sponsors
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ASME Division of Design Engineering
Chinese Academy of Sciences
Chinese Association for Automation
Chinese Mechanical Engineering Society

Co-sponsor
National Natural Science Foundation of China

Objectives

Mechanical and electrical systems show an increasing integration of mechanics with electronics and information processing. This integration is between the components (hardware) and the information-driven functions (software), resulting in integrated systems called mechatronic systems. The development of mechatronic systems involves finding an optimal balance between the basic mechanical structure, sensor and actuators, automatic digital information processing and control in which embedded systems play a key role. The field of embedded system and mechatronics is becoming evermore challenging; issues in embedded software lie at the focus of researchers both in industry and academia. The goal of this 4th IEEE/ASME MESA, MESA08, is to bring together experts from the fields of mechatronic and embedded systems, disseminate the recent advances made in the area, discuss future research directions, and exchange application experience. The conference program is organized in a number of symposia.

Venue

MESA08 will be held together along with the 11th Intl IEEE Conf on Intelligent Transportation Systems and 2008 IEEE Intl Conf on Service Operations and Logistics, and Informatics.

International Trade and Freight Transportation Conference

1-3 September 2008,
Ayia Napa, Cyprus

Scope:

Freight transportation is facing new challenges as the demand rapidly increases, competition puts tight constraints on costs and pricing, globalization introduces interdependencies not well understood and decisions have to be made under more constraints than ever before. Advances in technology and research in the area open the way for better solutions and approaches to a wide range of problems facing the industry. Technology alone however will not resolve all problems as socioeconomic, labor, environment and other issues influence decisions made throughout the world. The purpose of this conference is to bring together experts from different areas to address current and future technologies, policies and approaches related to freight transportation. The form of the conference is intended to allow extensive informal interactions among participants, something that cannot be found in some of the large conferences.

Topics:

Focus will be on three thematic Areas

I. Intelligent Freight Transportation Technologies
II. Modeling, Optimization and Simulation Tools
III. Policy, Economy and Environment

Specific topics include:

Logistics, Intelligent Transportation Systems, Container Terminals, Container ships, Container Trains, Modeling and Simulation Tools, Agile Ports, Labor Issues, Truck Routing, RFID, Empty Container reuse, Port and Terminal Technologies, Gate appointment system, Policy and environmental issues, etc.

A selected number of papers will be considered for publication in a special issue Journal.

Organization Committee:

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Professor Petros Ioannou, University of Southern California, ioannou@usc.edu

Program Chair:

Dr. Iris F.A. Vis, VU University Amsterdam, ivis@feweb.vu.nl

International Program Chair:

Professor Genevieve Giuliano, University of Southern California, giuliano@sppd.usc.edu

IIID Expert Forum Traffic Guiding Systems 2008

Infoconnectivity
Intertwined information for interconnected transport networks

in partial correspondence with Call FP7- TRANSPORT (TPT)-2008-RTD-1 / TPT.2008.13. New mobility / organisational schemes:
Interconnection between short and long-distance transport networks

4/5 September 2008, Tech Gate Vienna, Wien/Vienna, Austria

Organiser:

International Institute for Information Design (IIID)

The effectiveness of public transport often depends on how long it takes to change between different modes of transport. This can become even more critical when it comes to transferring from long- to short-distance transport networks and vice versa.If "inter-connectivity" between transport networks is to be enhanced, measures focusing on improving "INFOconnectivity" between transport networks and their customers are indispensable.Highest possible effects in accelerating passenger transfers may be expected by introducing the concept of "intertwined information" of and between transport networks.

Call for Speakers (Submission deadline: 11 June 2008)

Conference Calendar

by Massimo Bertozzi and Paolo Grisleri

This section lists upcoming ITS-related conferences, workshops, or exhibits. Contributions are welcome; please send announcements to itsconfs@ce.unipr.it.

2008

August 6-8
3rd International Symposium on Transport Simulation
Queensland, Australia
http://civil.eng.monash.edu.au/conferences/ists08

August 25-26
ITS America Intelligent Transportation System Conference
Los Angeles, California, USA
http://www.itsa.org/itsconference/c437/ITSA_Events/ITS_Conference.html

September 4-5
IIID Expert Forum Traffic Guiding Systems 2008
Vienna, Austria
http://www.iiid-expertforum.net/

September 14-19
FISITA 2008 World Automotive Congress
Munich, Germany
http://www.fisita2008.com

September 21-24
IEEE Vehicular Technology Conference Fall 2008
Calgary, Alberta, Canada
http://www.ieeevtc.org/vtc2008fall

September 22-26
International Conference on Intelligent Robots and Systems
Nice, France
http://iros2008.inria.fr

October 6-9
9th Intl. Symposium on Advanced Vehicle Control
Kobe, Japan
http://www.intergroup.co.jp/avec08/index.html

2008 (cont.)

October 22-24
The 8th International Conference on ITS Telecommunications
Phuket, Thailand
http://itst2008.nectec.or.th/

November 5-8
8th International Conference on Transport Systems Telematics
Katowice-Ustro, Poland
http://www.tst-conference.org/index.php?page=home&lang=en

November 13-14
International Conference on Automotive Technologies
Istambul, Turkey
http://www.icatconf.org/

November 16-18
The 11th IASTED International Conference on Intelligent Systems and Control
Orlando, Florida, USA
http://www.iasted.org/conferences/home-633.html

November 16-20
15th World Congress on ITS
New York, New York, USA
http://www.itsa.org/worldcongress.html

December 25-27
International Conference on Computer and Information Technology
Khulna, Bangladesh
Submissions due by: July 15, 2008
http://www.kuet.ac.bd/iccit2008/index.html

2009

February 4-5
ATEC-ITS France Congress
Paris, France
http://www.atec-tec.net/fr/its_accueil_f7.asp

July 16-18
International Symposium on Transportation and Traffic Theory
Hong Kong
http://www.isttt18.org

2009 (cont.)

May 13-17
2009 IEEE International Conference on Robotics and Automation
Kobe, Japan
Submissions due by: September 15, 2008
http://www.icra2009.org/

CALL FOR PAPERS

CALL FOR VOLUNTEERS

IEEE ITS SOCIETY
INTELLIGENT TRANSPORTATION SYSTEMS MAGAZINE

SCOPE

The IEEE ITS Magazine publishes peer-reviewed articles that

- provide innovative research ideas and application results,
- report significant application case studies, and
- raise awareness of pressing research and application challenges

in all areas of intelligent transportation systems.

In contrast to the archival publications in the IEEE Transactions on ITS, the ITS Magazine will focuses on providing information of general interest to all members of ITS society, serving as a dissemination vehicle for ITS Society members and others to learn the state of the art development and progress on ITS research and applications.

High quality tutorials, surveys, successful implementations, technology reviews, lessons learned, policy and societal impact, and ITS educational issues are also invited.

CALL FOR PAPERS

Suggested topics for authors include, but are not limited to, information technologies, infrastructure protection, public policy, and social and economic studies on ITS-related topics. Papers focusing on successful implementations, practical challenges, lessons learned, and policy considerations are encouraged.

If you are interested in submitting a paper, please contact the Editor-in-Chief, Dr. Charles Herget, at c.herget@ieee.org for more information on submission procedures.

CALL FOR VOLUNTEERS

An editorial board for the new Magazine is now being established. If you are interested in serving as an Associate Editor, please send your curriculum vitae to the Editor-in-Chief, Dr. Charles Herget at c.herget@ieee.org, along with a cover letter indicating the topics on which you feel qualified to serve as an Associate Editor.

IEEE Transactions on Intelligent Transportation Systems

CALL FOR PAPERS

Special issue on "ITS and road safety": The future of preventive and active safety in the automotive industry

In recent years a large number of driving assistance systems of ever increasing complexity are nearing maturity, and new technologies are going to reshape the applications and market of active road safety. This special issue is intended to provide an overview of the coming ITS applications for Safety with special emphasis on the technological and scientific challenges behind them.
The issue aims at describing the Advanced Driving Assistance Systems of the next generation, integrating many complex functions, which have been developed and tested at prototype level. Integrated enabling technologies, like integrated sensing and decision are also of interest.

Topics

• Papers focusing on either integrated horizontal enabling technologies or vertical prototypal integrated applications are welcome. In both cases papers should focus on prototypal working integrated systems that use one or more of the following technologies:

- Novel sensors
- Holistic Sensors data fusion
- Holistic Decision Systems
- Advanced imaging and image processing
- Systems based on communication and cooperation
- Information Systems
- Human Machine Interfaces
- Real time operation
- Autonomous intervention and Control
- Integrated safety systems

Submissions

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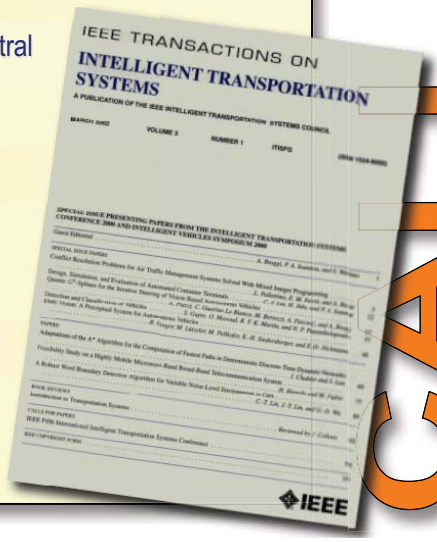

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IEEE Transactions on ITS Abstracts

Abstracts of Papers

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Yi-Hsien Chiang; Jyh-Ching Juang, "Control of Freeway Traffic Flow in Unstable Phase by H_∞ Theory," page(s): 193-208

Abstract: This paper devises a freeway controller that is capable of stabilizing traffic flow when the traffic system is in the unstable (congested) phase, in which a shock wave is likely to occur in the presence of any inhomogeneity and where the system is on the verge of a jam condition. Two types of traffic controllers are developed through the use of either a speed command approach that can be implemented in an intelligent transportation system (ITS) or ramp metering that is a typical way of preventing a freeway from overloading. By means of the feedback linearization technique, the discretized macroscopic traffic flow model is reformulated, in which the desired change of volume in each section is treated as a virtual input. By exploring the casual relations among density, speed, and flow change, the corresponding speed commands can be determined. The traffic flow control problem is formulated as an Hinfin control design problem so that uncertainties that are associated with the macroscopic model can be taken into account. Simulations show that the devised controller can effectively stabilize the traffic flow in the unstable phase. Design flexibilities associated with the method are also discussed.

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Alam, S.; Abbass, H.A.; Barlow M., "ATOMS: Air Traffic Operations and Management Simulator," page(s): 209-225

Abstract: In this paper, we introduce the air traffic operations and management simulator (ATOMS), which is an air traffic and airspace modeling and simulation system for the analysis of free-flight concepts. This paper describes the design, architecture, functionality, and applications of the ATOMS. It is an intent-based simulator that discretizes the airspace in equal-sized hyper-rectangular cells to maintain intent reference points. It can simulate end-to-end airspace operations and air navigation procedures for conventional air traffic, as well as for free flight. Atmospheric and wind data that are modeled in the ATOMS result in accurate trajectory predictions. The ATOMS uses a multiagent-based modeling paradigm for modular design and easy integration of various air traffic subsystems. A variety of advanced air traffic management (ATM) concepts that are envisioned in free flight are prototyped in the ATOMS, including airborne separation assurance (ASA), cockpit display of traffic information (CDTI), weather avoidance, and decision support systems (DSSs). Experimental results indicate that advanced ATM concepts make a sound case for free flight; however, there is a need to investigate and understand their complex interaction under nonnominal scenarios.

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Hansuk Sohn; Lee, J.D.; Bricker, D.L.; Hoffman, J.D., "A Dynamic Programming Algorithm for Scheduling In-Vehicle Messages," page(s): 226-234

Abstract: In-vehicle information systems (IVISs) can enhance or compromise driving safety. Such systems present an array of messages that range from collision warnings and navigation instructions to tire pressure and e-mail alerts. If these messages are not properly managed, the IVIS might fail to provide the driver with critical information, which could undermine safety. In addition, if the IVIS simultaneously presents multiple messages, the driver may fail to attend to the most critical information. To date, only simple algorithms that use priority-based filters have been developed to address this problem. This paper presents a dynamic programming model that goes beyond the immediate relevance and urgency parameters of the current Society of Automotive Engineers (SAE) message scheduling algorithm. The resulting algorithm considers the variation of message value over time, which extends the planning horizon and creates a more valuable stream of messages than that based only on the instantaneous message priority. This method has the potential to improve road safety because the most relevant information is

displayed to drivers across time and not just the highest priority at any given instant. Applying this algorithm to message sets shows that scheduling that considers the time-based message value, in addition to priority, results in substantially different and potentially better message sequences compared with those based only on message priority. This method can be extended to manage driver workload by adjusting message timing relative to demanding driving maneuvers.

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Sen, I; Matolak, D.W., "Vehicle–Vehicle Channel Models for the 5-GHz Band," page(s): 235-245

Abstract: In this paper, we describe the results of a channel measurement and modeling campaign for the vehicle-to-vehicle (V2V) channel in the 5-GHz band. We describe measurements and results for delay spread, amplitude statistics, and correlations for multiple V2V environments. We also discuss considerations used in developing statistical channel models for these environments and provide some sample results. Several statistical channel models are presented, and using simulation results, we elucidate tradeoffs between model implementation complexity and fidelity. The channel models presented should be useful for system designers in future V2V communication systems.

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Shinq-Jen Wu; Hsin-Han Chiang; Jau-Woei Perng; Chao-Jung Chen; Bing-Fei Wu; Tsu-Tian Lee , "The Heterogeneous Systems Integration Design and Implementation for Lane Keeping on a Vehicle," page(s): 246-263

Abstract: In this paper, an intelligent automated lane-keeping system is proposed and implemented on our vehicle platform, i.e., TAIWAN i TS-1. This system challenges the online integrating heterogeneous systems such as a real-time vision system, a lateral controller, in-vehicle sensors, and a steering wheel actuating motor. The implemented vision system detects the lane markings ahead of the vehicle, regardless of the varieties in road appearance, and determines the desired trajectory based on the relative positions of the vehicle with respect to the center of the road. To achieve more humanlike driving behavior such as smooth turning, particularly at high levels of speed, a fuzzy gain scheduling (FGS) strategy is introduced to compensate for the feedback controller for appropriately adapting to the SW command. Instead of manual tuning by trial and error, the methodology of FGS is designed to ensure that the closed-loop system can satisfy the crossover model principle. The proposed integrated system is examined on the standard testing road at the Automotive Research and Testing Center (ARTC) and extra-urban highways.

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Yi-Chang Chiu; Mirchandani, P.B., "Online Behavior-Robust Feedback Information Routing Strategy for Mass Evacuation," page(s): 264-274

Abstract: Disaster response to manmade and natural events involves the quick evacuation of the affected population to safer areas. Given the potential for large-scale loss of life and property, there is a need for effective emergency strategies to mitigate the adverse effects of these disasters. Most existing evacuation traffic management strategies focus on increasing network capacity along the evacuation direction such as contraflow lanes, but other information or routing strategies have not been fully explored. Optimal routing strategies can be presented to evacuees as recommended routes. Advising evacuees that take system-optimal routes help balance the distribution of evacuation flows among multiple evacuation routes. However, a critical aspect in evaluating the effectiveness of such strategies is to properly account for the possible evacuation route-choice behavior. This study analyzed the situation in which evacuees are given a set of system-optimal paths; evacuees choose their evacuation routes, following a certain route-choice behavior (rational, panic, etc.). Discussions focus on the extent to which the routing effectiveness can be properly estimated, subject to the route-choice behavior. This paper further proposes a behavior-robust feedback information routing (FIR) strategy to further improve system performance. The FIR is based on the concept of closed-loop control that reacts to the system state and updates the advised routes. The FIR that targets the system-optimal routing strategy has been shown to be effective and robust for real-time evacuation traffic management.

Castillo, E.; Jimenez, P.; Menendez, J.M.; Conejo, A.J., "The Observability Problem in Traffic Models: Algebraic and Topological Methods," page(s): 275-287

Abstract: This paper deals with the problem of observability of traffic networks, understanding as such the problem of identifying which is the subset of the origin-destination (OD)-pair and link flows that can be calculated based on a subset of observed OD-pair and link flows, and related problems. A modified topological version of an existing algebraic method for solving observability problems is given. The method is based on a step-by-step procedure, allowing us to update the information once each item of information (OD-pair or link flow) becomes available. In particular, three different observability problems are stated and solved using the proposed methodology, which is illustrated by its application to the Nguyen-Dupuis network and compared with the algebraic version. The topological version is much faster, uses much less memory, and presents no rounding errors or zero test problems but identifies fewer observable flows.

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Shou-Ren Hu; Chang-Ming Wang, "Vehicle Detector Deployment Strategies for the Estimation of Network Origin–Destination Demands Using Partial Link Traffic Counts," page(s): 288-300

Abstract: Making valid inferences about network origin-destination (OD) demands from limited link traffic count data requires a carefully structured data-collection strategy. Determination of the required number of vehicle detectors (VDs) and their installation in strategic locations for OD estimation purposes is essentially a network location problem. In this paper, a mathematical programming framework based on a user equilibrium assumption was developed to determine the most desirable locations for the deployment of VDs. A linearly independent model was also developed to deal with the network location problem. Proposed models were evaluated under different network sizes and varying OD demand levels. Numerical results are explained. These findings can beneficially contribute to the preparation of a desirable VD deployment plan in a general network.

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Xiao-Bing Hu; Di Paolo, E., "Binary-Representation-Based Genetic Algorithm for Aircraft Arrival Sequencing and Scheduling," page(s): 301-310

Abstract: Arrival sequencing and scheduling (ASS) at airports is an NP-hard problem. Much effort has been made to use permutation-representation-based genetic algorithms (GAs) to tackle this problem, whereas this paper attempts to design an efficient GA based on a binary representation of arriving queues. Rather than using the order and/or arriving time of each aircraft in the queue to construct chromosomes for GAs, this paper uses the neighboring relationship between each pair of aircraft, and the resulted chromosome is a 0-1-valued matrix. A big advantage of this binary representation is a highly efficient uniform crossover operator, which is normally not applicable to those permutation representations. The strategy of receding horizon control (RHC) is also integrated into the new GA to attack the dynamic ASS problem. An extensive comparative simulation study shows that the binary-representation-based GA outperforms the permutation-representation-based GA.

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Alfaro-Cid, E.; McGookin, E.W. ; Murray-Smith, D.J.; Fossen, T.I., "Genetic Programming for the Automatic Design of Controllers for a Surface Ship," page(s): 311-321

Abstract: In this paper, the implementation of genetic programming (GP) to design a controller structure is assessed. GP is used to evolve control strategies that, given the current and desired state of the propulsion and heading dynamics of a supply ship as inputs, generate the commanded forces required to maneuver the ship. The controllers created using GP are evaluated through computer simulations and real maneuverability tests in a laboratory water basin facility. The robustness of each controller is analyzed through the simulation of environmental disturbances. In addition, GP runs in the presence of disturbances are carried out so that the different controllers obtained can be compared. The particular vessel used in this paper is a scale model of a supply ship called CyberShip II. The results obtained illustrate the benefits of using GP for the automatic design of propulsion and navigation controllers for surface ships.

Barnes, N.; Zelinsky, A.; Fletcher, L.S., "Real-Time Speed Sign Detection Using the Radial Symmetry Detector," page(s): 322-332

Abstract: Algorithms for classifying road signs have a high computational cost per pixel processed. A detection stage that has a lower computational cost can facilitate real-time processing. Various authors have used shape and color-based detectors. Shape-based detectors have an advantage under variable lighting conditions and sign deterioration that, although the apparent color may change, the shape is preserved. In this paper, we present the radial symmetry detector for detecting speed signs. We evaluate the detector itself in a system that is mounted within a road vehicle. We also evaluate its performance that is integrated with classification over a series of sequences from roads around Canberra and demonstrate it while running online in our road vehicle. We show that it can detect signs with high reliability in real time. We examine the internal parameters of the algorithm to adapt it to road sign detection. We demonstrate the stability of the system under the variation of these parameters and show computational speed gains through their tuning. The detector is demonstrated to work under a wide variety of visual conditions.

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Munder, S.; Schnorr, C.; Gavrila, D.M. , "Pedestrian Detection and Tracking Using a Mixture of View-Based Shape–Texture Models," page(s): 333-343

Abstract
This paper presents a robust multicue approach to the integrated detection and tracking of pedestrians in a cluttered urban environment. A novel spatiotemporal object representation is proposed, which combines a generative shape model and a discriminative texture classifier, both of which are composed of a mixture of pose-specific submodels. Shape is represented by a set of linear subspace models, which is an extension of point distribution models, with shape transitions being modeled by a first-order Markov process. Texture, i.e., the shape-normalized intensity pattern, is represented by a manifold that is implicitly delimited by a set of pattern classifiers, whereas texture transition is modeled by a random walk. Direct 3-D measurements that are provided by a stereo system are further incorporated into the observation density function. We employ a Bayesian framework based on particle filtering to achieve integrated object detection and tracking. Large-scale experiments that involve pedestrian detection and tracking from a moving vehicle demonstrate the benefit of the proposed approach.

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Cai, H.; Lin, Y., "A Roadside ITS Data Bus Prototype for Intelligent Highways," page(s): 344-348

Abstract: Intelligent transport systems (ITSs) usually include three principal elements: vehicle, driver, and road (or, more generally, the environment). The use of ITS data bus (IDB) has been proposed to build sharable standard interfaces for in-vehicle information systems. Despite broadband communication technologies, such as dedicated short-range communication (DSRC), which have been developed to provide high-quality roadside-vehicle communication services for intelligent highways, the existing IDB model has not paid enough attention to the demands of information exchanges between the roadside and onboard units. In this paper, a new model of the roadside IDB (RIDB) is proposed to improve the existing IDB architecture. The physical layer, data-link layer, and application layer of the new model are also discussed. A prototype system of the RIDB, which is based on the wireless 802.11b protocol, has been developed in a test site. The experimental results demonstrated that the RIDB is feasible to provide high-quality roadside-vehicle and roadside-roadside communication services. Other potential applications of the IDB, such as probe cars and intersection collision prevention, are also discussed. The RIDB proposed in this paper is potentially useful for the construction of an intelligent transport infrastructure.

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Shehata, M.S.; Jun Cai; Badawy, W.M.; Burr, T.W.; Pervez, M.S.; Johannesson, R.J.; Radmanesh, A., "Video-Based Automatic Incident Detection for Smart Roads: The Outdoor Environmental Challenges Regarding False Alarms," page(s): 349-360

Abstract: Video-based automatic incident detection (AID) systems are increasingly being used in intelligent transportation systems (ITS). Video-based AID is a promising method of incident detection. However, the accuracy of video-based AID is heavily affected by environmental factors such as shadows, snow, rain, and glare. This paper presents a review of the different work done in the literature to detect outdoor environmental factors, namely, static shadows, snow, rain, and glare. Once these environmental conditions are detected, they can be compensated for, and hence, the accuracy of alarms detected by video-based AID systems will be enhanced. Based on the presented review, this paper will highlight potential research directions to address gaps that currently exist in detecting outdoor environmental conditions. This will lead to an overall enhancement in the reliability of video-based AID systems and, hence, pave the road for more usage of these systems in the future. Last, this paper suggests new contributions in the form of new suggested algorithmic ideas to detect environmental factors that affect AID systems accuracy.

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Papageorgiou, M.; Kosmatopoulos, E.; Papamichail, I.; Yibing Wang, "A Misapplication of the Local Ramp Metering Strategy ALINEA," page(s): 360-365

Abstract
In a recent series of articles with largely identical contents and results, some claims are raised about the pertinence and performance of the well-known and widely field-applied local ramp metering algorithm ALINEA and of some extended versions thereof. The expressed claims are based on simulation results with a self-made microscopic simulator. This paper shows that the produced simulation results and derived conclusions are based on an insufficient understanding of the feedback character of the ALINEA algorithm, which led to an inappropriate application of the method. More specifically, the mainstream measurement that feeds ALINEA was misplaced so that any occurring congestion could not be monitored; this renders ALINEA blind to the traffic conditions under control and negates the very notion of feedback.

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Nanni, L.; Lumini, A., "Ensemble of Multiple Pedestrian Representations," page(s): 365-369

Abstract
In this paper, a new approach for pedestrian detection is presented. We design an ensemble of classifiers that employ different feature representation schemes of the pedestrian images: Laplacian EigenMaps, Gabor filters, and invariant local binary patterns. Each ensemble is obtained by varying the patterns used to train the classifiers and extracting from each image two feature vectors for each feature extraction method: one for the upper part of the image and one for the lower part of the image. A different radial basis function support vector machine (SVM) classifier is trained using each feature vector; finally, these classifiers are combined by the ldquosum rule.rdquo Experiments are performed on a large data set consisting of 4000 pedestrian and more than 25 000 nonpedestrian images captured in outdoor urban environments. Experimental results confirm that the different feature representations give complementary information, which has been exploited by fusion rules, and we have shown that our method outperforms the state-of-the-art approaches among pedestrian detectors.

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Leow, W.L.; Daiheng Ni; Pishro-Nik, H., "A Sampling Theorem Approach to Traffic Sensor Optimization," page(s): 369-374

Abstract
With the objective of minimizing the total cost, which includes both sensor and congestion costs, the authors adopted a novel sampling theorem approach to address the problem of sensor spacing optimization. This paper presents the analysis and modeling of the power spectral density of traffic information as a 2-D stochastic signal using highly detailed field data. The field data were captured by the next-generation simulation (NGSIM) program in 2005. To the best knowledge of the authors, field data with such a level of detail were previously unavailable. The resulting model enables the derivation of a characterization curve that relates sensor error to sensor spacing.

The characterization curve, concurring in general with observations of a previous work, provides much more detail to facilitate sensor deployment. Based on the characterization curve and a formulation relating sensor error to congestion cost, the optimal sensor spacing that minimizes the total cost can be determined.

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