In This Issue

Society News
  Message from the Editor ................................................................. 2
  Board of Governors’ Meeting ......................................................... 3

Conferences
  IEEE Intelligent Vehicles 2010 Symposium Report ......................... 4
  Intelligent Vehicles Symposium 2011 .............................................. 6
  Forum on Integrated and Sustainable Transportation Systems .......... 7
  Intelligent Transportation Systems Conference 2011 ....................... 8
  Conference Calendar ..................................................................... 11

Announcements
  Methods and tools for supporting the Use Calibration and Validation
  of Traffic Simulation Models – MULTITUDE ..................................... 13
  Call for Nominations of Awards ...................................................... 14
  Call for Papers ITS Magazine ........................................................ 15
  Board of Governors Candidates for Election ................................... 16

IEEE Transaction on ITS Abstracts .................................................... 23

Officers and Committee Chairs ....................................................... 34
Web Archive and Electronic Newsletter Subscription

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

This issue will be my last as the Editor-in-Chief of the Newsletter. I would like to thank the Associate Editors who have performed a great service for the Society: Simona Berté as the Associate Editor for IEEE Transactions on ITS Reports and Abstracts, and Massimo Bertozzi and Paolo Grisleri as the Associate Editors for Conferences, Workshops, and Journals.

Starting with the January 2011 issue, the Editor-in-Chief will be Yaobin Chen from the Purdue School of Engineering and Technology, Indianapolis, Indiana, USA.

Members of the Society will be receiving ballots from IEEE for the election of members to serve on the Board of Governors of the Society soon. Biographical sketches and photographs of each of the candidates can be found in this Newsletter.
Board of Governors’ Meeting

The Society’s governing body, the Board of Governors (BoG) met in Funchal, Madeira Island, Portugal, on September 19, 2010, preceding the Society’s Intelligent Transportation Systems Conference.

Election of Officers

The officers of the Society are elected by the BoG. All officers serve for a term of two years except the president who serves for one year as president-elect, two years as president, and one year as past president. All officers except the president and the Editor-n-Chief of the Transactions on ITS may serve a maximum of two consecutive terms. The EIC of the Transactions may serve three consecutive two year terms. The President may not serve for two consecutive terms.

The Board of Governors elected the following individuals to the offices indicated for the term beginning January 1, 2011.

President-Elect

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Vice President Technical Activities

Urbano Nunes

Vice President Financial Activities

Daniel Dailey

Vice President Administrative Activities

Jeffrey Miller
Conferences

IEEE Intelligent Vehicles 2010 Symposium Report
Sayanan Sivaraman
University of California, San Diego

The 20th international IEEE Intelligent Vehicles Symposium was held in La Jolla, California, in June 2010. This is one of the premier international conferences in the field. Last time USA hosted this annual event was in 2005. The enthusiastic participation in the IV 2010 program reflects increasing importance and expanding opportunities in the Intelligent Vehicles related research and technologies. Over 300 participants, representing academia, industry, and governmental organizations, from 28 countries converged on the University of California, San Diego’s campus for the Symposium. Professor Mohan Trivedi of the University of California, San Diego, served as the IV 2010 General Chair and Professor Dan Dailey from the University of Washington assembled an outstanding technical program as the Program Chair. The strong technical program included approximately 200 papers, three keynote talks, pre-symposium workshops, tutorial, demonstrations, as well as the very first Ph.D. Dissertation Forum.

IEEE IV 2010 Leadership Team

The exciting opening day of this year’s IV Symposium featured a series of forums dealing with (1) Connected Intelligent Vehicles, (2) Eco-Friendly Intelligent Vehicles, and (3) Human-Centered Intelligent Vehicles which brought together a wide range of academics, researchers, and industry. For the first time, the IV Symposium featured a Ph.D. dissertation forum, with participation from 14 talented doctoral students representing Universities from Europe, Japan, and the USA. The distinguished jury panel of Prof. Dan Dailey, Prof. Klaus Dietmayer, Dr. Uwe Franke, and Prof. Sergiu Nedevschi offered very helpful critique to guide the future research direction of the young scholars.

The symposium featured informative keynote talks by distinguished researchers representing the government, academia, and industry. Mr. Ray Resendes of the National Highway and Traffic Safety Administration, USA, spoke of emerging research in vehicle-vehicle and vehicle-infrastructure communications and its implications for active safety. Prof. Katsushi Ikeuchi spoke about 4-dimensional spatio-temporal modeling of cities for driver assistance. Dr. Uwe Franke [Daimler] spoke about stereo-vision for active safety. The high quality of oral presenta-
tions was applauded by all the attendees as well as the valuable exchange of ideas as a result of the poster sessions.

The PhD Dissertation forum held for the first time in the IV Symposium attracted much interest. Photo shows students who were recognized for their PhD proposals. Ashish Tawari, Andreas Geiger, Philip Lenz, Robin Schubert, Dr. Brendan Morris [Forum Chair], Cuong Tran.

IV 2010 Keynote Speakers

Dr. Uwe Franke [Daimler]  Prof. Katsushi Ikeuchi [University of Tokyo]  Mr. Ray Resendes [NHTSA]

The final day of the Intelligent Vehicles Symposium featured various exhibitions of research level intelligent vehicles, live demonstrations of research systems, and tours of unique laboratory test beds highlighted current exciting work through first hand interaction.

Exciting new research and technological innovations were demonstrated at the IEEE IV 2010 including the “Junior” the Urban Grand Challenge vehicle by VW-Stanford University, LISA test beds for Human-Centered Driver Assistance by UCSD. The photo shows IEEE ITS Society President Professor Alberto Broggi, in one of the LISA test beds.

IV 2011 Symposium will be in Baden-Baden, Germany in June 2011.
THE INTELLIGENT VEHICLES SYMPOSIUM (IV’11) is the premier annual forum sponsored by the IEEE INTELLIGENT TRANSPORTATION SYSTEMS SOCIETY (ITSS). Researchers, academicians, practitioners, and students from universities, industry, and government agencies are invited to discuss research and applications for Intelligent Vehicles and Intelligent Infrastructures. The technical presentations are characterized by a single session format so that all attendees remain in a single room for multilateral communications in an informal atmosphere. Tutorials will be offered on the first day followed by three days of presentations and a vehicle demonstration day. An exhibition area will be available for the presentation of products and projects.

Program topics include but are not limited to:
- Advanced Driver Assistance Systems
- Automated Vehicles
- Vehicular Safety, Active and Passive
- Vehicle Environment Perception
- Driver State and Intent Recognition
- Smart Infrastructure
- Impact on Traffic Flows
- Cooperative Vehicle-Highway Systems
- Collision Avoidance
- Pedestrian Protection
- V2I / V2V Communication
- Assistive Mobility Systems
- Intelligent Ground, Air and Space Vehicles
- Autonomous / Intelligent Robotic Vehicles
- Image, Radar, Lidar Signal Processing
- Information Fusion
- Vehicle Control
- Telematics
- Human Factors
- Human Machine Interaction
- Novel Interfaces and Displays
- Intelligent Vehicle Software Infrastructure

Complete manuscripts in PDF format must be electronically submitted for peer-review in IEEE standard-format. For detailed submission instructions visit the conference website www.mrt.uni-karlsruhe.de/iv2011

Important Dates
Special Session Proposal: January 15th, 2011
Paper submission deadline: January 15th, 2011
Notification of acceptance: March 10th, 2011
Final paper submission: April 1st, 2011

Contact
For proposal of a special session, demonstration, and exhibition contact the organization committee at iv2011@mrt.kit.edu

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KIT, Germany
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Exhibition Chair Markus Maurer
TU Braunschweig, Germany
Transportation of goods and people plays a vital role in the lives of everyone and in virtually all businesses on earth. The cost of transportation, both personal and freight, accounts for a significant share in the global economy. Traditionally, transportation has been divided into three categories: land (automobiles, trucks, and rail); air; and water. There are four societies in IEEE Division IX addressing these issues, namely the Aerospace and Electronics Systems Society (AESS), the Intelligent Transportation Systems Society (ITSS), the Oceanic Engineering Society (OES), and the Vehicular Technology Society (VTS). Each of these societies addresses issues in a particular mode of transportation. However, there are many issues affecting all of these modes of transportation in the face of increasing demand. Some of the issues include congestion, environmental impact, and energy sources.

New technologies are required to solve these issues, and IEEE is one the world’s leading professional associations for the advancement of these technologies. The purpose of FISTS is to bring together world leaders in technology, implementation, and policy management to share information on issues involving land, air, and sea systems.

Call for Papers: Program Topics

The IEEE FISTS committee invites technical papers that will undergo the standard IEEE peer review process and will appear in a conference proceedings. Program topics include:

**Sustainable Land Transportation**
- Traffic Management
- Traveler Information Services
- Traffic Data Collection and Analysis
- Traffic Estimation/Prediction
- ECO-Friendly ITS applications
- Innovative Transit Systems
- Innovative Goods Movement Systems
- Transportation Solutions for Urban Areas

**Sustainable Water Transportation**
- Linking Waterways with Road and Rail
- Advanced Propulsion Systems
- Traffic Management/Information Services

**Sustainable Air Transportation**
- Air Traffic Management Systems
- Aircraft Operations and Fuels

**Communication Efficiency**
- Green Radio
- Communication Power Systems
- Sustainable Wireless Networks

**Integrated Systems**
- Co-operative Systems
- Innovative Multi-Modal Travel Solutions
- Transportation Infrastructure
- Intelligent Vehicles/Infrastructure
- Crossborder Multimodal Integration

**Energy**
- Alternative Energy and Fuels
- Innovative Energy Management
- Future Energy Sources

**Environmental Issues**
- Transport Greenhouse Gas Emissions
- Transport Air Pollutant Emissions
- Transport-related Water Quality Issues

**Efficiency Issues**
- Capacity Management of Roads
- Capacity Management of Rail
- Throughput Maximization
- Systems Operation Efficiency
- Regulative and Legal Issues
- Intermodal Capacity Management

**Paper Submission**

Complete manuscripts in PDF format must be electronically submitted for peer-review in IEEE standard-format (6 pp., dbl. column). Detailed submission instructions can be found on the paper submission website: www.ieee-fists.org

**Submission Deadline: December 1, 2010**
**Notification of Acceptance Date: February 18, 2011**
**Final Paper Submission Date: March 31, 2011**
 Announcement

Intelligent Transportation Systems (ITS) have the promise of improving mobility, safety, and security, while ensuring energy efficiency and reducing environmental impacts of transportation systems. In ITS, these seemingly conflicting objectives are accomplished through advanced research and development and implementation of state-of-the-art communications, controls, automation, and information technologies in transportation systems.

The 14th IEEE ITS Conference theme is Safe, Secure, and Sustainable transportation, which ensures saving energy and the environment. IEEE ITSC 2011 brings together researchers, engineers, practitioners, managers, and policy makers from academia, industry, and government to share and discuss the latest in ITS R&D results and implementation strategies. This conference specially includes dedicated sessions at which Government experts and decision makers will share the latest R&D and implementation needs of Intelligent Transportation Systems.

 Venue

The George Washington University  
Cafritz Conference Center - 3rd Floor Marvin Center  
800 21st Street, NW  
Washington, DC, 20052, USA

At the heart of the nation’s capital on the campus of The George Washington University, this IEEE Conference provides an ideal setting for exchange of ideas between academic/industry researchers and Government decision makers.

Washington DC offers numerous technical and site seeing opportunities to conference participants. Home to some of the world’s best museums, finest dining and shopping, spectacular parks, and historic buildings in a beautiful metropolitan environment, Washington DC has something to offer to every visitor.
Call for Papers

Original and innovative contributions in ITS research and advanced implementations and deployments are sought for technical sessions. Articles conveying new developments in theory, analytical and numerical simulation and modeling, experimentation, advanced deployment and case studies, results of laboratory or field operational tests, and other related creative endeavors as well as special educational development for ITS curriculum are sought. The conference theme is Safe, Secure, and Sustainable transportation, which ensures saving energy and the environment. The technical areas include but are not limited to the following:

- Traffic theory, modelling, simulation
- Intelligent algorithms
- Sensors and actuators
- Vision systems and processing
- Safety Systems
- Security Systems
- Evacuation Systems
- Traffic and Communications Networks
- Traffic Control Systems
- V2V and V2I Communications
- Technologies for ITS User services: ATMS ATIS, AVCS, etc.
- Intelligent Vehicles
- Driver Assistance
- Vehicle Collision Avoidance
- Integrated Safety Systems
- Commercial Vehicle Operations
- Multi-modal ITS
- ITS Implementation
- Pedestrian and Bicyclist Safety and Mobility systems
- ITS for Special Needs
- Emergency Services

In the tradition of successful IEEE ITS Conferences, only the highest quality papers will be accepted through an on-line peer review process. The final version of the accepted papers will appear on the Conference CD, (only) after at least one author’s official registration.

Best Student Paper Award

Articles written and presented by a primary author who is a student will be specially selected for the Best Student Paper Award recognition during the Conference. This is arranged through IEEE ITS Committee.

Special Issue of IEEE Transactions in ITS

Selected exceptional quality articles will be invited for submission to a special issue of the IEEE Transactions in Intelligent Transportation Systems; Authors will be asked to revise their papers according to the standards of the transactions, which will be subjected to the additional transactions review process.

Workshops

Proposals are sought for Special Workshops and Tutorials related to the topics and themes of the conference.

Important Dates

- Full-paper submission deadline: March 15, 2011
- Notification of acceptance: June 1, 2011
- Final paper submission deadline: July 1, 2011
- Special Session proposal submission deadline: February 25, 2011
- Workshop/Tutorial proposal submission deadline: March 15, 2011
Technical and Special Tours

Special technical tours will be arranged to visit various government Laboratories such as the Federal Highway Administration (FHWA) Laboratories at Turner Fairbank Highway Research Center, McLean, VA, and the National Institute of Standards and Technology (NIST), among others.

A variety of Special Tours can be accessed via commercial venues. Most capital area attractions are either within walking distance or a short Metro (subway) ride.

Who Should Attend

Those in ITS research, development, design, deployment, planning, and decision making who are in academic institutions, transportation industry, automotive manufacturers and suppliers, government, local transport authorities, national labs, international organizations, public transport authorities, freight and transport operators, public transport operators, service providers, telecom operators, system integrators, commercial fleet owners, road operators, and motoring organizations and all others who are in the energy and environment sector with an interest in transportation systems will benefit by attending this unique conference.

Organizing Committee

<table>
<thead>
<tr>
<th>Role</th>
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<th>Institution</th>
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<tbody>
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<td>Austria</td>
</tr>
<tr>
<td>Technical Themes Co-Chairs and Committee:</td>
<td>TBD</td>
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Conference Calendar

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

2010

October 18-22
Taipei, Taiwan
http://www.iros2010.org.tw

October 25-29, 2010
17th World Congress on ITS
Busan, South Korea
http://www.itsworldcongress.kr
Submission due by: January 2010

November 9-11
10th International Conference on ITS Telecommunications
Kyoto, Japan
http://www.itst2010.org/

November 4-7
9th International Conference on Transport Systems Telematics
Katowice-Ustroń, Poland
http://www.tst-confERENCE.org

November, 10-12
2nd International Congress on Automation in the Mining Industry
Santiago, Chile

December, 6-8
Modelling and Control in Agriculture, Horticulture and Post-Harvest 2010
Tokyo, Japan
http://elam.kais.kyoto-u.ac.jp/agricontrol2010/
2011

March 22-23
WIT 2010: 8th International Workshop on Intelligent Transportation
Submission due by: November 15th, 2010
http://wit.tu-harburg.de/

March 5-7
VISIGRAPP-2011 Conference
Algarve, Portugal
http://visigrapp.org/
Submission due by: October 19, 2010

April 12-14
SAE 2010 World Congress
Cobo Center
Detroit, Michigan, USA
http://www.sae.org/congress

May 9-13
IEEE International Conference on Robotics and Automation
Shanghai, China
http://www.icra2011.org/

May 15-18
IEEE 73rd Vehicular Technology Conference: VTC2011-Spring
Budapest, Hungary
http://www.ieeevtc.org/vtc2011spring/

June 5-9
2011 IEEE Intelligent Vehicles Symposium
Baden-Baden, Germany
http://www.mrt.uni-karlsruhe.de/iv2011/
Submission due by: January 15th, 2011

June 20-25
Computer Vision and Pattern Recognition: CVPR 2011
Colorado Springs, CO, USA
Submission due by: Nov. 11, 2010

June 27-30
ISIE 2011 - IEEE International Symposium on Industrial Electronics
Gdansk, Poland
http://www.isie2011.pl/
Submission due by: October 23, 2010
Announcements

Methods and tools for supporting the Use Calibration and Validation of Traffic Simulation Models – MULTITUDE (www.multitude-project.eu)

Simulation models have, over the last decade, become an important tool in transportation science and engineering, however there are still several issues which cause difficulties and confusion and are restricting their use and uptake. These issues are now being addressed by the MULTITUDE project, which was launched earlier this year and is funded by the European Union COST programme (Cooperation in the field of Scientific and Technical Research), and intends to develop, test and promote the use of methods and procedures for the calibration and validation of traffic simulation models.

One of the first objectives of the project is to perform an on-line survey regarding the state of the art of current practice in simulation (www.multitude-project.eu/survey), and from the 11th October we would like to invite you to participate, and add your experiences. Results from the survey will be published at the end of the year, along with a state of the art report regarding calibration data and techniques.

Over the next 3 years, the project will go on to examine issues such as data availability and quality, as well as the relationship between data accuracy and calibration, as well as developing and testing methodologies, suitable for deterministic as well as stochastic models, for estimating traffic model parameters.

If you would like to be added to the mailing list to be further involved in the project please either leave your details at the end of the survey or contact Dissemination Manager Mark Brackstone at mark.brackstone@egis-mobilite.co.uk.
IEEE ITS Outstanding Research Award
IEEE ITS Outstanding Application Award
IEEE ITS Institutional Lead Award

Call for Nomination of Awards

Purpose and Selection Criteria

The IEEE ITS Outstanding Research Award, IEEE ITS Outstanding Application Award, and IEEE ITS Lead Award are given annually for ITS researchers, practitioners, and research/development teams who have made significant contributions to research in ITS related fields (ITS Research Award), developed and deployed successful ITS systems or implementations (ITS Application Award), and demonstrated leadership in promoting ITS technologies (ITS Institutional Lead Award). These awards are established to recognize, promote, and publicize major research contribution, application innovations with real-world impact, and ITS institutional leadership.

Application Materials

Each application must consist of the following materials:

(1) A 5-page summary statement providing sufficient detail for evaluation of the innovations and impacts of the work.
(2) At least 3 letters of recommendation from the recognized peer researchers, customers or users of the developed application, and organizations attesting to its significance and impact.

Please email applications before December 31, 2010 to ITSS Vice President of Membership: jason.geng@ieee.org.

Dedicated selection committees will evaluate the applications for the IEEE ITS Awards and propose candidates for final approval by the ITSS Board of Governors.
Call for Papers
IEEE
Intelligent Transportation Systems Magazine

Scope
Innovations in mobility require close interaction between research and practitioners in all aspects of Intelligent Transportation Systems. As the new dissemination magazine of the IEEE ITS Society, the IEEE Intelligent Transportation System Magazine establishes an interdisciplinary forum connecting experts in all fields of ITS. It publishes news on ITS as well as peer-reviewed articles quarterly 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.

Topics
- Ground, Air, and Water Transportation Systems
- Information Management (Databases, Data Fusion)
- Sensors (Infrastructure and Vehicle-Based)
- Sensor Data Processing (Video, Radar, Lidar, etc.)
- Human-Machine Interfaces
- Communication (v2v, v2i)
- Social, Economic, and Ecologic impact
- Field Studies & Implementation Reports
- Control (Traffic and Vehicle)
- Decision Systems
- Simulation
- Reliability and Safety
- Standards &Public Policies
- Technology Forecast & Transfer

Paper Submission
Submissions can be uploaded at the Magazine submission site http://www.ewh.ieee.org/tc/its/submit.html
Authors may submit Regular or Short Technical Papers, Tutorials, Surveys, Technology Reviews, Reports on Successful Implementations, Policy, or Educational Issues. Papers will be reviewed by independent reviewers and accepted papers will be published in the IEEE ITS Magazine.

IEEE ITS Society web site
Up to date information on the IEEE ITS Magazine and further publication guidelines are provided at the official ITSS web site www.ewh.ieee.org/tc/its/

Editor-inChief
For any further questions contact the Editor-in-Chief: Christoph Stiller, Karlsruhe Institute for Technology, Germany; email: stiller@kit.edu
Board of Governors Election

Each year, the members of the Society elect five members to serve a three year term on the Board of Governors (BoG), the Society’s governing body. The BoG consists of the fifteen elected members (five each year for a three-year term) and the officers of the Society.

The candidates for election are nominated by the Society’s Nominations Committee. The chair of the Committee is designated in the Society’s bylaws. This year, the chair was Fei-Yue Wang who was president in 2006-2007. The committee nominated eight candidates for the five positions to be elected. Members of the Society will receive ballots from IEEE with instructions for voting.

Brief biographical sketches and photos of those nominated follow.

Sudarshan S. Chawathe serves as Associate Professor of Computer Science, and Cooperating Associate Professor of the Climate Change Institute, at the University of Maine. He received the M.S. and Ph.D. degrees in Computer Science from Stanford University, and the B.Tech. degree in Computer Science and Engineering from the Indian Institute of Technology (IIT), Kanpur. He is the recipient of the President’s Gold Medal from IIT Kanpur and a CAREER award from U.S. National Science Foundation. His research interests include data management, with emphasis on scientific data and dynamic and poorly structured environments, Web information systems, and intelligent transportation systems. http://cs.umaine.edu/people/chaw.html It would be my honor to serve on the Board of Governors of the ITS society and I thank you for your attention. In support of my candidacy, I would like to highlight the following: ITS Society Experience: I have been actively involved with the ITS Society since its inception. I have served on the ITSS Board of Governors and on the Executive committee as VP Finance and VP Administrative Activities. In the pre-society period, I served on the ITS Council’s Technical Committee on Homeland Security. Consequently, I am very familiar with the procedures and protocols of the society and can work effectively with the officers and other members of the society, as well as with key sta. at IEEE central. Selected accomplishments:

When I started work as VP Finance, the society was on the IEEE’s financial watch-list. With the help of then chair Bill Scherer, I made a strong case for the society at watch-list review meetings, arguing convincingly that the root cause for the financial shortcomings was not within our society, given our strong conferences and journal and modest expenses. (This approach is in contrast with some other societies on the watch list which simply rolled over and accepted whatever IEEE claimed, generally not to the society’s advantage.) In general, I helped the society navigate through these financial troubles.

I was called upon, at very short notice, to step in as Program Chair for ITSC 2007 when the previous chair stepped down at a late date. I accepted this task and worked hard, with Dan Dailey and others, to ensure a successful conference.

With help from Dan Dailey and Daniel Zeng, I have created and maintained the Administrative
Activities section of the ITSS Web site as a way to ensure easy availability of meeting minutes and other society documents. Although improvements are still underway, the site already provides convenient access to all such documents, going back to the pre-society council days.

In my work with the society, since 2005, I have missed only one meeting: due to a storm in February 2010 that shut down Boston airport; I still worked by phone with hotel sta. to ensure a smooth meeting. Synergy with Research and Skills: My research on Database and Information Systems (especially the Web) emphasizes interdisciplinary work, as does my joint appointment to an interdisciplinary research institute. ITS is one of the key focus areas for my work, resulting in several publications, and a strong thread of continuing work. As a result, I am eager to continue contributing to ITS with not only research, but also service.

Mashrur (Ronnie) Chowdhury, Ph.D., P.E., F.ASCE is the IDEAS Professor, College of Engineering and Science, and Associate Professor, Department of Civil Engineering, at Clemson University

Mashrur (Ronnie) Chowdhury earned his doctorate degree in civil engineering from the University of Virginia in 1995 where he was co-advised on his dissertation by faculty from the department of civil and systems engineering. While at the University of Virginia, he was research assistant in the Center for Risk Management of Engineering Systems.

Dr. Chowdhury, having held senior engineering positions from 1994 to 2000 and having been an educator since 2000, has contributed significantly to the practice, education and research of Intelligent Transportation Systems (ITS). Dr. Chowdhury currently serves as an IDEAS professor of the College of Engineering and Science and an associate professor in the department of civil engineering at Clemson University. He was previously a senior engineer for Iteris, Inc. and Bellomo-McGee, Inc. (BMI) in Virginia, USA where he led numerous tasks related to the planning, design and evaluation of ITS projects for state and federal agencies. As a senior engineer at BMI, he played a central role in many national projects of significance, including the quantification of the safety impacts of the National Highway System, and supporting the USDOT’s ITS Metro Model Deployment Initiatives (MMDI) as the evaluation coordinator. Dr. Chowdhury is also a contributor to the Virginia Department of Transportation (VDOT) ITS initiatives including authoring the VDOT’s ITS Migration Plan 1997-2006, developing ITS strategic plans for different regions in Virginia, leading the design of an Automatic Traffic Rollover Warning Systems (ATRWS) for selected freeway ramps, and managing other important projects under an ITS on-call contract of Iteris, Inc. with VDOT. His study on advisory speeds conducted at the Federal Highway Administration’s Turner-Fairbank Highway Research Center in Virginia in 1990-1991 has been widely accepted, utilized and referenced by practitioners and researchers.

Dr. Chowdhury’s ITS research encompasses a board spectrum of areas, which includes security, decision support systems, communication infrastructure, and sustainable mobility. Dr. Chowdhury’s research has been sponsored by the National Science Foundation, U.S. Department of Transportation and state transportation agencies. In recognition of his work, Dr. Chowdhury received the Murray Stokeley Award for Excellence in Teaching from Clemson
University College of Engineering and Science in 2009, the Frank A. Burtner Award for Excellence in Advising from Clemson University in 2010 and Clemson University Board of Trustees Award for Faculty Excellence in 2010. He is a registered professional engineer in Ohio. He also serves as an associate editor of the IEEE Transactions on ITS and the Journal of ITS, and an editorial advisory board member of the Journal of Transportation Security. Dr. Chowdhury was the editor of a special issue of the Journal of ITS, which is based on the 15th ITS World Congress held in the New York City, USA.

Dr. Chowdhury is the former chair of the American Society of Civil Engineers (ASCE) Committee on Computing in Transportation. He has published over 50 peer-reviewed articles and has co-authored two text books on ITS; one on fundamental of ITS planning (Artech House, 2003) and the other on transportation security utilizing ITS (Wiley, 2008). He is a member of the IEEE ITS Society, Transportation Research Board Committee on Artificial Intelligence and Advanced Computing Applications, and Committee on Visualization in Transportation. He is a fellow of the ASCE.

Abdelkader El Kamel (M’96, SM’00) was born in Nabeul, Tunisia. He received the Engineering Diploma from French “Grande Ecole”, Ecole Centrale de Lille, in 1990, the Ph.D. in Feb. 1994 and the “Habilitation to Supervise Research” (HDR) in Nov. 2000 all in Computer & Systems Engineering from Centrale Lille, France. Professor at both the Ecole Centrale de Lille and the Ecole Centrale of Beijing, Dr. El Kamel is appointed as Permanent Visiting Professor in major Engineering/Business Schools in Tunisia and serves as Ministry Advisor for “International Relations & Cooperation” for the Ministry of Research and for “Intelligent Systems & Advanced Technologies” for the Ministry of Telecommunication Technologies.

He is regularly invited as Visiting Professor in China (F111 Key Project), Chili, India and Romania. He is the founding & Co-Chair of the ITS Research Group at IHEC Carthage, Tunisia, and is leader of a Research Project within the French-Chinese joint Lab. LIA/LIAMA in Beijing on “Design & Monitoring of ITS”.

Dr. El Kamel is the General Chair & Co-organizer of the IEEE/IMACS CESA’2011 Multi-conference to be held in Valparaiso, Chili and was, among others, the Conference Chair of “Intelligent Automation and Control Conference” in the 17th World Automation Congress (WAC) held in Budapest in 2006, the Organizer and General Chair of the IEEE-SMC’02 Conference held in Tunisia in 2002, the Organizer and General Chair of the IEEE/IMACS Multi-conference CESA’98 held in Hammamet in 1998. He received several international awards: a WAC Distinguished Contribution Award in July 2006 “for his dedicated and outstanding contributions to the success of WAC’06”, an IEEE Outstanding Contribution Award in October 2002 "for leadership in organization the SMC’02 conference"; an IEEE Outstanding Contribution Award in October 1998 "for leadership in organization of the IEEE sponsored CESA’98 conference and for many contributions to research and scholarship".

Dr. El Kamel is particularly active within IEEE: Chair of the Technical Committee on "Control of Complex Systems with Uncertainties" since 2002, Co-Chair then Chair of “Student Activi-
ties Committee”, 1998-2003, President elect of the French IEEE "Intelligent Systems" Chapter and Member elect of the Board of Governors of the IEEE France Section since 2005. He is also Member elect of the IFAC TC 3.2 "Computational Intelligence in Control" since 2005 and was appointed, in 2003, Associate Editor of the AutoSoft Journal. He was Member elect of the National Council of Universities (CNU) in France, 2000-2004. Dr. El Kamel has been invited speaker for about 25 plenary lectures or tutorials in international conferences and is on the Program Committee for about 100 IEEE/IFAC conferences. He has organized several invited sessions in IEEE/IFAC conferences and served as session chairman. His major research interests include intelligent systems and control, ITS, complex systems, computational intelligence & optimization. Applying intelligent technology in transportation systems is the current focus of his works. He has published more than 70 technical papers in International Journals and Conferences, has participated to 2 books in his field of interest and has edited about 15 proceedings & CD-ROM conference proceedings.

Azim Eskandarian is a Professor of Engineering and Applied Science at the CEE Department of The George Washington University (GWU), where he initially started as an Associate Research Professor in 1993. He is the founding director of the Center for Intelligent Systems Research (CISR) since 1996 and the director of the cross-disciplinary and interdepartmental “Transportation Safety and Security” program, which is one of the major Areas of Excellence of the university. Dr. Eskandarian was also the co-founder of the National Crash Analysis Center (NCAC) in 1992-93 and served as its director from 1998 to 2002. He has over 28 years of R&D and engineering design experience in Dynamic Systems, Controls, Intelligent Systems, and Applied and Computational Mechanics, with applications in automotive engineering, transportation safety, impact dynamics, crashworthiness, intelligent vehicles, collision avoidance, and robotics.

Dr. Eskandarian authored over 133 refereed articles, one book, three edited volumes, one pending patent, 60 formal presentations/Abstracts, and over 36 technical reports. His research results have been presented in 138 conferences, seminars, and invited talks. He established four new research laboratories including a car and a truck driving simulator. His publications in the IEEE Transactions on ITS has become among the highest cited articles (two articles ranked third and fifth among the top ten) according to a recent evaluation; as a result GWU was ranked the second highest cited institution.

Dr. Eskandarian’s pedagogical efforts have been instrumental in the establishment of a new and unique graduate program of study (Masters and Doctoral) in “Transportation Safety” at GWU since 1994. He added the Intelligent Transportation Systems graduate specialty to this curriculum, and developed and introduced a new undergraduate Transportation Engineering option in the CEE Department. Prior to joining GWU, Dr. Eskandarian was an assistant professor at Pennsylvania State University, York Campus for four years (1989-92) and earlier (1983-89, he held engineering and project management positions in the defense industry.

He has been elected to the Board of Governors of IEEE ITS society in 2007, and was invited to the IEEE Committee on Transportation and Aerospace Policy in 2009. He is also active in the ASME Transportation and Automotive Committee of Dynamic Systems and Control Division, and is an active member of SAE. He is the associate editor and editorial board member of five
journals. He has been the PI and Co-PI of 25 sponsored research awards totaling more than $23.5 million.

Dr. Eskandarian has served on several government committees, boards, and review panels. He received his B.S. (with honors), M.S., and D.Sc. degrees in Mechanical Engineering from GWU, Virginia Polytechnic Institute and State University, and GWU in 1982, 1983, and 1991, respectively.

**Lefei Li** is an associate professor in the department of Industrial Engineering, Tsinghua University. He is serving as the co-director of the Tsinghua Operations and Service Research Lab (TOPS). He received his B.S. degree in Electronic Engineering from Zhejiang University in 2002, M.S. (2004) degree in Industrial Engineering and Ph.D. (2006) degree in Systems and Industrial Engineering from the University of Arizona. Dr. Li joined Tsinghua University in 2006, conducting research in ITS and logistics systems.

Dr. Li’s research focuses on applying system engineering and industrial engineering concepts and techniques to Urban Transportation Systems and Other Service Systems. His current research interests include Transfer Coordination in Public Transportation, Artificial Transportation System, Service Operations and Management.

After joining Tsinghua University as a faculty member four years ago, Dr. Li has managed or actively participated in several urban transportation and logistics/service network design projects, sponsored by top logistics companies or public agencies in China. His research funding is now at the level of one million Chinese Yuan.

Dr. Li has published several journal papers and peer-reviewed conference papers, which present his research in transit signal priority, traffic flow forecasting, artificial logistics system for disaster relief and artificial urban healthcare system.

Dr. Li has been active in IEEE ITS Society conferences, serving as session chair, reviewer, associate editor in MESA, SOLI, IV and ITSC. He was the program co-chair for SOLI’07 in Philadelphia USA and ITSC’08 in Beijing China. He also served as the general chair for SOLI’10 in Qingdao China.

Dr. Li has been actively participating the editorial work of the magazine and transactions. From 2009, he is serving as associate editor of the IEEE Transactions on Intelligent Transportation Systems and the ITS department editor of IEEE Intelligent Systems. He also served as the guest editor of ITS magazine for a special issue focusing on ITS in China.
Lingxi Li is an Assistant Professor in the Department of Electrical and Computer Engineering at Purdue School of Engineering and Technology, IUPUI. He is also affiliated with the Transportation Active Safety Institute, a university-wide multidisciplinary research center at IUPUI. He received his Ph.D. degree in electrical and computer engineering from the University of Illinois at Urbana-Champaign, Urbana, Illinois, USA in 2008. Since 2008, Dr. Li has been with Purdue School of Engineering and Technology, IUPUI.

Dr. Li’s areas of research interest include modeling, diagnosis, and control of complex systems, fault-tolerant systems, discrete event and hybrid systems, with applications to intelligent transportation systems, power systems, and communication networks. His current research focuses on transportation active safety control systems, fault-tolerant control systems, and vehicular communication systems. He has published a number of technical papers in refereed journals and conference proceedings including IEEE Transactions on Automatic Control, IEEE Transactions on Automation Science and Engineering, and IEEE Transactions on Systems, Man, and Cybernetics, Part A. Dr. Li has participated in several research projects related to intelligent traffic controller design, fault-tolerant control of urban traffic networks, and vehicle safety testing. His research has been sponsored by the University RSFG grant and the National Science Foundation of USA.

Dr. Li has been actively involved in professional service. He has served as a frequent reviewer for many international conferences and journals including several IEEE Transactions and as a guest reviewer for the Asian Journal of Control. He has also served as a member of international program committee and session co-chair for many international conferences. He has served as the program co-chair of the 2010 IEEE International Conference on Vehicular Electronics and Safety. Dr. Li has served as an associate editor for IEEE Transactions on Intelligent Transportation Systems since 2009.

Dr. Li is willing to serve on the Board of Governors of IEEE ITS society. If elected, he would like to work with other board members to promote the field of ITS by developing related curriculum in ITS with focuses on the traffic management and control, vehicular networks, and active safety. He would also like to focus on the development of metrics related to vehicle active safety and its associated testing and validation tools and procedures. Dr. Li is ready to play an important role in this emerging area for ITS based on his understanding of the challenges, his knowledge of intelligent transportation systems, and his experience in collaborating with colleagues in both academia and industry.

Rosaldo Rossetti joined the Faculty of Engineering at University of Porto, Portugal, as an assistant professor in 2006, initially in the Informatics Section of the Department of Electrical and Computer Engineering. As of January 2008, however, he moved to the recently created Department of Informatics Engineering, where he also serves as the coordinator of the ERASMUS Exchange Programmes and University Partnerships. He is also a research fellow at LIACC, within the Distributed Artificial Intelligence and Robotics Group, at the same University. From 2002 to 2006, he was with...
Atlantica University, in Lisbon, where he served as director of the Computing and Systems Management BSc(Hons) Programme. There he co-founded the Computing and Systems Management Laboratory in 2003, a R&D unit he coordinated until 2006. Dr Rossetti received a BEng(Hons) in Civil Engineering from UFC (2005) and holds a PhD in Computer Science from UFRGS, Brazil (2002). From 1998 to 2000, he carried out his doctoral studies as a PhD research student at Leeds University’s Institute for Transport Studies, UK, within the Network Modelling Group. His areas of interest generally include complex systems analysis, systems optimisation and stochastic processes control, computer simulation, engineering software and CAD. Currently he is focusing on the application of Distributed Artificial Intelligence (DAI) techniques to tackle engineering problems, and specially on using multi-agent systems (MAS) as a modelling metaphor to address issues in Artificial Transportation Systems (ATS). He has been engaged as member of technical committees in many conferences within the AI, MAS, and Simulation communities, and has been invited as reviewer for journals such as IEEE Transactions on ITS, Transportation Research Part C, ASCE, Transactions of SCS International, and the Journal of Intelligent Transportation Systems: Technology, Planning, and Operations. Dr Rossetti has been very active in promoting the field of Artificial Transportation Systems as the main organiser of the ATS Workshops and Special Sessions series at IEEE ITS Conferences, since 2007, and the thematic track series on AI applications to Sustainable Transportation Systems at EPIA Conferences. He is currently a guest editor for a forthcoming special issue of IEEE Transactions on ITS. Rosaldo Rossetti is a member of IEEE, ACM and the Portuguese Society for Artificial Intelligence.

Rosaldo Rossetti is highly motivated to serve in the IEEE ITS Society and is a great enthusiast of artificial intelligence (AI) and multi-agent systems (MAS) applications to traffic and transport solutions. If given the opportunity to become a member of the Board of Governors of IEEE ITSS, Dr Rossetti would like to play a very active role in promoting technical activities in the field of Artificial Transportation Systems and Simulation. Understanding that this is rather a multidisciplinary arena which could be beneficial to all, he would like to help to build an interactive interface for promoting scientific exchange among the various ITSS sub-fields. In addition he would also like to foster the cross-fertilisation between ITS and other knowledge fields, drawing the attention of other technical communities, namely the AI and MAS communities to ITS related issues, as a means to increase submissions and participation at IEEE ITSS conferences and technical events. He is also committed to promote the Society’s activities in Portugal and in Europe, and in Brazil as well, especially among young researchers and students, stimulating their engagement on a long-term basis, which he believes will have a positive impact on the Society.

Yinhai Wang is an Associate Professor in transportation engineering at the University of Washington (UW). He is a long time supporter to IEEE ITSS. He served as the publication chair twice for IEEE ITSS conferences, one for the 2007 IEEE ITSC in Seattle and the other for the 2010 IEEE Intelligent Vehicle Symposium in San Diego. He decided to run for the IEEE ITSS Board of Governors election because he believes that he can make a solid contribution to the society with his dedication, energy, and vision from his multi-culture background and multi-disciplinary education. Dr. Wang has a Ph.D. in transportation engineering from the University of Tokyo (1998), a
master's degree in computer science and engineering from the UW, and another master's degree in construction management and a bachelor degree in civil engineering from Tsinghua University, China. His multi-disciplinary background in education sets a great foundation for his research and teaching in Intelligent Transportation Systems.

Dr. Wang is the founder and the director of the Smart Transportation Applications and Research Laboratory (STAR Lab) at the UW. Dr. Wang has conducted extensive research in ITS. Over the past seven years, Dr. Wang has actively involved in 27 research projects as the Principal Investigator (PI) and 14 research projects as co-PI. The funding totaled nearly $39 million for these projects. He has published 40 peer-reviewed journal articles, two edited books, one book chapter, and 27 peer-reviewed conference papers. To disseminate research findings, he has delivered 56 invited talks and 89 presentations or posters at national or international conferences, research institutes, and workshops. One of his papers “Can Single Loop Detectors Do the Work of Dual Loop Detectors?” won the American Society of Civil Engineers (ASCE) Journal of Transportation Engineering Best Paper Award for 2003.

Dr. Wang is also very active in professional community services. He serves as members on both the Freeway Operations Committee and Transportation Information Systems and Technology Committee at the Transportation Research Board (TRB). He is also a member of the Advanced Transportation Technologies Committee at ASCE. Dr. Wang is currently an associate editor for the ASCE Journal of Computing in Civil Engineering and the Thomas & Marilyn Nielsen Endowed Professor at the UW.

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**IEEE Transactions on ITS Abstracts**

**Abstracts of Papers**

IEEE Transactions on Intelligent Transportation Systems
Volume 11, No. 3, September 2010

Linjing Li; Xin Li; Changjian Cheng; Cheng Chen; Guanyan Ke; Zeng, D.D.; Scherer, W.T.; , "Research Collaboration and ITS Topic Evolution: 10 Years at T-ITS," pp.517-523.

Abstract: This paper investigates the collaboration patterns and research topic trends in the publications of the IEEE Transactions on Intelligent Transportation Systems (T-ITS) over the past decade. We find that coauthorship is prevalent and that the coauthorship networks possess the scale-free property on high degree nodes. Collaborations usually occur within the same research institutions and countries. Interorganization/region collaboration structures are usually connected through a few productive/high-impact authors. Typical international collaborations are between the U.S. and other countries such as China, Germany, U.K., and Italy. Active topics studied in IEEE T-ITS publications in the past ten years include traffic management and machine vision, among others. Authors can be partitioned into common interest groups, of which machine vision and automatic vehicle control attract more researchers.

Abstract: The eight papers in this special section present some of the latest research developments and breakthroughs achieved in the area of active safety as a result of cooperation between key industrial and academic players all over Europe.


Abstract: Vehicle collision mitigation, cooperative driving, and vehicle-to-vehicle (V2V) and/or vehicle-to-infrastructure (V2I) communication constitute a broad multidisciplinary research field that focuses on improving road safety. Statistics indicate that the primary cause of most road accidents is vehicles' excessive speed and delayed drivers reaction. Thus, road safety can be improved by early warning based on V2V communication. An innovative system called wireless local danger warning (WILLWARN), which is based on recent and future trends of cooperative driving, enables an electronic safety horizon for foresighted driving by implementing onboard vehicle-hazard detection and V2V communication. One of the key innovative features of the proposed system is the focus on low penetration levels in rural traffic by a new message-management strategy that is based on storing warning information in the vehicle and distributing warnings through communication, particularly with oncoming traffic. The system timely warns the driver about a dangerous situation ahead by decentralized distribution of warnings and incident messages via ad hoc intervehicle communication. The WILLWARN system is based on a modular object-oriented architecture consisting of the V2V communication module (VVC), the warning message-management module (WMM), the hazard-detection-management module (HDM), the hazard-warning-management module (HWM), a Global Positioning System (GPS) receiver, and various onboard sensors. In this paper, all system modules, as well as their interoperability, are presented in detail.


Abstract: This paper describes a novel driver-support system that helps to maintain the correct speed and headway (distance) with respect to lane curvature and other vehicles ahead. The system has been developed as part of the Integrating Project PReVENT under the European Framework Programme 6, which is named SAfe SPEed and safe distaNCE (SASPENCE). The application uses a detailed description of the situation ahead of the vehicle. Many sensors [radar, video camera, Global Positioning System (GPS) and accelerometers, digital maps, and vehicle-to-vehicle wireless local area network (WLAN) connections] are used, and state-of-the-art data fusion provides a model of the environment. The system then computes a feasible maneuver and compares it with the driver's behavior to detect possible mistakes. The warning strategies are based on this comparison. The system “talks” to the driver mainly via a haptic pedal or seat belt and “listens” to the driver mainly via the vehicle acceleration. This kind of operation, i.e., the comparison between what the system thinks is possible and what the driver
appears to be doing, and the consequent dialog can be regarded as simple implementations of the rider-horse metaphor (H-metaphor). The system has been tested in several situations (driving simulator, hardware in the loop, and real road tests). Objective and subjective data have been collected, revealing good acceptance and effectiveness, particularly in awakening distracted drivers. The system intervenes only when a problem is actually detected in the headway and/or speed (approaching curves or objects) and has been shown to cause prompt reactions and significant speed correction before getting into really dangerous situations.


Abstract: Vehicle collision mitigation, cooperative driving, and vehicle-to-vehicle (V2V) and/or vehicle-to-infrastructure (V2I) communication constitute a broad multidisciplinary research field that focuses on improving road safety. Statistics indicate that the primary cause of most road accidents is vehicles' excessive speed and delayed drivers reaction. Thus, road safety can be improved by early warning based on V2V communication. An innovative system called wireless local danger warning (WILLWARN), which is based on recent and future trends of cooperative driving, enables an electronic safety horizon for foresighted driving by implementing onboard vehicle-hazard detection and V2V communication. One of the key innovative features of the proposed system is the focus on low penetration levels in rural traffic by a new message-management strategy that is based on storing warning information in the vehicle and distributing warnings through communication, particularly with oncoming traffic. The system timely warns the driver about a dangerous situation ahead by decentralized distribution of warnings and incident messages via ad hoc intervehicle communication. The WILLWARN system is based on a modular object-oriented architecture consisting of the V2V communication module (VVC), the warning message-management module (WMM), the hazard-detection-management module (HDM), the hazard-warning-management module (HWM), a Global Positioning System (GPS) receiver, and various onboard sensors. In this paper, all system modules, as well as their interoperability, are presented in detail.


Abstract: This paper deals with the integration of multiple advanced driver-assistance systems (ADAS) and in-vehicle information systems (IVIS) in a holistic driver-support system. The paper presents the results of a project named Integrated Safety Systems (INSAFES), which was part of PReVENT: an integrating project carried out under the European Framework Programme 6. Integration in INSAFES is tackled at three different levels in the framework of a “cognitive car” perspective: 1) at the perception level, to represent the world around the vehicle, including object-tracking between sensor fields and the detection of driver intentions; 2) at the decision level, to reproduce humanlike holistic motion plans, which serve as “reference maneuvers” to evaluate the motion alternatives that a driver faces; and 3) at the level of interaction with the driver and vehicle control (action level), to arbitrate between the requests of functions.
competing for driver attention. A function that provides simultaneous longitudinal and lateral support has been developed. It gives support for safe speed, safe distance, lane change, and all-around collision avoidance all at the same time. At its core, there is a tool (evasive/reference maneuver) that constantly evaluates two possible alternatives (in lane and evasive/lane change) and compares them with the driver input to detect which one applies, which dictates warnings and driver interactions, and whether there is a better alternative. In addition, a “warning manager” has been developed, acting like a referee who lets the ADAS applications work stand-alone and then combines the requests of each application, prioritizes them, and manages the interaction with the user. The warning manager can be particularly useful in the case of integration of pre-existing standalone functions, which can be quickly reused. If a holistic ADAS is developed, the warning manager can still be used to combine it with IVIS functions. In fact, depending on the kind of ADAS and IVIS considered, the most suitable approach can be either to combine functions in a unified multifunctional driver-support application or to arbitrate between them through the warning manager.


Abstract: The Adaptive Integrated Driver-vehicle interfacE (AIDE) is an integrated project funded by the European Commission in the Sixth Framework Programme. The project, which involves 31 partners from the European automotive industry and academia, deals with behavioral and technical issues related to automotive human-machine interface (HMI) design, with a particular focus on integration and adaptation. The project involves tightly integrated empirical research, driver-behavior modeling, and methodological and technological development. This paper provides an overview of the AIDE Sub-Project 3 results dealing with the design, development, and integration of the AIDE system in three prototype vehicles, together with the evaluation results of the trials.


Abstract: Pedestrians are the most vulnerable participants in urban traffic. The first step toward protecting pedestrians is to reliably detect them in a real-time framework. In this paper, a new approach is presented for pedestrian detection in urban traffic conditions using a multilayer laser sensor mounted onboard a vehicle. This sensor, which is placed on the front of a vehicle, collects information about the distance distributed according to four planes. Like a vehicle, a pedestrian constitutes, in the vehicle environment, an obstacle that must be detected, and located and then identified and tracked if necessary. To improve the robustness of pedestrian detection using a single laser sensor, a detection system based on the fusion of information located in the four laser planes is proposed. The method uses a nonparametric kernel-density-based estimation of pedestrian position of each laser plane. The resulting pedestrian estimations are then sent to a decentralized fusion according to the four planes. Temporal filtering of each object is finally achieved within a stochastic recursive Bayesian framework (particle filter), allowing a closer observation of pedestrian random movement dynamics. Many experimental results are given and validate the relevance of our pedestrian-detection algorithm with regard to a method.
using only a single-row laser-range scanner.


Abstract: This paper presents the design and first test on a simulator of a vehicle trajectory-planning algorithm that adapts to traffic on a lane-structured infrastructure such as highways. The proposed algorithm is designed to run on a fail-safe embedded environment with low computational power, such as an engine control unit, to be implementable in commercial vehicles of the near future. The target platform has a clock frequency of less than 150 MHz, 150 kB RAM of memory, and a 3-MB program memory. The trajectory planning is performed by a two-step algorithm. The first step defines the feasible maneuvers with respect to the environment, aiming at minimizing the risk of a collision. The output of this step is a target group of maneuvers in the longitudinal direction (accelerating or decelerating), in the lateral direction (changing lanes), and in the combination of both directions. The second step is a more detailed evaluation of several possible trajectories within these maneuvers. The trajectories are optimized to additional performance indicators such as travel time, traffic rules, consumption, and comfort. The output of this module is a trajectory in the vehicle frame that represents the recommended vehicle state (position, heading, speed, and acceleration) for the following seconds.


Abstract: Current research on advanced driver-assistance systems (ADASs) addresses the concept of highly automated driving to further increase traffic safety and comfort. In such systems, different maneuvers can automatically be executed that are still under the control of the driver. To achieve this aim, the task of assessing a traffic situation and automatically taking maneuvering decisions becomes significantly important. Thus, this paper presents a system that can perceive the vehicle's environment, assess the traffic situation, and give recommendations about lane-change maneuvers to the driver. In particular, the algorithmic background for this system is described, including image processing for lane and vehicle detection, unscented Kalman filtering for estimation and tracking, and an approach that is based on Bayesian networks for taking maneuver decisions under uncertainty. Furthermore, the results of a first prototypical implementation using the concept vehicle Carai are presented and discussed.


Abstract: Going beyond standard lane-departure-avoidance systems, this paper addresses the development of a system that is able to deal with a large set of different traffic situations. Its foundation lies on a thoroughly constituted environment detection through which a decision system is built. From the output of the decision module, the driver is warned or corrected through suited actuators that are coupled to control strategies. The input to the system comes
from cameras, which are supplemented by active sensors (such as radar and laser scanners) and
vehicle dynamic data, digital road maps, and precise vehicle-positioning data. In this paper, the
presented system design is divided into three layers: the perception layer, which is responsible
for the environment perception, and the decision and action layers, which are responsible for
evaluating and executing actions, respectively.

Fei-Yue Wang; , "Parallel Control and Management for Intelligent Transportation Systems:

Abstract: Parallel control and management have been proposed as a new mechanism for con-
ducting operations of complex systems, especially those that involved complexity issues of both
engineering and social dimensions, such as transportation systems. This paper presents an over-
view of the background, concepts, basic methods, major issues, and current applications of Par-
allel transportation Management Systems (PtMS). In essence, parallel control and management
is a data-driven approach for modeling, analysis, and decision-making that considers both the
engineering and social complexity in its processes. The developments and applications de-
scribed here clearly indicate that PtMS is effective for use in networked complex traffic systems
and is closely related to emerging technologies in cloud computing, social computing, and cy-
berphysical-social systems. A description of PtMS system architectures, processes, and compo-
nents, including OTSt, Dyna CAS, aDAPTS, iTOP, and TransWorld is presented and discussed.
Finally, the experiments and examples of real-world applications are illustrated and analyzed.

Shin-Ting Jeng; Tok, Y.C.A.; Ritchie, S.G.; , "Freeway Corridor Performance Measurement
Based on Vehicle Reidentification," pp.639-646.

Abstract: Section-related or link-based traffic sensor data can provide reliable and accurate in-
puts for traffic-performance-measurement systems. Section performance measurements can eas-
ily be generated via a vehicle-reidentification system. Inductive loop-detector (ILD)-based sys-
tems are cost effective because ILDs are widely installed in the field (with fewer market pene-
tration concerns) and provide essentially anonymous surveillance with few, if any, privacy con-
cerns. Accordingly, the authors have recently developed an algorithm, i.e., RTREID-2, using
inductive loop signature-based methods for vehicle reidentification (ILD-VReID) and which
was dedicated to meet the needs for real-time implementation and section-performance meas-
urement. RTREID-2 was developed by utilizing a piecewise slope rate (PSR) approach to trans-
form the raw vehicle signatures obtained from square loops (only). This paper reports the re-
sults of a 10.0-km (6.2-mi) freeway corridor implementation of RTREID-2 under congested
morning peak-period conditions. Although RTREID-2 has been designed for real-time opera-
tion, this initial corridor investigation was conducted offline. The corridor contained mostly
round inductive loop sensors with some square loops, providing an opportunity to assess the
applicability and transferability of RTREID-2 to homogenous and heterogeneous loop-sensor
systems. Analyses of travel time and speed at both freeway corridor and individual freeway sec-
tion levels were conducted, and excellent results were obtained compared with Global Position-
ing System (GPS) measurements from control vehicles. The results suggest that RTREID-2 has
the potential to successfully be implemented in a congested freeway corridor, utilizing either or
both round or square inductive loop sensors.

Abstract: We present a method that is suitable for clustering of vehicle trajectories obtained by an automated vision system. We combine ideas from two spectral clustering methods and propose a trajectory-similarity measure based on the Hausdorff distance, with modifications to improve its robustness and account for the fact that trajectories are ordered collections of points. We compare the proposed method with two well-known trajectory-clustering methods on a few real-world data sets.


Abstract: This paper presents a model-based algorithm that estimates how the driver of a vehicle can either steer, brake, or accelerate to avoid colliding with an arbitrary object. In this algorithm, the motion of the vehicle is described by a linear bicycle model, and the perimeter of the vehicle is represented by a rectangle. The estimated perimeter of the object is described by a polygon that is allowed to change size, shape, position, and orientation at sampled time instances. Potential evasive maneuvers are modeled, parameterized, and approximated such that an analytical expression can be derived to estimate the set of maneuvers that the driver can use to avoid a collision. This set of maneuvers is then assessed to determine if the driver needs immediate assistance to avoid or mitigate an accident. The proposed threat-assessment algorithm is evaluated using authentic data from both real traffic conditions and collision situations on a test track and by using simulations with a detailed vehicle model. The evaluations show that the algorithm outperforms conventional threat-assessment algorithms at rear-end collisions in terms of the timing of autonomous brake activation. This is crucial for increasing the performance of collision-avoidance systems and for decreasing the risk of unnecessary braking. Moreover, the algorithm is computationally efficient and can be used to assist the driver in avoiding or mitigating collisions with all types of road users in all kinds of traffic scenarios.


Abstract: This paper describes two studies in which two night-vision enhancement systems were examined to compare nighttime driver performance in pedestrian detection. In the first study, the levels of clutter in the images displayed by the two types of night-vision enhancement systems were measured objectively and subjectively. The subjective ratings of clutter changed as a power function of the objective measure of clutter intensity. In the second study, the effect of clutter on glance behavior during pedestrian detection was examined in a driving simulator. Night-vision images with less clutter required shorter search times and fewer glances to detect the pedestrian, but the duration of each glance remained relatively constant.
Abstract: Vehicle localization is a key issue that has recently attracted attention in a wide range of applications. Navigation, vehicle tracking, emergency calling, and location-based services are examples of emerging applications with a great demand for location information. The Global Positioning System (GPS) has been the de facto standard solution for the vehicle-localization problem. Nevertheless, GPS-based localization is inaccurate and unreliable due to GPS’ inherent poor performance in vertical positioning and the prevalent horizontal movement, in addition to anomalies caused by line-of-sight occlusions and multipath issues in urban canyons. Although augmenting GPS localization with inertial sensory data has demonstrated significant performance improvements, there remain situations that give rise to degraded localization accuracy—a deficiency that many applications cannot tolerate. In this paper, we propose intervehicle-communication-assisted localization, a localization technique that takes advantage of the emerging vehicle ad hoc networks environments. Communication among vehicles is utilized to compute a relative vehicle location, the integration of which with motion information and GPS location estimates leading to highly accurate vehicle localization. This proposed localization technique is tested in various simulated road-segment scenarios. It is evident from the simulation results that intervehicle communication has the potential to lead to the improvement of the robustness and accuracy of vehicle-location estimation.


Abstract: It is well established in the literature that secondary tasks adversely affect driving behavior. Previous research has focused on discovering the general trends by analyzing the average effects of secondary tasks on a population of drivers. This paper conjectures that there may also be individual effects, i.e., different effects of secondary tasks on individual drivers, which may be obscured within the average behavior of the population, and proposes a model-based approach to analyze them. Specifically, a radial-basis neural-network-based modeling framework is developed to characterize the normal driving behavior of a driver when driving without secondary tasks. The model is then used in a scenario of driving with a secondary task to predict the hypothetical actions of the driver, had there been no secondary tasks. The difference between the predicted normal behavior and the actual distracted behavior gives individual insight into how the secondary tasks affect the driver. It is shown that this framework can help uncover the different effects of secondary tasks on each driver, and when used together with support vector machines, it can help systematically classify normal and distracted driving conditions for each driver.


Abstract: On current railway systems, it is becoming ever more necessary to install safety elements to avoid accidents. One of the causes that can provoke serious accidents is the existence of obstacles on the tracks, either fixed or mobile. In this paper, a multisensory system that can inform the monitoring system about the existence of obstacles is proposed. The system for ob-
Obstacle detection consists of two emitting and receiving barriers, which are placed on opposing sides of the railway, respectively, and use infrared and ultrasonic sensors, thus establishing different optical and acoustic links between them. The interruption of one or several links should produce an alarm. However, even without the existence of objects, degradation of links could occur due to atmospheric attenuation, solar radiation, etc., also producing an activation of the alarm system. Since detection is based on the lack of radiation in the detectors, the use of complementary sensors for the same task is justified. Since the minimum size of an object for which an alarm is required to be generated is $50 \times 50 \times 50$ cm, in some situations, several links are interrupted; however, alarms should not be generated. Typical cases are the flight of leaves or the movement of small animals in the scanned area. To avoid alarm activation in such situations, this paper proposes the combined use of diverse techniques of data fusion, based on fuzzy logic and the Dempster-Shafer theory of evidence, to validate the existence of objects, providing a highly reliable detection system.


Abstract: Rapid urbanization and the growing demand for faster transportation has led to heavy congestion in road traffic networks, necessitating the need for traffic-responsive intelligent signal control systems. The developed signal control system must be capable of determining the green time that minimizes the network-wide travel time delay based on limited information of the environment. This paper adopts a distributed multiagent-based approach to develop a traffic-responsive signal control system, i.e., the geometric fuzzy multiagent system (GFMAS), which is based on a geometric type-2 fuzzy inference system. GFMAS is capable of handling the various levels of uncertainty found in the inputs and rule base of the traffic signal controller. Simulation models of the agents designed in PARAMICS were tested on virtual road network replicating a section of the central business district in Singapore. A comprehensive analysis and comparison was performed against the existing traffic-control algorithms green link determining (GLIDE) and hierarchical multiagent system (HMS). The proposed GFMAS signal control outperformed both the benchmarks when tested for typical traffic-flow scenarios. Further tests show the superior performance of the proposed GFMAS in handling unplanned and planned incidents and obstructions. The promising results demonstrate the efficiency of the proposed multiagent architecture and scope for future development.


Abstract: This paper introduces a dangerous-driving warning system that uses statistical modeling to predict driving risks. The major challenge of the research is how to discover the safe/dangerous driving patterns from a sparsely labeled training data set. This paper proposes a semisupervised learning method to utilize both the labeled and the unlabeled data, as well as their interdependence to build a proper danger-level function. In addition, the learned function adopts a continuous parametric form, which is more suitable in modeling the continuous safe/dangerous-driving state transitions in a practical dangerous-driving warning system. Our comprehensive experimental evaluations reveal that, in comparison with driving danger-level estimation using classification-based methods, such as the hidden Markov model (HMM) or the
conditional random field algorithm, the proposed method requires less training time and achieved higher prediction accuracy.


Abstract: This paper presents a new clustering-based methodology for sensor placements on freeways for estimating travel times. The proposed methodology is applicable to both freeways with no existing deployment and freeways with existing sensor deployments, where it identifies the critical sensors that need to be regularly maintained. The freeway sections are clustered based on speed data, with neighboring sections with identical speed profiles being grouped into a cluster. A new approach to estimate freeway travel times using the final clusters, which is called the optimal placement method, is also proposed. A family of k-means clustering algorithms and a hierarchical algorithm are then explored using real-world case studies of three freeway segments in Virginia. Speed and travel-time data are obtained using Global Positioning System (GPS)-equipped probe vehicles. The clustering results indicated that the hierarchical and k-means with a priori knowledge algorithms produced the best clusters. The tradeoff plots of travel-time measures (e.g., error) versus the number of freeway sensors were generated for two travel-time estimation methods: 1) optimal placement method and 2) midpoint placement method. The optimal placement method consistently produced better travel-time estimates than the midpoint placement method for all three case studies. The travel times were also estimated using three other methods found in the literature: 1) the zone of influence method; 2) the instantaneous method; and 3) the linear method. The results showed that the optimal placement method outperformed these methods in all three case studies.


Abstract: Automated passenger tracking in public transportation systems can be used to estimate the short-term demand and, thereby, to optimize the fleet schedule in real time. It can also be used to determine the origin-destination matrix and to maintain statistics of each passenger's transportation habits over time, thus enabling enhancements in long-term planning. However, ubiquitously tracking passengers throughout a network requires the ability to recognize them at single locations in the network. In this paper, we study the merits of realizing this task by means of radio-frequency identification (RFID) technologies. Forty volunteers carried RFID tags of the norm EPC Gen2 in their backpacks, wallets, pockets, and hands through a mockup of a bus door equipped with four reading antennas. Setups with one and two rows of persons walking through the portal were evaluated. The RFID tags were embedded in laminated plastic cards. Single-tag cards embedded with a single EPC Gen2 tag and dual-tag cards that also contained a traditional Mifare tag were used. Recognition statistics of passengers for all the combinations of one, two, three, and four antennas are presented. The recognition percentages are mainly influenced by the antenna position and radiation pattern and by the line-of-sight conditions between the tag and the antennas.
Abstract: Satellites are currently being used to track the positions of trains. Positioning systems using satellites can help reduce the cost of installing and maintaining trackside equipment. This paper develops a nonlinear combinatorial data reduction model for a large amount of railway Global Positioning System (GPS) data to decrease the memory space and, thus, speed up train positioning. Three algorithms are proposed by employing the concept of looking ahead, using the dichotomy idea, or adopting the breadth-first strategy after changing the problem into a shortest path problem to obtain an optimal solution. Two techniques are developed to substantially cut down the computing time for the optimal algorithm. The surveyed GPS data of the Qinghai-Tibet railway (QTR) are used to compare the performance of the algorithms. Results show that the algorithms can extract a few data points from the large amount of GPS data points, thus enabling a simpler representation of the train tracks. Furthermore, these proposed algorithms show a tradeoff between the solution quality and computation time of the algorithms.


Abstract: We present a novel real-time computer-vision system that robustly discriminates which of the front-row seat occupants is accessing the infotainment controls. The knowledge of who is the user—that is, driver, passenger, or no one—can alleviate driver distraction and maximize the passenger infotainment experience. The system captures visible and near-infrared images of the front-row seat area in the vehicle. The algorithm uses a modified histogram-of-oriented-gradients feature descriptor to represent the image area over the infotainment controls and a support vector machine (SVM) and median filtering over time to classify each image to one of the three classes with 97.9% average correct classification rate. This rate was achieved over a wide range of illumination conditions, human subjects, and times of day. With an offset of 5 pixels in any direction, the rate could still be maintained at better than 85%. This approach represents an alternative to detecting and tracking the hand movements and then classifying the hands into the respective classes. This approach demonstrates the ability to achieve good classification rates, despite the presence of vast illumination changes of the vehicle environment.
### Officers

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
</tr>
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<tbody>
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</tr>
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</tr>
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</tr>
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</tr>
<tr>
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</tr>
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</tr>
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<td>Fei-Yue Wang, CAS, China, and U. of Arizona, Tucson, AZ, USA</td>
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</tbody>
</table>

### Committee Chairs

<table>
<thead>
<tr>
<th>Committee</th>
<th>Chair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awards</td>
<td>Chelsea C. White III</td>
</tr>
<tr>
<td>Conferences and Meetings</td>
<td>Reinhard Pfliegl</td>
</tr>
<tr>
<td>Constitution and Bylaws</td>
<td>Sudarshan Chawathe</td>
</tr>
<tr>
<td>Fellow Evaluation</td>
<td>Petros Ioannou</td>
</tr>
<tr>
<td>Finance</td>
<td>Daniel J. Dailey</td>
</tr>
<tr>
<td>History</td>
<td>Rye Case</td>
</tr>
<tr>
<td>Long-Range Planning</td>
<td>Fei-Yue Wang</td>
</tr>
<tr>
<td>Member Activities</td>
<td>Jason Geng</td>
</tr>
<tr>
<td>Nominations and Appointments</td>
<td>William T. Scherer</td>
</tr>
<tr>
<td>Publications</td>
<td>Christoph Stiller</td>
</tr>
<tr>
<td>Standards</td>
<td>Jason Geng</td>
</tr>
<tr>
<td>Student Activities</td>
<td>Shuming Tang</td>
</tr>
<tr>
<td>Technical Activities</td>
<td>Daniel Zeng</td>
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</tbody>
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