



# INTELLIGENT TRANSPORTATION SYSTEMS

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## IEEE ITS SOCIETY NEWSLETTER

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## **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](http://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.

## **Editorial Board**

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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](mailto:c.herget@ieee.org).

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## **SOCIETY NEWS**

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### **From the Editor**



*by Charles Herget*

This issue of the Newsletter contains a message from our society president, Bill Scherer, his last as president. Next year, our president will be Alberto Broggi, whom you will remember as the Editor-in-Chief of our Transactions on ITS for many years.

Next, we have an article on a new joint venture for our society with three other IEEE societies, Aerospace and Electronic Systems, Oceanic Engineering, and Vehicular Technology. These four societies all have transportation as their main interest, covering air and water, as well as land. We are planning a joint conference, called the IEEE Forum on Integrated and Sustainable Transportation Systems. We are planning to hold the conference in June 2011 in Vienna.

It is still in the planning phase. We will be keeping you informed in future issues of the Newsletter. We hope many of the readers of the Newsletter will volunteer to participate in the organization and attend.

We have included a report on our Intelligent Transportation Systems Conference (ITSC'09) that was held in St. Louis, Missouri, USA, earlier this month.

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.

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## **President's Message**

*by Bill Scherer*

Hello ITSS Members:

As we wrap-up our year, I thought I would share this section of the Five-Year Society Review by IEEE that was just completed. Hopefully, this gives a perspective on our Society, the issues facing the Society, and its future. I have found the past two-years as President rewarding and look forward to Alberto's leadership as we move forward.

WT Scherer, President

### **3. MISSION, CORE VALUES, AND VISION**

Describe the MISSION/PURPOSE of the Society or Council (S/C).

The purposes of the Society are to bring together the community of scientists and engineers who are involved in the field of interest stated herein, and to advance the professional standing of the Members and Affiliates. The Society is scientific, literary and educational in character to provide a forum for the discussion and exchange of information to advance the theory, design, development, and application of intelligent transportation systems. The Society aids in promoting close cooperation and exchange of technical information among its Members and Affiliates, and as means to these ends shall hold public meetings for the reading and discussion of periodical and special works of literature, science and art pertaining thereto, the initiation and development of engineering standards, and any other activities necessary, suitable and proper for the fulfillment of

these objectives. Through its Committees the Society studies and provides for the needs of its Members and Affiliates.

Describe the core VALUES of the organization. (As examples: quality of publications including content, on-time delivery, and cost; educational programs, fulfillment of IEEE's Mission).

As a new Society, our primary goals in these beginning years are twofold: 1) to provide the premier forum for publishing technical articles on ITS and state-of-the-art information on ITS developments, and 2) to be the premier organizer of conferences (and workshops) that provide a venue for presenting the latest developments in all aspects of ITS. Value #1 is achieved by our highly rated (by IEEE) journal, our newsletter, and our newly formed IEEE ITSS Magazine (begins publishing this year – see publications). Our second value is achieved through our conferences -- we now organize and are the lead on six global conferences. Numerous other ancillary activities, such as technical committees, etc., are primarily concerned with the support of our publications and the content of our conferences.

Describe the S/C's VISION.

Our vision is that ITSS will be, without a doubt, seen globally as the premier provider of knowledge regarding ITS – archival information, contemporary research, and the state-of-the-art in the ITS industrial developments. With our highly respected Journal and our global conferences, we feel the vision is already being accomplished in the few short years we have existed as a Society.

#### **4. STRATEGIC GOALS, OBJECTIVES, AND PLANS**

##### a. Describe the STRATEGY the S/C uses to achieve its MISSION and VISION.

The ITS Society is well connected to and has liaisons with other transportation and related technology professional organizations in the technical world, such as ITS World, Institute of Transportation Engineers, Society of Automotive Engineers, and US Department of Transportation, Transportation Research Board.

ITSS's strategic goal and main objective is to keep a leading position in the world of decision-making organizations and grow stronger as a reference point for scientific projects, produce standards, and provide expertise in the ITS field.

Future plans for the ITS Society are to increase its visibility thanks to its successful conferences and workshops, and to its well respected publications. The IEEE Trans on ITS is already on the right way and is improving its impact factor and its audience year after year, while the new ITS Magazine is starting with the first issue in this month; the plan is to become one of the reference publications for practitioners in the ITS field.

- b. Describe the uniqueness of this strategy and the benefits it provides for the S/C.

We focus on our primary objectives – publications and conferences. Thus we are emphasizing the factors that provide 1) intellectual value to our members and the broader IEEE community, and 2) generate the revenue necessary for financial viability.

- c. Describe the three most important issues facing the S/C.

Global economic crisis and its impact on our society – conferences, membership, and publications

Finances; especially making our newly launched magazine successful.

Continued growth of our conferences and society membership.

- d. Describe the strategies to address these three activities.

Global economic crisis and its impact on our society – conferences, membership, and publications: This is a difficulty faced by all IEEE; we are doing more to promote our conferences, and we are getting creative on the structuring of our conferences. For example, our flagship conference (ITSC) this year has fewer submissions than the previous year, so we are working hard creating more invited tracks by reaching out to professionals with related interests.

Finances -Making our newly launched magazine successful. The magazine launches this year, are we are promoting it extensively and making sure of the quality, which we believe will provide value to members and be a valuable and desirable component of our ITSS membership.

Continued growth of our conferences and society membership. With quality publications and quality conferences, we believe that membership will follow.

- e. Describe the near- and far-term objectives that support these activities.

Our primary objective is to expand our reach (via publications and conferences) and associated membership. Achievement of this objective naturally addresses the concerns in c. above.

- f. Describe the plans to achieve these objectives.

The Global Forum on Transportation Systems Integration (see earlier section – 2e) is designed to give our society high visibility. Secondly, we are structuring our Society to directly have a focus on the publications and conferences. This is accomplished by the restructuring of our technical committees, which are being aligned to directly represent the structure of the conferences (i.e., each TC has significant responsibility for generating, managing and reviewing, selecting, and organizing conference tracks) and each TC has responsibility for the associated technical editorship in publications (via the structuring of our senior editors and associate editors).

- g. Describe how the expected outcomes of these three plans further the S/C's Strategic Objectives.

Directly as stated above.

- h. Describe the S/C's position in the global technical world. (See Section 2 e.)
- i. Describe any new technology areas that the S/C have pursued during the past five-years.

We have been active in councils (Biometrics and Systems) and we have added three new conferences (that we lead) in emerging technology areas, including Service Operations, Logistics and Informatics (SOLI 2009), Mechatronic and Embedded Systems and Applications (MESA09), and Intelligence and Security Informatics (ISI).

- j. Describe the threats to the future viability of the S/C.

We must continue to grow our membership, and the new Magazine must eventually become financially viable through advertisements and/or a change in publication strategy (i.e., all electronic, less frequent, etc.). Our Society was given an award for outstanding leadership and financial success by IEEE (under the Presidency of Fei-Yue Wang); however, the restructuring of IEEE allocations moved us in one year from this award status level to being on the Watch list. This occurred as we were planning the launch of the magazine. Fortunately, we are having successful conferences, and we are working with IEEE TAB FinCom to address these new financial issues and are making good progress towards financial viability.

- k. Describe how the S/C recognizes and supports new technologies. Please provide specific examples.

This is clearly accomplished via our conferences and the newly added conferences that address expanding aspects of ITS, such as mechatronics and security implications. Our new Magazine will also be a forum for the dissemination and discussion of new technology.

- l. Describe any joint programs with other Societies or councils such as jointly sponsored meetings, publications, and committee meetings. Provide specific examples.

Many of our conferences have joint sponsorship (our flagship conferences – ITSC and IV are solely sponsored by ITSS), including SOLI (co-sponsored by INFORMS and AIS SIG on E-Business) and MESA (co-sponsored by ASME). Also, our Global Forum is being organized in conjunction with OES, AES and VTS.

- m. How successful have you been?

Our new conferences have been successful and are sustaining.

- n. Do you have future plans for such activities? (See 2 e.)
- o. Where do you see your Society/Council being in five years?

*The premier society in the world for ITS technical publications and conferences.*

- p. Describe the S/C's process and organization for Long-range or Strategic Planning.

We have a committee that addresses these issues; however, the Excom and the BOG play a continuous and critical role in these activities, such as the expansion (page count) of the journal, new publications (magazine), and the creation of the expanding set of conferences we manage.

- q. Describe how the S/C recognizes and stimulates new areas of interest.

This is primarily done through 1) new conferences/workshops and new topics within conferences, and 2) special issues of our ITS journal (and now the Magazine).

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## **ITSS Initiative for an IEEE Forum on Integrated and Sustainable Transportation Systems**

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*by Bill Scherer and Charles Herget*

We would like to tell you about a project we have planned with four other societies in IEEE. We are currently planning an international event we are calling the IEEE Forum on Integrated and Sustainable Transportation Systems that will be held in Vienna, Austria, in 2011. Four societies from IEEE are participating in the organization: Aerospace and Electronic Systems Society (AESS), Oceanic Engineering Society (OES), Intelligent Transportation Systems Society (ITSS), and Vehicular Technology Society (VTS).

All four of these societies address various aspects of transportation, but this topic is very broad and there is a great deal of overlap in the topics of interest of the societies. 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, including automobiles, trucks, and rail; air; and water. 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. There are four societies that specifically address the technologies in transportation. Although there is some overlap in the scope of these societies the primary interest of these societies are as follows: the Vehicular Technology Society (VTS) and the Intelligent Transportation Systems Society (ITSS) address land

transportation, the Aerospace Electronics Society (AES) addresses air, and the Oceanic Engineering Society (OES) addresses water.

The presidents (or their designees) of all of the societies in IEEE meet three times a year in a meeting of the unit at IEEE having organizational responsibility for the activities of the societies, the Technical Activities Board (TAB). TAB is divided into ten divisions. Each of the 38 societies and eight councils belongs to one of the divisions. Four of the societies participating belong to Division IX on TAB.

At a Division IX meeting during the November 2008 TAB meeting in New Brunswick, NJ, the presidents of these societies met and agreed that although the applications addressed by the four societies may differ, there are a significant number of issues common to all of the modes of transportation, for example as denoted in congestion, environmental concerns, and energy supply. The presidents agreed to request the administrative committees of each of their societies to approve co-sponsorship of a meeting that addresses the technologies affecting all of these modes of transportation. Subsequently, the Professional Communication Society joined the effort.

Some tentative decisions were made at a subsequent meeting of the four society presidents, attended by the Division IX Director, during the February 2009 Board Series in San Juan, PR.

A summary of these tentative decisions follows.

- 1) Transportation systems are critical, especially in global economic environment and with emphasis on infrastructure renewal
- 2) The purpose of the meeting is to bring world technical and implementation leaders together to share information, research, problems, and ideas: technology, implementation, management, policy, etc.
- 3) Issues involving land, air, and sea systems, and all supporting technologies will be addressed.
- 4) Bring disparate global societies together involved with the comprehensive transportation systems environment.
- 5) Plan for the IEEE Forum on Integrated and Sustainable Transportation Systems in the spring or summer of 2011 in Vienna.

The members of the steering committee are Charles Herget (ITSS), Chair; James Barbera (OES rep); Jerry Carroll (OES pres); James Irvine (VTS pres); Reinhard Pfliegl (ITSS) Local Arrangements; Bob Rassa (AES pres); Bill Scherer (ITSS pres); and Fei-Yue Wang (ITSS rep).

We are excited about this unique event and the opportunity to have the IEEE play a lead role in establishing the critical foundations for the future of global transportation. If you are interested in participating in the organization of the event or have any comments or suggestions, please contact either of us or any of the steering committee members. We will report on future developments in subsequent newsletters and IEEE ITSS magazine issues.

Charles Herget, Founding Past-President, ITSS  
Bill Scherer, President ITSS

## **Election of Officers**

Officers of the Society are elected by the Board of Governors. All officers, except the president, are elected for two year terms. The president is elected to the position of president-elect for one year, then serves as president for two years, and finally serves as immediate past-president for one year. The election of officers for the positions of president-elect and vice presidents for administrative activities, financial activities, and technical activities is conducted in even numbered years for two year terms beginning January 1st of the following year. Election of officers for the position of Editor-in-Chief of the Transactions on ITS and the vice presidents for conference activities, member activities, and publication activities is held in odd numbered years for two year terms beginning January 1st of the following year.

The following officers were elected to two-year terms beginning January 1, 2010, at the Board of Governors meeting in St. Louis, Missouri, USA, on October 4, 2009.



Reinhard Pfliegl,  
Austria Tech  
Vienna, Austria  
Vice President for Conference Activities



Jason Geng  
Rockville, Maryland, USA  
Vice President for Member Activities



Christoph Stiller  
Universität Karlsruhe  
Karlsruhe, Germany  
Vice President for Publication Activities



Fei-Yue Wang  
Chinese Academy of Sciences, Beijing, China, and  
University of Arizona, Tucson, Arizona, USA  
Editor-in-Chief, Transactions on Intelligent Transportation Systems

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## Conferences

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### Conference Report



The 12th International IEEE Conference on Intelligent Transportation Systems was held in St. Louis, Missouri, USA, on October 4-7, 2009.

Photos from the conference and related activities follow.



Steve Watkins, General Chair  
Missouri University of Science and Technology,  
Opening the Conference

Ganesh Kumar Venayagamoorthy,  
Missouri University of Science and Technology,  
Giving the Opening Plenary Talk





Scott Belcher,  
President and CEO,  
Intelligent Transportation Systems Society  
of America

Luncheon Keynote Speaker

Steve Watkins,  
Missouri University of Science and Tech-  
nology,  
General Chair

and

Matthew Barth,  
University of California, Riverside,  
Program Chair



Sudarshan Chawathe,  
University of Maine,  
Publicity Chair

Sahra Sedigh  
Missouri Univ. of Science and Technology  
Publications Chair

Steve Watkins,  
General Chair

Matthew Barth,  
Program Chair

## Awards Presented at the Gala Banquet

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### ITSS Outstanding ITS Research Award

Pravin Varaiya  
Nortel Networks Distinguished Professor  
Department of Electrical Engineering & Computer Sciences  
University of California, Berkeley

Award Citation: "For contributions to design of Automated Highway Systems and research in wireless traffic surveillance."



Wei-Bin Zhang accepting the award on behalf of Pravin Varaiya from ITS Society President, William Scherer

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### ITSS Outstanding ITS Institution Lead Award

NavLab  
Carnegie Mellon University  
Robotics Institute  
Pittsburgh, Pennsylvania

Award Citation: "For contributions to research and development in autonomous navigation and robotic vehicles."

Chuck Thorpe, Carnegie Mellon University, accepting the award on behalf of NavLab from ITS Society President, William Scherer



## ITSS Best Ph.D. Dissertation Awards 2009



First Prize  
Dr. Arne Kesting  
“Microscopic Modeling of Human and  
Automated Driving:  
Towards Traffic-Adaptive Cruise Control”

Christoph Stiller, ITSS Vice President.  
Arne Kesting,  
Bill Scherer, ITSS President



Second Prize (Tie)  
Dr. Verena Schmid  
“Trucks in Movement: Hybridization of  
Exact Approaches and Variable Neighbor-  
hood Search for the Delivery of Ready-  
Mixed Concrete”

Christoph Stiller, ITSS Vice President.  
Verena Schmid,  
Bill Scherer, ITSS President



Second Prize (Tie)  
Dr. Andrea D'Ariano  
“Improving Real-Time Train Dispatching:  
Models, Algorithms and Applications”

Christoph Stiller, ITSS Vice President.  
Andrea D'Ariano,  
Bill Scherer, ITSS President

## Outstanding Service Awards

The society presented two outstanding service awards to past presidents of the Society.



Charles Herget, Founding President of the Society (2005), accepting the award from ITSS President, Bill Scherer



Fei-Yue Wang, ITS Society President, 2006-2007



## Candid Photos

(Left) Your Newsletter Editor, Charles Herget, and his wife, Therese, on a Mississippi River Cruise before the conference

(Below) Members of the Society's Executive Committee reading the conference program during a break in Monday Night Football.

Left to right: Sudarshan Chawathe, Bill Scherer, Christoph Stiller, and Mike Smith.



## **ITS Society Sponsored Conferences**

Following are the ITS Society sponsored conferences.

### **2009**

October 28-30

First IEEE Vehicular Networking Conference (IEEE VNC 2009)

Tokyo, Japan

<http://vnc2009.org>

November 10-12

Vehicular Electronics and Safety (VES)

Pune, India

<http://icves2009.com>

### **2010**

June 21-24

Intelligent Vehicles Symposium

La Jolla, California, USA

<http://cvrr.ucsd.edu/iv2010/>

July 15-17

The 6th IEEE/ASME International Conference on

Mechatronic and Embedded Systems and Applications (MESA'10)

<http://www.asmemesa.org>

2010 IEEE International Conference on Vehicular Electronics and Safety (VES'10)

<http://www.ieeeves.org>

2010 IEEE/INFORMS International Conference on Service Operations, Logistics, and Informatics (SOLI'10)

<http://www.ieeesoli.org>

MESA'10, VES'10, and SOLI'10 will be held concurrently in  
Qingdao, China

September 19-22

The 13th International IEEE Conference on Intelligent Transportation Systems

Madeira Island, Portugal

<http://itsc2010.isr.uc.pt>

Announcements for these conferences appear on the following pages.

# IEEE VNC 2009

First IEEE Vehicular Networking Conference 2009

October 28-30, 2009  
Tokyo University of Science,  
Morito Memorial Hall Tokyo, Japan

Sponsors:  
IEEE Intelligent Transportation Systems Society (ITSS)  
IEEE Communications Society (ComSoc)

IEEE VNC 2009 is a new conference established with the merger of IEEE V2VCOM and IEEE AutoNet Workshops under IEEE ITS Society and IEEE ComSoc.

### Honorary Chair

Prof. Tadao Saito, Toyota InfoTechnology Center, Japan  
Prof. Emeritus, The University of Tokyo

### General Chairs

Dr. Onur Altintas, Toyota InfoTechnology Center, Japan

Dr. Wai Chen, Telcordia Technologies,  
USA

### Technical Program Committee Chairs

Prof. Vinny Cahill, Trinity College Dublin, Ireland

Prof. Falko Dressler, University of Erlangen-Nürnberg, Germany

Prof. Eylem Ekici, Ohio State University, USA



Celebrating 125 Years  
of Engineering the Future

## 2009 IEEE International Conference on Vehicular Electronics and Safety



Nov 10-12, 2009 Pune, India

The International Conference in Vehicular Electronics and Safety (ICVES) is an Annual Meeting sponsored by IEEE Intelligent Transportation Systems Society (ITSS) as a forum for researchers from Industry and Universities to discuss research and applications in Vehicle Electronics and Safety. This fifth meeting of ICVES 2009 will be held at Pride Hotel Pune, India.

### General Co-Chairs

K. Venkatesh Prasad (Ford Motor Company)  
Anup Sable (KPIT Cummins)

### Technical Program Co-Chairs

S. N. Merchant (IIT Bombay)  
Edward C. Nelson (Ford Motor Company)  
Kazuya Takeda (Nagoya University)



## Call for Papers

# 2010 IEEE Intelligent Vehicles Symposium

Sponsored by the IEEE Intelligent Transportation Systems Society  
Hosted by the University of California, San Diego

June 21-24, 2010, La Jolla, CA



**THE INTELLIGENT VEHICLES SYMPOSIUM (IV'10)** 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, most of the papers will be poster presentations. Papers dealing with all aspects of vehicle-related intelligent systems and cooperation between vehicles and infrastructures are solicited for **IV'10**. This year the symposium will directly follow the IEEE CVPR 2010 conference, held the previous week in San Francisco, CA. A Ph.D. Dissertation Forum will offer advanced Ph.D. students the opportunity to present their research to a panel of distinguished faculty and industry luminaries.

### Program Topics

- Driver Assistance Systems
- Automated Vehicles
- Active and Passive Safety
- Vehicle Environment Perception
- Driver State and Intent Recognition
- Looking-In, Looking-Out Perception
- System Architecture
- Smart Infrastructure
- Impact on Traffic Flows
- Cooperative Vehicle-Highway Systems
- Collision Avoidance
- Pedestrian Protection
- Inter-Vehicle Communications
- Dedicated Short Range Communications
- Assistive Mobility Systems for Disabled
- Intelligent Air and Space Vehicles
- Intelligent Robotic Vehicles
- Image, Radar, Lidar Signal Processing
- Information Fusion
- Vehicle Control
- Telematics
- Communications and Networks
- Human Factors
- Human Machine Interaction
- Novel Interfaces and Displays
- Others

### Important Dates

Paper submission deadline	<b>Jan. 15, 2010</b>
Notification of acceptance	<b>Mar. 30, 2010</b>
Workshop proposal deadline	<b>Feb. 1, 2010</b>
Demo/Exhibit proposal deadline	<b>Mar. 15, 2010</b>
Ph.D. Dissertation Forum submissions	<b>Apr. 15, 2010</b>

### Further Information

Further information can be found on our website, [cvrr.ucsd.edu/iv2010](http://cvrr.ucsd.edu/iv2010). If you want to organize a special session, workshop or demonstration you can contact the organization committee at [ieeeiv2010@gmail.com](mailto:ieeeiv2010@gmail.com).

#### General Chair

Professor Mohan M. Trivedi  
University of California, San Diego  
[mtrivedi@ucsd.edu](mailto:mtrivedi@ucsd.edu)

#### Program Chair

Professor Daniel J. Dailey  
University of Washington  
[dan@its.washington.edu](mailto:dan@its.washington.edu)



# Call For Papers



IEEE Intelligent Transportation Systems Society Sponsored Conferences

Qingdao Shangri-La Hotel, China, July 15-17 2010

Please visit conference website for details and potential changes

## 2010 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA'10)

<http://www.asmemesa.org>

## 2010 IEEE/INFORMS International Conference on Service Operations, Logistics, and Informatics (SOLI'10)

<http://www.ieeesoli.org>

## 2010 IEEE International Conference on Vehicular Electronics and Safety (VES'10)

<http://www.ieeeves.org>

Paper submission deadline: February 12, 2010

Notification of acceptance: April 18, 2010

Camera-ready copy Due: May 16, 2010

## Welcome to Qingdao!

The One of the Most Beautiful Coast Tourist Attractions of China  
The Home of the Famous Tsingdao Beer and Chinese International Beer Festival



Qingdao Websites: <http://english.qingdao.gov.cn/n2043295/index.html>, <http://www.qdta.cn/>, <http://www.qd.sd.cn/>



# Call for Papers



## The 6<sup>th</sup> IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA10)

Qingdao, China, July 15-17, 2010

<http://www.asmemesa.org>

### Advisory Committee

Jorge Angeles, McGill University, Canada  
David M. Auslander, Univ. of California, Berkeley, USA  
Tianyou Chai, Northeast University, China  
Ru-Wei Dai, Chinese Academy of Sciences, China  
Krishna C. Gupta, Univ. of Illinois at Chicago, USA  
C.S. George Lee, National Science Foundation, USA  
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Bahram Ravani, Univ. of California, Davis, USA  
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Jianrong Tan, Zhejiang University, China  
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Tianmiao Wang, Beihang University, China

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### Chair of the Honors and Awards Committee

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Yanqing Gao, University of Arizona, USA

### Publicity Chairs

Huayong Yang, Zhejiang University, China  
Li Zheng, Tsinghua University, China

### Publication Chair

Guanpi Lai, University of Arizona, USA

### Local Organizing Chair

Nan Zhang, Chinese Academy of Sciences, China

### Executive Secretariat Contact E-Mail

leemesa2010@gmail.com

### International Program Committee

<http://www.asmemesa.org>

### 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 6<sup>th</sup> IEEE/ASME MESA, MESA10, 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.

### Symposia and Symposium Chairs

#### Autonomous Systems and Ambient Intelligence

Hyo-Sung Ahn, Gwangju Institute of Science and Technology, Korea  
**Autonomic and Distributed Mechatronic and Embedded Systems**

Yu-Cheng Chou, University of California at Davis, USA

#### Bio-Mechatronics and Bio-sensors

Shane Xie, University of Auckland, New Zealand

#### Cyber-Physical Systems and Cooperative Systems

Stephen Nestinger, Worcester Polytechnic Institute, USA

#### Development, Verification, Debug Tools for Mechatronic and Embedded Systems

Jia Xu, York University, Canada

#### Embedded Computer Vision

Peter Rössler, UAS Technikum Wien, Austria

#### Embedded System Infrastructure and Theory

Martin Horauer, UAS Technikum Wien, Austria

#### Diagnosis and Monitoring in Mechatronic Systems

Wen Chen, Wayne State University, USA

#### Mechatronic and Embedded System Applications

Emanuele Frontoni, Polytechnic Univ. of Marche, Italy

#### Mechatronic and Embedded Systems in Education

Zhaoqing Wang, Zhejiang Sci-Tech University, China

#### Mechatronic and Embedded Systems for Renewable Energy Systems

Uriel A. Rosa, University of California, Davis

#### Mechatronic Control and Electrical Vehicular Systems

Chengbin Ma, UM-SJTU J.Inst., Shanghai Jiaotong U.

#### Robotics and Mobile Machines

Xianwen Kong, Heriot-Watt University, UK

#### Sensors and MEMS

Ja Choon Koo, Sungkyunkwan University, Korea

#### Sensor Networks and Networked Embedded Systems

Bo Chen, Michigan Technological University, USA

#### Small Unmanned Aerial Vehicle Technologies and Applications

YangQuan Chen, Utah State University, USA

### Sponsor

IEEE Intelligent Transportation Systems Society

### Technical Co-sponsors

ASME Division of Design Engineering

IEEE Control System Society

Chinese Academy of Sciences

Chinese Association for Automation

Chinese Mechanical Engineering Society

National Natural Science Foundation of China

### Paper Submission

Complete manuscripts in PDF format must be electronically submitted to the conference website <http://www.asmemesa.org>. Submitted manuscripts should be six (6) pages or less in IEEE two-column format, including figures, tables, and references. Please use the [LaTeX style file](#) or [Microsoft Word template](#) available from the conference website to prepare your manuscript.

### Important Dates

**February 12, 2010** Full paper, proposal for special session, workshop and tutorial

**April 18, 2010** Notification of acceptance

**May 16, 2010** Camera ready paper submission

# IEEE ITSC 2010



13<sup>th</sup> International IEEE Conference on Intelligent Transportation Systems  
Madeira Island, Portugal, 19 – 22 September 2010

## On the Way to Intelligent Sustainable Mobility

### Conference committee

#### General Chair:

Urbano Nunes  
University of Coimbra, Portugal

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UNIVERSIDADE DE COIMBRA



The IEEE Intelligent Transportation Systems Society (ITSS) is sponsoring its 13<sup>th</sup> international conference on basic research and applications of leading advances in communications, computer, control, and electronics technologies related to Intelligent Transportation Systems (ITS).

### CALL FOR PAPERS

#### Program topics

##### Travel and traffic management

- Travel information and route guidance
- Ride matching and reservation
- Traveler services information
- Traffic control
- Incident management
- Travel demand management
- Emissions testing and mitigation
- Highway-rail intersection

##### Emergency management and transportation security

- Emergency notification and personal security
- Emergency vehicle management
- ITS and national security
- Parallel management
- Systems for transportation emergency

##### 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

##### 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
- Artificial transportation systems

##### Other topics

- Intelligent infrastructure
- Agent-based methods
- Electronic payment services

##### Public transportation management

- Public transportation management
- En-route transit information
- Personalized public transit
- Public travel security

##### Intelligent vehicles

- Aerial, marine and surface intelligent vehicles
- Environment perception
- Lane detection and lane keeping
- Pedestrian and vehicle detection
- Real-time perception and sensor fusion
- Multi-autonomous vehicle studies, models, techniques and simulations
- HMI and Human-machine interaction
- Cooperative techniques
- Collision prediction and avoidance
- Advanced vehicle safety systems
- Driver assistance systems
- Real-time motion planning in dynamic environments.
- Sensor fusion for accurate global positioning
- Lidar, vision and radar sensing
- Vehicle localization and autonomous navigation
- Automated vehicle operation

##### Electric vehicle technologies

- Electric motors drives and propulsion technologies
- Energy efficiency optimization
- Special purpose vehicles for aged and handicapped people
- Passenger cars and public transport
- Battery management systems
- Advanced energy storage and control systems
- Hybrid plug-in systems
- Infrastructure for charging, communication and controls
- Vehicle-to-grid (V2G) and smart grids

#### Paper submission

Complete manuscripts in PDF format must be electronically submitted for peer-review in IEEE standard-format. Detailed submission instructions can be found through conference website at <http://itsc2010.isr.uc.pt>.

Manuscript submission deadline: 15 March 2010



## **Conference Calendar**

*Massimo Bertozzi*

*Paolo Grisleri*

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

### **2009**

October 11-15

The 2009 IEEE/RSJ International Conference on Intelligent RObots and Systems (IROS 2009)  
Saint Louis, MO, USA  
<http://www.iros09.mtu.edu>

October 12-15

7th International Conference on Computer Vision System (ICVS2009)  
Liege, Belgium  
<http://icvs2009.intelsig.be>

October 20-22

9th International Conference on Telecommunications for ITS  
Lille, France  
<http://itst2009.inrets.fr>

November 2-4

IASTED Intelligent Systems and Control  
Cambridge, MA, U.S.A.  
<http://www.iasted.org/conferences/home-665.html>

November 4-7

9th International Conference on Transport Systems Telematics  
Katowice-UstroÅ„, Poland  
<http://www.tst-conference.org>

November 11-13, 2009  
8th Chilean Congress and 3rd Ibero/American Congress on Intelligent Transportation Systems  
Santiago, CHILE  
<http://www.itschile.cl>

December 16-18  
Artificial Intelligence Applications in Intelligent Transportation Systems  
4th Indian International Conference on Artificial Intelligence  
Tumkur (near Bangalore), India  
<http://www.iiconference.org/iicai09/its.html>

## 2010

March 23-24, 2010  
WIT 2010: 7th International Workshop on Intelligent Transportation  
Hamburg, Germany  
Submission due by: November 16th, 2009  
<http://wit.tu-harburg.de/>

April 4-7, 2010  
3rd International Conference on Transport Science and Technology Conference  
New Delhi, India  
Submission due by: December 31, 2009  
<http://www.ewebevolution.com/transtec/>

April 12-15, 2010  
SAE 2010 World Congress  
Detroit, Michigan, USA  
<http://www.sae.org/congress>

May 3-8, 2010  
IEEE International Conference on Robotics and Automation  
Anchorage, Alaska, USA  
<http://icra2010.grasp.upenn.edu>

May 16-19, 2010  
IEEE 71st Vehicular Technology Conference: VTC2010-Spring  
Taipei, Taiwan  
<http://www.ieeevtc.org/vtc2010spring/>  
Submission due by: 15 October 2009

May 17-21, 2010  
VISAPP-2010 Conference  
Angers, France  
<http://visapp.visigrapp.org/>  
Submission due by: November 22, 2009

June 13-18, 2010

Computer Vision and Pattern Recognition: CVPR 2010

Hyatt Regency, San Francisco, California

<http://cvl.umiacs.umd.edu/conferences/cvpr2010/>

Submission due by: November 19, 2009

July 4-7, 2010

ISIE 2010 - IEEE International Symposium on Industrial Electronics

Bari, Italy

<http://www.isie2010.it/>

Submission due by: October 16, 2010

August 1-4, 2010

National Rural ITS Conference

Seaside, OR, USA

<http://www.nritsconference.org>

Submission due by: February 1, 2010

September 6-8, 2010

7th Symposium on Intelligent Autonomous Vehicles

Lecce, Italy

<http://iav2010.unile.it/>

Submission due by: December 14, 2009

September 8-10, 2010

2010 IEEE Multi-Conference on Systems and Control

Yokohama, a port city on Tokyo Bay, Japan

<http://www.mei.titech.ac.jp/msc10/>

Submission due by: October 15, 2009

October 25-29, 2010

17th World Congress on ITS

Busan, South Korea

<http://www.itsworldcongress.kr>

Submission due by: January 2010

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## Announcements

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### The Keys to Success in Transportation Systems are Networks and Information

Ever increasing mobility is a Mega-trend rapidly changing our world. The **IEEE Intelligent Transportation Systems Society** is the community that shapes the technology behind it.

Our conferences are the meeting places for professionals in ITS. ITSS technical board members from industry and academia advance new technologies. The Transactions, Magazine, and Newsletter are the outstanding sources of information in ITS. Last not least IEEE ITSS promotes the Career of young as well as experienced engineers in ITS through its various programmes. **Be part of the Community!**



Join the IEEE Intelligent Transportation Systems Society  
[www.ieee.org/itss](http://www.ieee.org/itss)



# 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

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>▪ Ground, Air, and Water Transportation Systems</li> <li>▪ Information Management (Databases, Data Fusion)</li> <li>▪ Sensors (Infrastructure and Vehicle-Based)</li> <li>▪ Sensor Data Processing (Video, Radar, Lidar, etc.)</li> <li>▪ Human-Machine Interfaces</li> <li>▪ Communication (v2v, v2i)</li> <li>▪ Social, Economic, and Ecologic impact</li> </ul> | <ul style="list-style-type: none"> <li>▪ Field Studies &amp; Implementation Reports</li> <li>▪ Control (Traffic and Vehicle)</li> <li>▪ Decision Systems</li> <li>▪ Simulation</li> <li>▪ Reliability and Safety</li> <li>▪ Standards &amp; Public Policies</li> <li>▪ Technology Forecast &amp; Transfer</li> </ul> |
|---|--|

## Paper Submission

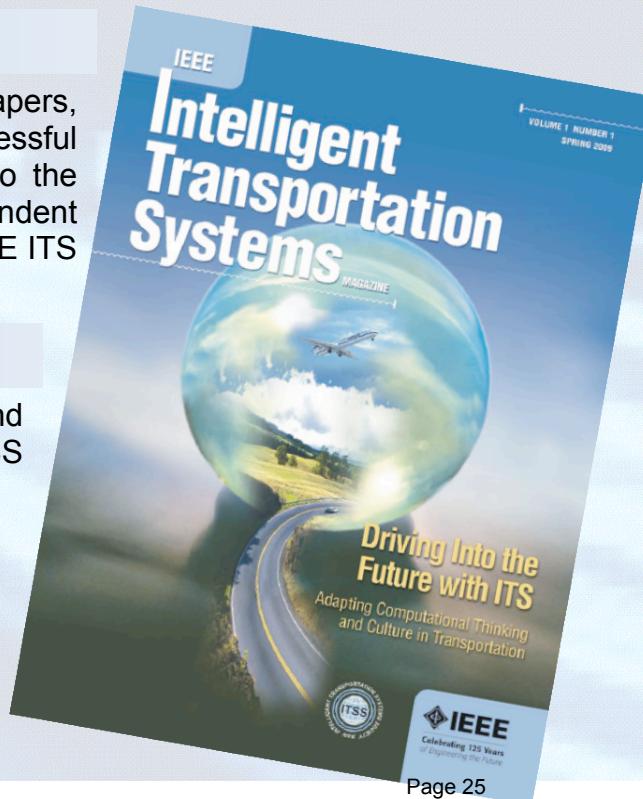
Authors may submit Regular or Short Technical Papers, Tutorials, Surveys, Technology Reviews, Reports on Successful Implementations, Policy, or Educational Issues, directly to the Editor-in-Chief. Papers will be reviewed by independent reviewers and accepted papers will be published in the IEEE ITS Magazine.

## 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.ieee.org/itss](http://www.ieee.org/itss)

## Editor-inChief

Papers shall be submitted directly to the Editor-in-Chief:  
 Christoph Stiller, Institut für Mess- und Regelungstechnik,  
 Universität Karlsruhe (TH), 76131 Karlsruhe, Germany;  
 email: [stiller@mrt.uka.de](mailto:stiller@mrt.uka.de)





## IEEE Kiyo Tomiyasu Technical Field Award

***Do you know of an outstanding engineer/scientist who is making significant contributions to the state of the art?***

If so, you should think about nominating him/her for the IEEE Kiyo Tomiyasu Technical Field Award.

The IEEE Kiyo Tomiyasu Award was established in 2001 for outstanding early to midcareer contributions to technologies holding the promise of innovative applications. It may be awarded to an individual, or a team of not more than three, within 15 years of their highest academic degree and not more than age 45 at the time of the nomination, to any areas of IEEE interest that promise innovative applications.



If the award is presented to a team, these restrictions will apply to all. The recipient of the IEEE Kiyo Tomiyasu Award will receive a bronze medal, a certificate, and a US\$10,000 honorarium.

Selection Criteria include: (a) innovation or development, (b) social value and impact, (c) uniqueness of concept, (d) other technical accomplishments, and (d) the quality of the nomination.

We are looking for nominations of people from all branches and technical specialties in industry and academia. Please pass this information along to anyone whom you think may know a potential candidate.

Information on this award, past recipients, and nomination forms may be found on the IEEE Awards web site at:

<http://www.ieee.org/about/awards/sums/tomiyasu.html>

**The nomination deadline is 31 January every year.**

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## **Board of Governors Election**

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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 to be the Society's past, past president. This year, the chair was Charles Herget who was president in 2005. The other members are chosen by the chair with the approval of the BoG.

The members of this year's Nominations Committee were as follows.

Charles Herget, Chair  
Past President, IEEE ITS Society (2005)  
Alameda, California, USA

Mark Brackstone  
Egis Mobilite Ltd.  
London, UK

James Misener  
California PATH, University of California  
Berkeley, California, USA

Sergiu Nedevschi  
Technical University of Cluj-Napoca  
Cluj-Napoca, Romania

The committee nominated nine candidates for the five positions to be elected. The election will be conducted by IEEE. Members of IEEE will receive ballots. The schedule for the election follows.

eNotice to Members:	12 November 2009
Elec Starts/Mail Date:	17 November 2009
Email Reminders:	3 December 2009 & 21 December 2009
Election Ends:	29 December 2009
Announcement of Results:	5 January 2010

Brief biographical sketches of each of the candidates follow.

**Tankut Acarman** received the B.Sc. degree in electrical engineering and the M.Sc. degree in computer and control engineering in 1993 and 1996 from İstanbul Technical University (İstanbul, Turkey), and the Ph.D. degree in electrical engineering from the Ohio State University, (Columbus, USA) in 2002. He joined Galatasaray University, computer engineering department in 2003 as an assistant professor, and since 2009 he has been the vice director of Institute of Science.



His research interests lie along all aspects of Intelligent Vehicle Technologies, driver assistance systems, autonom systems with special attention into modeling and control. He was a faculty member of a potential center for network of excellence funded by EU-FP6. He has served as an expert in various projects, e.g. a national project aiming to reduce traffic accidents by improving driving and driver prudence through signal processing and advanced information technologies, control strategies development for hybrid electric vehicle technologies and deployment of new driver assistance systems in cooperation with R&D departments of automotive companies in Turkey.

He was a finance chair and associate editor of IEEE Intelligent Vehicle symposium in 2007, publication chair of IEEE International Conference on Vehicular Electronics and Safety, and IEEE First Vehicular Network Conference in 2008 and 2009, respectively. He has been an associate editor of the Intelligent Vehicle symposium in 2008, IFAC symposium on Control in Transportation Systems in 2009. He has been a vice chair candidate of IFAC Transportation systems committee in 2009.

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**Arnaud de La Fortelle** is both director of the Mines ParisTech robotics lab (CAOR) and of the Joint Research Unit LaRA (Mines ParisTech and INRIA). He has a Ph.D. in Applied Mathematics and engineer degrees for the French Ecole Polytechnique and Ecole des Ponts et Chaussées. After his studies he got a position as civil servant at the French Transports Ministry who sent him in research labs (INRIA and today Mines Paris-Tech).



During his PhD he analyzed asymptotic behavior of stochastic systems (large deviations theory) with particular focus on telecom and transport. Then he used his modeling skills in the ITS domain with a particular focus on cyberspace. After taking responsibilities at the IMARA team, he was more involved in project management and continues to study stochastic systems, fully automated vehicles and communication. He managed for LaRA several French and European projects (Puvame, Prevent/Intersafe, REACT, COM2REACT...) and is currently coordinator of the European project GeoNet and of the French project AROS.

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**Toshio Fukuda** received the B.A. degree from Waseda University, Tokyo, Japan, in 1971, and the M.S and Dr. Eng. from the University of Tokyo, Tokyo, Japan, in 1973 and 1977, respectively.

In 1977, he joined the National Mechanical Engineering Laboratory. In 1982, he joined the Science University of Tokyo, Japan, and then joined Nagoya University, Nagoya, Japan, in 1989. Currently, he is Professor of Department of Micro-Nano Systems Engineering at Nagoya University, where he is mainly involved in the research fields of intelligent robotic and mechatronic system, cellular robotic system, and micro- and nano-robotic system.



Dr. Fukuda was President of IEEE Robotics and Automation Society (1998-1999), Director of the IEEE Division X, Systems and Control (2001-2002), and Editor-in-Chief of IEEE / ASME Transactions on Mechatronics (2000-2002). He was President of IEEE Nanotechnology Council (2002-2003, 2005) and President of SOFT (Japan Society for Fuzzy Theory and Intelligent Informatics) (2003-2005). He was elected as a member of Science Council of Japan (2008-). He received the IEEE Eugene Mittelmann Award (1997), IEEE Millennium Medal (2000), IEEE Robotics and Automation Pioneer Award (2004), IEEE Robotics and Automation Society Distinguished Service Award (2005), Award from Ministry of Education and Science in Japan (2005), IEEE Nanotechnology Council Distinguished service award (2007), Best Googol Application paper awards from IEEE Trans. Automation Science and Engineering (2007), Best papers awards from RSJ (2004) and SICE (2007), Special Funai Award from JSME (2008), 2009 George Saridis Leadership Award in Robotics and Automation (2009), IEEE Fellow (1995), SICE Fellow (1995), JSME Fellow (2001), RSJ Fellow (2004).

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**Katsushi Ikeuchi** received B.E. degree from Kyoto University in 1973 and the Ph.D. from the University of Tokyo in 1978. After working at MIT AI Laboratory for three years, ETL for five years, and CMU Robotics Institute for ten years, he joined the University of Tokyo in 1996, and is currently a full professor. His research interest spans computer vision, robotics, computer graphics, and Intelligent Transportation Systems. In these research fields, he has received several awards, including the David Marr Prize in computational vision for the paper "shape from interreflection," and IEEE R&A K-S Fu memorial best transaction paper award for the paper "Toward Automatic Robot Instruction from Perception -- Mapping Human Grasps to Manipulator Grasps." In addition, in 1992, his paper, "Numerical Shape from Shading and Occluding Boundaries," was selected as one of the most influential papers to have appeared in Artificial Intelligence Journal within the past ten years. His IEEE activities include General Chair, IROS75, ITSC00, IV01; Program Chair, CVPR76, ICCV03; Associate Editor, 1992-95, IEEE Trans. R&A, IEEE Trans. PAMI. He is Editor-in-Chief of International Journal of Computer Vision, and Asia-Pacific Regional Program director of ITSW03. Dr. Ikeuchi was elected to IEEE Fellow in 1998.



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**Lefei Li** (Member 2006) is an assistant 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. His current research interests include Transit Signal Priority System, Transfer Coordination in Public Transportation, and Artificial Transportation System.

After joining Tsinghua University as a faculty member three 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 and artificial logistics system for disaster relief.

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.

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. He also serves as the guest editor for a special issue of ITS magazine.

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**Satoshi (Sam) Oyama** (Member 1972) is Senior Manager of Road Transport Systems Dept., Total Solutions Div., Hitachi, Ltd., Tokyo, Japan. He is a graduate of Department of Electrical Engineering, Training Institute for Engineering Teachers, Tohoku University, Sendai, Japan in 1969. He joined Yagi Antenna Co., Ltd. in Tokyo.



From 1983 to 1990, he was with Hitachi Sales Corp. of America, New Jersey, U.S.A., and worked for broadcast satellite signal receiving systems and CATV equipments. After his returning to Japan, he has been involving with 5.8GHz Dedicated Short Range Communications (DSRC) standardization activities for several years. DSRC is widely deployed for such as Electronics Toll Collection (ETC) and other ITS applications. His current interests are on Vehicle Safety Communications (VSC) based on inter-vehicle communications, millimeter wave high resolution vehicular radar for ITS applications and Wireless LAN. For many years,

he has been working for ITS radio communications standardization activities in standardization organizations such as ITU-R, IEEE802.11 and ISO. He has been active in IEEE Society conferences and ITS World Congress for many years as session moderator, speaker and reviewer.

From 1999, he has been a delegate of Japan for ITU-R SG5 WP5A. In 2009, he was assigned to Chair of Sub WG2 for ITS radio communications. In Asia-Pacific Region, he was appointed to Chair of ITS Task Group in APT (Asia-Pacific Telecommunity) Wireless Forum (AWF) in 2009. From 1999 to 2009, he served as Leader of Wireless Communications Joint Expert Groups and Rapporteur of ITS Expert Group, APT Standardization Program (ASTAP). In Japan, he has been Chair of DSRC International Working Group, DSRC Expert Group, and Vice Chair of VSC Task Group, ITS Info-Communications Forum, Japan. From December 2006 to March 2009, he was Chair of International Relationship and Architecture Sub Committee, JSafety Committee in ITS Japan. In ISO, he was the expert from Japan for TC204 WG15 for DSRC, and he was Leader of International Harmonization Project, Radio Communications Sub WG, WG15 in Japan.

He received the Achievement Award from ITU Association of Japan in 2006. He is a registered Professional Engineer. He is a member of IEEE, the Institute of Electronics, Information and Communication Engineers (IEICE), Japan and the Institution of Professional Engineers, Japan.

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**Bart van Arem** obtained his Master (1986) and PhD degree (1990) in Applied Mathematics at the University of Twente, the Netherlands. From 1991-2009 he worked at the Netherlands Organization for Applied Scientific Research TNO as a senior researcher and program manager in the field of Intelligent Transport Systems. From 2003-2009 he was also a part-time professor at the University of Twente, the Netherlands. Currently, he is full professor at Delft University of Technology, Civil Engineering and Geosciences. He specializes in modelling the impacts of ITS on driving behaviour and traffic flows characteristics. He has participated in numerous EU funded projects (recently eImpact, SAFESPOT, CVIS) and national research programs such as the Dutch TRANSUMO program. In 2003 he founded the knowledge centre Application of Integrated Driver Assistance of TNO and the University of Twente. He has published a large number of paper in journals and conference proceedings.



He has been a member of the IEEE ITS Society since 2004. He served as Editor-in-Chief of the ITSS Newsletter from 2004-2006, and he served on the Board of Governors of the ITSS Society from 2007-2009. He serves as associate editor at numerous IEEE ITSS sponsored conferences and served as a general chair of the IEEE Intelligent Vehicles Symposium in 2008, Eindhoven, the Netherlands.

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**Sergio A Velastin** received his BSc degree in Electronics, MSc by Research and PhD from the University of Manchester, UK in 1978, 1979 and 1981 respectively. His doctoral thesis was on the use of image processing techniques for tracking pedestrians and vehicles. After post-doctoral work on intelligent robotics at the University of Surrey (UK) he became Professor and Director of the Institute of Informatics at the Universidad Austral de Chile, followed by a senior systems engineer position in industry developing vehicle location and navigation systems for fleet control. In 1990 he joined the faculty of the Department of Electronic Engineering at King's College London where he set up the Vision Research Laboratory. Together with colleagues in the Transport Studies Group of University College London, he developed a program of research on the use of computer vision techniques to effect improvements in safety and security in public transportation networks. In 2001 he and his team moved to the Digital Imaging Research Centre (DIRC) at Kingston University London where Dr Velastin is currently its Director. DIRC is one of the largest computer vision groups in the UK and Europe. He and his team have conducted key work in UK and EU-funded research projects such as CROMATICA, PRISMATICA (Technical Coordinator of a 16-partner project including London Underground, Brussels Metro, Paris Public Transport Authority, etc.), ADVISOR and CARETAKER as well as industrially-funded research such as "Making Effective Use of CCTV in the Railways (Railway Safety and Standards Board) and "Intelligent Pedestrian Surveillance System for Public Transport in Rome" (funded by ATAC, Rome's Transport and Mobility Authority). He has served in an international panel of experts for defining a European roadmap for Intelligent Transport Systems. He conceived, organized and chaired successive international symposia on visual surveillance systems (IDSS-03, IDSS-04, ICDP-05, ICDP-06, ICDP-09) and represent his university as a member of the International Union of Public Transport (UITP). He is currently working with Transport for London on using advanced computer vision to detect, classify and track urban road users to improve management and safety. He is co-editor of a book on Intelligent Distributed Surveillance Systems and has published extensively on computer vision and transport applications. He is a member of the IEEE (ITS, Computer and SMC Societies) and the IET (UK).



Position statement: What is really exciting about ITS is that it is ultimately about people, quality of life and good use of resources and the environment. This fosters collaboration and a multi-disciplinary approach where technology is understood in the context of addressing the needs of a range of stakeholders. If elected to the Board of Governors of the IEEE ITS, he will do his best to champion the appropriate use of ITS in addressing short and long-term challenges facing us all. He will use his experience and motivation to bring together different disciplines, practitioners, academics and end-users, for which IEEE-ITS is ideally placed to take a leading role to bridge scientific rigor with professional practice and societal aspirations.

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**Wei-Bin Zhang** is a Research Engineer at the California PATH Program, Institute of Transportation Studies of University of California at Berkeley (UCB). He has played various project and program management roles at PATH. Mr. Zhang is also an Advisory Professor of Beijing Jiaotong University.



Between 1982 and 1987, Mr. Zhang was a Lecturer at Northern Jiaotong University (now Beijing Jiaotong University) and was involved in the development of railway computer interlocking systems. In 1987, Mr. Zhang joined the Institute of Transportation Studies and participated in the early founding of the California PATH Program. For the past 22 years, Mr. Zhang has been leading and conducting research in various areas of Intelligent Transportation Systems (ITS), including Advanced Vehicle Control and Safety Systems (AVCSS), Advanced Traffic and Traveler Information Systems (ATIS) and Advanced Public Transportation Systems (APTS). Between 1987 and 1994, his primary research focus was in electronic vehicle guidance technologies. Among the research results, he developed the concept of magnetic guidance system, which has been later adopted for various applications worldwide. Between 1994 and 1995, he was the Technical Director of National Automated Highway Systems Consortium (NAHSC), a \$210M national program led by the U.S. Department of Transportation and General Motors. His primary responsibility was to provide direction and oversee the technical activities of the overall NAHSC program. Between 1996 and 1997, Mr. Zhang managed the development of the prototype platoon Automated Highway System (AHS) and showcased in Demo '97, a Congress-mandated national technical feasibility demonstration of AHS. Since 1997, Mr. Zhang worked with California Department of Transportation, US DOT and local transportation agencies to establish a number of research and deployment programs in California, including guidance for highway winter maintenance vehicles, Bus Rapid Transit, Transit collision warning systems (IVI), rail grade crossing research, Integrated Corridor Management (ICM), transit Vehicle Assist and Automation (VAA), Intersection Signal Adaptation (TSA) and field operational tests of Connected Traveler multi-modal traveler information system. He has published over 70 refereed papers and reports in the areas of automated vehicle control, advanced transit and traffic technologies and ITS systems issues.

Mr. Zhang He is a member of IEEE and TRB. He has served on various Technical and program committees for TRB, ITSC and APTA. He also serves as a technical reviewer for various journal and technical publications and conferences under IEEE and other societies. Mr. Zhang was a member of ITS America International Council and the Chair for ITSA's China Committee. He was a founder for North America Chinese Transportation Association (NOCOTA), the board member and Vice President of NACOTA. He was the board member of International Chinese Professional Association (ICTPA) and President of Northern California Chapter. He was also a founding member of Society of Chinese American Professors and Scientists (CoCAPS).

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## IEEE Transactions on ITS Abstracts

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### Abstracts of Papers

IEEE Transactions on Intelligent Transportation Systems  
Volume 10, No. 3, September 2009

Nedevschi, S.; Bota, S.; Tomiuc, C., "Stereo-Based Pedestrian Detection for Collision-Avoidance Applications," pp.380-391.

**Abstract:** Pedestrians are the most vulnerable participants in urban traffic. The first step toward protecting pedestrians is to reliably detect them. We present a new approach for standing- and walking-pedestrian detection, in urban traffic conditions, using grayscale stereo cameras mounted on board a vehicle. Our system uses pattern matching and motion for pedestrian detection. Both 2-D image intensity information and 3-D dense stereo information are used for classification. The 3-D data are used for effective pedestrian hypothesis generation, scale and depth estimation, and 2-D model selection. The scaled models are matched against the selected hypothesis using high-performance matching, based on the Chamfer distance. Kalman filtering is used to track detected pedestrians. A subsequent validation, based on the motion field's variance and periodicity of tracked walking pedestrians, is used to eliminate false positives.

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Courbon, J.; Mezouar, Y.; Martinet, P., "Autonomous Navigation of Vehicles from a Visual Memory Using a Generic Camera Model," pp.392-402.

**Abstract:** In this paper, we present a complete framework for autonomous vehicle navigation using a single camera and natural landmarks. When navigating in an unknown environment for the first time, usual behavior consists of memorizing some key views along the performed path to use these references as checkpoints for future navigation missions. The navigation framework for the wheeled vehicles presented in this paper is based on this assumption. During a human-guided learning step, the vehicle performs paths that are sampled and stored as a set of ordered key images, as acquired by an embedded camera. The visual paths are topologically organized, providing a visual memory of the environment. Given an image of the visual memory as a target, the vehicle navigation mission is defined as a concatenation of visual path subsets called visual routes. When autonomously running, the control guides the vehicle along the reference visual route without explicitly planning any trajectory. The control consists of a vision-based control law that is adapted to the nonholonomic constraint. Our navigation framework has been designed for a generic class of cameras (including conventional, catadioptric, and fish-eye cameras). Experiments with an urban electric vehicle navigating in an outdoor environment have been carried out with a fisheye camera along a 750-m-long trajectory. Results validate our approach.

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Fraichard, T.; Laugier, C.; Vasquez, D., "Incremental Learning of Statistical Motion Patterns With Growing Hidden Markov Models," pp.403-416.

**Abstract:** Modeling and predicting human and vehicle motion is an active research domain. Due to the difficulty of modeling the various factors that determine motion (e.g., internal state and perception), this is often tackled by applying machine learning techniques to build a statistical model, using as input a collection of trajectories gathered through a sensor (e.g., camera and laser scanner), and then using that model to predict further motion. Unfortunately, most current techniques use offline learning algorithms, meaning that they are not able to learn new motion patterns once the learning stage has finished. In this paper, we present an approach where motion patterns can be learned incrementally and in parallel with prediction. Our work is based on a novel extension to hidden Markov models (HMMs) - called growing hidden Markov models - which gives us the ability to incrementally learn both the parameters and the structure of the model.

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Porikli, F.; Davis, L.; Hussein, M., "A Comprehensive Evaluation Framework and a Comparative Study for Human Detectors," pp.417-427.

**Abstract:** We introduce a framework for evaluating human detectors that considers the practical application of a detector on a full image using multisize sliding-window scanning. We produce detection error tradeoff (DET) curves relating the miss detection rate and the false-alarm rate computed by deploying the detector on cropped windows and whole images, using, in the latter, either image resize or feature resize. Plots for cascade classifiers are generated based on confidence scores instead of on variation of the number of layers. To assess a method's overall performance on a given test, we use the average log miss rate (ALMR) as an aggregate performance score. To analyze the significance of the obtained results, we conduct 10-fold cross-validation experiments. We applied our evaluation framework to two state-of-the-art cascade-based detectors on the standard INRIA person dataset and a local dataset of near-infrared images. We used our evaluation framework to study the differences between the two detectors on the two datasets with different evaluation methods. Our results show the utility of our framework. They also suggest that the descriptors used to represent features and the training window size are more important in predicting the detection performance than the nature of the imaging process, and that the choice between resizing images or features can have serious consequences.

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Burgard, W.; Grisetti, G.; Stachniss, C., "Nonlinear Constraint Network Optimization for Efficient Map Learning," pp.428-439.

**Abstract:** Learning models of the environment is one of the fundamental tasks of mobile robots since maps are needed for a wide range of robotic applications, such as navigation and transportation tasks, service robotic applications, and several others. In the past, numerous efficient approaches to map learning have been proposed. Most of them, however, assume that the robot lives on a plane. In this paper, we present a highly efficient maximum-likelihood approach that

is able to solve 3-D and 2-D problems. Our approach addresses the so-called graph-based formulation of simultaneous localization and mapping (SLAM) and can be seen as an extension of Olson's algorithm toward non-flat environments. It applies a novel parameterization of the nodes of the graph that significantly improves the performance of the algorithm and can cope with arbitrary network topologies. The latter allows us to bound the complexity of the algorithm to the size of the mapped area and not to the length of the trajectory. Furthermore, our approach is able to appropriately distribute the roll, pitch, and yaw error over a sequence of poses in 3-D mapping problems. We implemented our technique and compared it with multiple other graph-based SLAM solutions. As we demonstrate in simulated and real-world experiments, our method converges faster than the other approaches and yields accurate maps of the environment.

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Bergasa, L.M.; Lopez, M.E.; Ocana, M.; Barea, R.; Schleicher, D., "Real-Time Hierarchical Outdoor SLAM Based on Stereovision and GPS Fusion," pp.440-452.

**Abstract:** This paper presents a new real-time hierarchical (topological/metric) simultaneous localization and mapping (SLAM) system. It can be applied to the robust localization of a vehicle in large-scale outdoor urban environments, improving the current vehicle navigation systems, most of which are only based on Global Positioning System (GPS). Then, it can be used on autonomous vehicle guidance with recurrent trajectories (bus journeys, theme park internal journeys, etc.). It is exclusively based on the information provided by both a low-cost, wide-angle stereo camera and a low-cost GPS. Our approach divides the whole map into local submaps identified by the so-called fingerprints (vehicle poses). In this submap level (low-level SLAM), a metric approach is carried out. There, a 3-D sequential mapping of visual natural landmarks and the vehicle location/orientation are obtained using a top-down Bayesian method to model the dynamic behavior. GPS measurements are integrated within this low-level improving vehicle positioning. A higher topological level (high-level SLAM) based on fingerprints and the multilevel relaxation (MLR) algorithm has been added to reduce the global error within the map, keeping real-time constraints. This level provides nearly consistent estimation, keeping a small degradation with GPS unavailability. Some experimental results for large-scale outdoor urban environments are presented, showing an almost constant processing time.

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Doshi, A.; Trivedi, M.M., "On the Roles of Eye Gaze and Head Dynamics in Predicting Driver's Intent to Change Lanes," pp.453-462.

**Abstract:** Driver behavioral cues may present a rich source of information and feedback for future intelligent advanced driver-assistance systems (ADASs). With the design of a simple and robust ADAS in mind, we are interested in determining the most important driver cues for distinguishing driver intent. Eye gaze may provide a more accurate proxy than head movement for determining driver attention, whereas the measurement of head motion is less cumbersome and more reliable in harsh driving conditions. We use a lane-change intent-prediction system (McCall et al., 2007) to determine the relative usefulness of each cue for determining intent.

Various combinations of input data are presented to a discriminative classifier, which is trained to output a prediction of probable lane-change maneuver at a particular point in the future. Quantitative results from a naturalistic driving study are presented and show that head motion, when combined with lane position and vehicle dynamics, is a reliable cue for lane-change intent prediction. The addition of eye gaze does not improve performance as much as simpler head dynamics cues. The advantage of head data over eye data is shown to be statistically significant ( $p < 0.01$ ) 3 s ahead of lane-change situations, indicating that there may be a biological basis for head motion to begin earlier than eye motion during "lane-change"-related gaze shifts.

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Hui Fang; Chunxiang Wang; Ming Yang; Ruqing Yang, "Ground-Texture-Based Localization for Intelligent Vehicles," pp.463-468.

**Abstract:** Localization is a critical problem in the research of intelligent vehicles. Although it can be achieved by using a real-time kinematic global positioning system (RTK-GPS, or fused with other methods such as dead reckoning), it may be unfeasible if every vehicle has to be equipped with such an expensive sensor. This paper proposes a ground-texture-based map-matching approach to address the localization problem. To reduce the effect of complicated illumination in outdoor environments, a camera is fixed downward at the bottom of a vehicle, and controllable lights are also equipped around the camera for consistent illumination. The proposed approach includes two steps: 1) mapping and 2) localization. RTK-GPS is only used in the mapping, and other sensor data from camera and odometry are captured with time stamps to create a global ground texture map. A multiple-view registration-based optimization algorithm is applied to improve map accuracy. In the localization step, vehicle pose is estimated by matching the current camera frame with the best submap frame and by fusion strategy. Results with both synthetic and real experiments prove the feasibility and effectiveness of the proposed approach.

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Gavilan, M.; Sotelo, M.A.; Alvarez, S.; Parra, I.; Llorca, D.R.; Naranjo, J.E., "An Experimental Study on Pitch Compensation in Pedestrian-Protection Systems for Collision Avoidance and Mitigation," pp.469-474.

**Abstract:** This paper describes an improved stereovision system for the anticipated detection of car-to-pedestrian accidents. An improvement of the previous versions of the pedestrian-detection system is achieved by compensation of the camera's pitch angle, since it results in higher accuracy in the location of the ground plane and more accurate depth measurements. The system has been mounted on two different prototype cars, and several real collision-avoidance and collision-mitigation experiments have been carried out in private circuits using actors and dummies, which represents one of the main contributions of this paper. Collision avoidance is carried out by means of deceleration strategies whenever the accident is avoidable. Likewise, collision mitigation is accomplished by triggering an active hood system.

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Baker, C.; Urmson, C.; Darms, M.S.; Rybski, P.E., "Obstacle Detection and Tracking for the Urban Challenge," pp.475-485.

**Abstract:** This paper describes the obstacle detection and tracking algorithms developed for Boss, which is Carnegie Mellon University's winning entry in the 2007 DARPA Urban Challenge. We describe the tracking subsystem and show how it functions in the context of the larger perception system. The tracking subsystem gives the robot the ability to understand complex scenarios of urban driving to safely operate in the proximity of other vehicles. The tracking system fuses sensor data from more than a dozen sensors with additional information about the environment to generate a coherent situational model. A novel multiple-model approach is used to track the objects based on the quality of the sensor data. Finally, the architecture of the tracking subsystem explicitly

Abstracts each of the levels of processing. The subsystem can easily be extended by adding new sensors and validation algorithms.

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Murali, N.V.; Chandramouli, C.; Agarwal, V., "A Cost-Effective Ultrasonic Sensor-Based Driver-Assistance System for Congested Traffic Conditions," vol.10, no.3, pp.486-498.

**Abstract:** In urban areas, congested traffic results in a large number of accidents at low speeds. This paper describes an accurate and fast driver-assistance system (DAS) that detects obstacles and warns the driver in advance of possible collisions in such a congested traffic environment. A laboratory prototype of the system is built and tested by simulating different weather conditions in the laboratory. The proposed DAS is also suitable as a parking-assistance system. Ultrasonic sensors are used to detect obstacles in this paper because they have several advantages over other types of sensors in short-range object detection. Multiple sensors are needed to get a full-field view because of the limited lateral detectable range of ultrasonic sensors. Furthermore, crosstalk is a common problem when multiple ultrasonic sensors are used. A simple microcontroller-based method to reduce crosstalk between sensors is described, which is achieved by firing each transducer by a pseudorandom number of pulses so that the echo of each transducer can uniquely be identified. Existing DASs need more time to reliably detect the objects, making them unsuitable for DASs, where time is a critical factor. A method to reduce the obstacle detection time of the system is also proposed. The cost of this high-performance system is expected to be very reasonable. All the practical implementation details are included. Extensive experimentation has been carried out, and the results confirm the speed and reliability of the presented system.

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Yikai Chen; Qing-Jie Kong; Yuncai Liu; Zhipeng Li, "An Approach to Urban Traffic State Estimation by Fusing Multisource Information," pp.499-511.

**Abstract:** This paper presents an information-fusion-based approach to the estimation of urban traffic states. The approach can fuse online data from underground loop detectors and global

positioning system (GPS)-equipped probe vehicles to more accurately and completely obtain traffic state estimation than using either of them alone. In this approach, three parts of the algorithms are developed for fusion computing and the data processing of loop detectors and GPS probe vehicles. First, a fusion algorithm, which integrates the federated Kalman filter and evidence theory (ET), is proposed to prepare a robust, credible, and extensible fusion platform for the fusion of multisensor data. After that, a novel algorithm based on the traffic wave theory is employed to estimate the link mean speed using single-loop detectors buried at the end of links. With the GPS data, a series of technologies are combined with the geographic information systems for transportation (GIS-T) map to compute another link mean speed. These two speeds are taken as the inputs of the proposed fusion platform. Finally, tests on the accuracy, conflict resistance, robustness, and operation speed by real-world traffic data illustrate that the proposed approach can well be used in urban traffic applications on a large scale.

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Li Qu; Jianming Hu; Li Li; Yi Zhang, "PPCA-Based Missing Data Imputation for Traffic Flow Volume: A Systematical Approach," pp.512-522.

**Abstract:** The missing data problem greatly affects traffic analysis. In this paper, we put forward a new reliable method called probabilistic principal component analysis (PPCA) to impute the missing flow volume data based on historical data mining. First, we review the current missing data-imputation method and why it may fail to yield acceptable results in many traffic flow applications. Second, we examine the statistical properties of traffic flow volume time series. We show that the fluctuations of traffic flow are Gaussian type and that principal component analysis (PCA) can be used to retrieve the features of traffic flow. Third, we discuss how to use a robust PCA to filter out the abnormal traffic flow data that disturb the imputation process. Finally, we recall the theories of PPCA/Bayesian PCA-based imputation algorithms and compare their performance with some conventional methods, including the nearest/mean historical imputation methods and the local interpolation/regression methods. The experiments prove that the PPCA method provides significantly better performance than the conventional methods, reducing the root-mean-square imputation error by at least 25%.

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Schouten, H.E.; Nijmeijer, H.; Ploeg, J., "Position Control of a Wheeled Mobile Robot Including Tire Behavior," pp.523-533.

**Abstract:** Advanced driver assistance systems are increasingly available on road vehicles. These systems require a thorough development procedure, an important part of which consists of hardware-in-the-loop experiments in a controlled environment. To this end, a facility called vehicle hardware-in-the-loop (VeHIL) is operated, aiming at testing the entire road vehicle in an artificial environment. In VeHIL, the test vehicle is placed on a roller bench, whereas other traffic participants, i.e., vehicles in the direct neighborhood of the test vehicle, are simulated using wheeled mobile robots (WMRs). To achieve a high degree of experiment reproducibility, focus is put on the design of an accurate position control system for the robots. Due to the required types of maneuvers, these robots have independently driven and steered wheels. Consequently,

the robot is overactuated. Furthermore, since the robot is capable of high-dynamic maneuvers, slip effects caused by the tires can play an important role. A position controller based on feed-back linearization is presented, using the so-called multicycle approach, which regards the robot as a set of identical unicycles. As a result, the WMR is position controlled, whereas each unicycle is controlled, taking weight transfer and longitudinal and lateral tire slip into account.

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Hongbin Zha; Xiaowei Shao; Huijing Zhao; Jinshi Cui; Chiba, M.; Shibasaki, R., "A Laser-Scanner-Based Approach Toward Driving Safety and Traffic Data Collection," vol.10, no.3, pp.534-546.

**Abstract:** This work is motivated by the following two potential applications: 1) enhancing driving safety and 2) collecting traffic data in a large dynamic urban environment. A laser-scanner-based approach is proposed. The problem is formulated as a simultaneous localization and mapping (SLAM) with object tracking and classification, where the focus is on managing a mixture of data from both dynamic and static objects in a highly dynamic environment. A trajectory-oriented closure is also proposed using the sporadically available global positioning system (GPS) measurements in urban areas to assist for global accuracy, particularly when the vehicle makes a noncyclical measurement in a large outdoor environment. Experiments are conducted using the data that were collected along a course near 4.5 km in a highly dynamic environment. Possibilities of the approaches toward the two potential applications are demonstrated, and avenues for future works are discussed.

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Chiew, K.; Shaowen Qin, "Scheduling and Routing of AMOs in an Intelligent Transport System," vol.10, no.3, pp.547-552.

**Abstract:** Autonomous moving objects (AMOs), such as automated guided vehicles (AGVs) and autonomous robots, have widely been used in the industry for decades. In an intelligent transport system with a great number of AMOs involved, it is important to eliminate potential congestion and deadlocks among AMOs to maintain a well-organized traffic flow. In this paper, we propose an algorithm that adapts bitonic merge sort algorithm for concurrent scheduling and routing of a great number (i.e.,  $4n^2$ ) of AMOs on an ntimesn mesh topology of path network without congestion or deadlocks among AMOs during their moves. The results are tested by experiments with randomly generated data and the comparison of a related model.

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## **IEEE Intelligent Transportation Systems Magazine**

### **Abstracts**

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#### **Abstracts of Papers**

IEEE Intelligent Transportation Systems Magazine  
Volume 1, No. 2, Summer 2009

Stiller, C., "Editor's Column," p. 2.

**Abstract:** While most industrialized countries experience substantial economical turbulences these days, we witness some emerging countries that seem to withstand such negative trends. In this context many hopes are focused on China whose economical and industrial growth continues at a fast pace. Like few other countries, China's further development will have large impact on the ecology, economy, and the political situation on our planet.

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Scherer, W.T.; Herget, C., "ITSS initiative for an IEEE forum on integrated and sustainable transportation systems [President's Message]," pp.3-4.

**Abstract:** This president's message has been written by your Society's current president, William Scherer, and a past president (2005), Charles Herget. We would like to tell you about a project we have planned with four other societies in IEEE. We are currently planning an international event we are calling the IEEE Forum on Integrated and Sustainable Transportation Systems that will be held in Vienna, Austria, in 2011. Five societies from IEEE are participating in the organization: Aerospace and Electronics Systems (AES), Oceanic Engineering Society (OES), Intelligent Transportation Systems Society (ITSS), Professional Communications Society (PCS), and Vehicular Technology Society (VTS).

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Li, L., Tang, S. "Introduction to special issue by guest editors," p.5.

**Abstract:** The five articles in this special issue focus on the promising research in intelligent transportation systems being conducted in China.

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Li, R.; Jia, L., "On the layout of fixed urban traffic detectors: an application study," pp.6-12.

**Abstract:** One of the basic functions of Intelligent Transportation System is to collect traffic data through detectors. Thus, the layout of traffic detectors on the urban road system is important for the development of Intelligent Transportation System. With the urgent demand for real-

time traffic information, a high-density layout of detectors has been adopted resulting in huge investment. Based on the real demand for the construction of an urban traffic flow detector system, a set of principles for the layout of traffic detectors are proposed, which could be easily carried out to determine the densities and positions of the detectors in practical applications. An applicant example of these principles is also given to explain the whole process in detail, including the method to choose the areas, roads, links and positions for detector installation.

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Huang, L.; Wu, J., "Cyclists' path planning behavioral model at unsignalized mixed traffic intersections in China," pp.13-19.

**Abstract:** Study on the cyclist's path planning behavior in mixed traffic flow intersection is very important. The paper presents a fuzzy logic based behavior model to describe cyclist path planning behaviors at unsignalized intersections in mixed traffic flow situations (with many conflicts among motorcars, non-motor vehicles and pedestrians). Field data have been collected for fuzzy logic modeling, model calibration and validation, and the simulation results are promising. The model can be used in mixed traffic flow simulation and path planning models for Personal Mobility Vehicles (PMVs).

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Li, Q.; Zeng, Z.; Yang, B., "Hierarchical model of road network for route planning in vehicle navigation systems," pp.20-24.

**Abstract:** Road network is a fundamental part of route planning in vehicle navigation systems. In this paper two aspects are considered for hierarchical model of road networks, which are data model and graph model. The former aims to present a hierarchical road network in vehicle navigation systems. The latter model constructs a multi-level graph according to the hierarchy traits of road network. Based on these two aspects, a road network can be better organized for route planning of vehicle navigation systems.

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Yao, D.; Zhang, Y.; Li, L.; Su, Y.; Cheng, S.; Xu, W., "Behavior modeling and simulation for conflicts in vehicles-bicycles mixed flow," pp.25-30.

**Abstract:** Great changes are taking place in Chinese economic and societal life during the last decade, which brings significantly increasing pressure to the transportation systems of most Chinese cities. For example, in Beijing, vehicles (the number of which grew threefold, 890k in 1995 to 2580k in 2005) are now fiercely competing for the right of roads with the existing large amount of bicycles. Because many streets in Beijing are not fully channelized to separate vehicles and bicycles (e.g. see Fig. 1), such competition leads to notable growth of traffic accidents and decline of traffic efficiency. This important matter has attracted growing research interests recently. On the other side, in order to deal with the energy crisis, many localities in some de-

veloped countries are encouraging people to use bicycles or rollers for trips. How this new trip mode affects the city traffic flow also needs careful investigations.

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Zhao, H.; Cui, J.; Zha, H.; Katabira, K.; Shao, X.; Shibasaki, R., "Sensing an intersection using a network of laser scanners and video cameras," pp.31-37.

**Abstract:** In this research, a novel system for monitoring an intersection using a network of single-row laser range scanners (subsequently abbreviated as "laser scanner") and video cameras is proposed. Laser scanners are set on the road side to profile an intersection horizontally from different viewpoints. The contour points of moving objects are captured at a certain horizontal plane with a high scanning rate (e.g., 37 Hz). A laser-based processing algorithm is developed, thus the moving objects entered the intersection are detected and tracked to estimate their state parameters, such as: location, speed, and direction at each time instance. In addition, laser data and processing results are forwarded to an associated video camera, so that a visualization as well as fusion-based processing can be achieved. An experiment in central Beijing is presented, demonstrating that a large quantity of physical dimension and detailed traffic data can be obtained through such a system.

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