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

Society News

From the Editor
by Charles Herget

Earlier this month, I attended the Society’s Intelligent Transportation Systems Conference (ITSC 08) in Beijing, China. This year, two other conferences sponsored by the Society, the 2008 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI 08), and the 2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA 08), were held concurrently with ITSC 08 on a trial basis. If the outcome is deemed successful, the intention is to repeat the concurrent meetings every four years. I think the experiment went well. We will have to wait for the report from the Conference Committee for its evaluation.

A great deal of the material contained in this Newsletter comes from the meetings in Beijing. You will find a report on some activities at the Board of Governors meeting. There are many photographs from the conference and its awards banquet.

In this issue, you will find a report on an award given to Prof. Alberto Broggi’s VisLab in Parma. You will also find statements from the candidates for election to the Board of Governors for a term beginning in 2009 as well as the usual abstracts of papers from the most recent issue of the Society’s Transactions on ITS and the Conference Calendar.
Dear readers,

This will be my last message as Editor-in-Chief of our IEEE Transactions on Intelligent Transportation Systems. Although my term would end at the end of 2009, I have asked to resign and step down as EiC since I have been elected as President-Elect of the IEEE ITS Society.

I have been serving the ITS Society as EiC of our premiere publication for almost 5 years now and have been working hard to promote the Journal and increase its appreciation in our community.

In the last few years we have increased substantially the number of papers and pages published per year (doubled from 2004 to 2007); we have introduced new types of manuscripts and have imposed some more strict limits on the number of pages per paper. Thanks to a very strong Editorial Board (and sometimes to the pressure that I've put on them to deliver reviews and recommendations on time) we have reached a remarkable result in reducing the time from submission to first decision to less than 90 days (on average).

The number of submissions is continuously increasing and in 2008 we reached about 0.67 papers per day, which is much higher than what we originally had in 2004 (0.46 per day). Special Issues, which I tried to limit to one per year (some of them were just converted into Special Sections), have brought a great deal of energy into the journal and have indeed attracted more readers and authors.

The acceptance ratio for our publication is about 24%.

Finally, one of the most important performance indexes used to assess any publication is the Impact Factor; we have made remarkable steps forward since 2004: from 1.104 to 1.689 (in 2007). Our journal is raking higher and higher every year on the IEEE list of publications.

The IEEE Periodical Review in 2008 was smooth and witnessed our performance at the IEEE PSPB level.

Unfortunately not everything went smoothly in these 5 years, particularly this year: on May 27, 2008 we underwent the migration of our peer-review software (ManuscriptCentral) to the new version. This was a compulsory move that has been continuously delayed for many years due to the problems suffered by other Journals in the migration process. Anyway, as I mentioned, this year we migrated; just after the migration, we encountered many problems in the customization of the new site and in the porting of the old data. To cut a long story short, I had to block the
Journal down for more than two months, during which I tried to look for help. Unfortunately, the help I was seeking didn't arrive and I had to resume working with a new system lacking some functionality that the old system had. The handling of the journal then slowed down since it still requires many hand-made interventions on each final recommendation that I send.

Last-but-not-least, I'd like to thank the whole editorial board for their great support and -at the same time- ask for their forgiveness if sometimes I've been putting too much pressure on them. I'm truly indebted with the IEEE staff that have been following our publication, amongst them Stephanie Weidel, Jeff Cichocki, Chris Perry, and Bill Colacchio, who were very responsive to all our problems with administrative issues.

Indeed this journal would have been nothing without the great help that I received from Simona Berte` who has been constantly monitoring the various stages of the composition and production of each issue, and have provided a lot of help to website users and authors throughout the years. I'm happy that she agreed to continue serving as Editorial Assistant to the IEEE Trans on ITS even in the next years, when I will step down as EiC, and will serve the next EiCs as well: I'm sure that her 5+ years long experience will definitely continue boosting the performance of our journal also in the future.

The next EiC will be Prof. Fei-Yue Wang, from the University of Arizona and the Chinese Academy of Sciences, to whom I'm honored to send my best wishes for a great job in consolidating the premiere publication of our scientific society in the worldwide arena.

As I mentioned, I will continue serving the Society in my new capacity as President-Elect in 2009, and then President in the following two years.

Respectfully submitted,
Alberto Broggi

<table>
<thead>
<tr>
<th>Year</th>
<th>Submissions (papers/day)</th>
<th>Page budget</th>
<th>Published papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>167 (0.46)</td>
<td>360</td>
<td>36</td>
</tr>
<tr>
<td>2005</td>
<td>157 (0.43)</td>
<td>480</td>
<td>42</td>
</tr>
<tr>
<td>2006</td>
<td>234 (0.64)</td>
<td>620</td>
<td>49</td>
</tr>
<tr>
<td>2007</td>
<td>205 (0.56)</td>
<td>720</td>
<td>60</td>
</tr>
<tr>
<td>2008</td>
<td><strong>190 in 283 days (0.67)</strong></td>
<td><strong>720</strong></td>
<td><strong>63</strong></td>
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</table>
The Society’s governing body, the Board of Governors (BoG) met in Beijing, China, on October 11, 2008, preceding the Society’s Intelligent Transportation Systems Conference. Some actions that were taken follow.

**Election of Officers**

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

The Board of Governors elected the following individuals to the offices indicated for the term beginning January 1, 2009.

- **President-Elect**: Alberto Broggi
- **VP Financial Activities**: Daniel Dailey
- **VP Technical Activities**: Daniel Zeng
- **VP Administrative Activities**: Sudarshan Chawathe

**Publications**

Alberto Broggi is currently serving his third term which ends December 31, 2009, as Editor-in-Chief (EIC) of the Society’s Transactions. He announced that he would resign as EIC of the Transactions upon assuming the position of president-elect in 2009. Upon resignation by an officer, the Society president appoints someone to fulfill the remainder of the term with the approval of the BoG. Society President William Scherer appointed Fei-Yue Wang to serve the remainder of Broggi’s term, and the BoG approved.

There was discussion about the status of the Society’s new Magazine. The first issue was scheduled to appear in February of this year, but no issues have been published to date. The Vice President for Publication Activities stated that the publication’s staff at IEEE said it was not unusual for new publications to encounter delays during startup. The current EIC of the Magazine is Charles Herget who is also EIC of this Newsletter. He agreed to serve in both positions until a permanent EIC of the Magazine was appointed. The Publications Committee formed a search for an EIC and selected Christoph Stiller to serve in that position effective January 1, 2009. Stiller agreed to serve and his appointment was approved by the BoG.
Conferences

The 11th International IEEE Conference on Intelligent Transportation Systems (ITSC 08)
2008 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI 08)
2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA 08)

This year the Society sponsored three conferences held concurrently in Beijing, China, on October 12-15, 2008: The 11th International IEEE Conference on Intelligent Transportation Systems (ITSC 08), The 2008 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI 08), and The 2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA 08). (Sponsorship of the MESA Conference was shared with ASME, The American Society of Mechanical Engineers.)

This issue of the Newsletter will feature pictures from ITSC 08. Pictures from the other two conferences will appear in future issues of the Newsletter.

ITSC 08 General Chair, Prof. Fei-Yue Wang welcoming the attendees.

Society President and ITSC 08 Program Chair, Prof. William T. Scherer welcoming attendees.

Program Co-Chairs

Dr. Matthew Barth

Dr. Lefei Li

Dr. Urbano Nunes
Keynote Addresses

Trends and Research Directions in Supply Chain & Logistics Engineering

Prof. Chelsea C. White III  
H. Milton Stewart School of Industrial and Systems Engineering  
Georgia Institute of Technology

To Set up A Sustainable Transportation Systems for Beijing 2008 Olympic Games

Dr. Xiaoming Liu  
Director of the Beijing Municipal Committee of Communications  
Beijing Municipal Committee of Transport

The Theory of Commodity Material Flow

Academician Shoubo Xu  
Beijing Jiaotong University

Mechatronics Design and Implementation of Driver Assistance Technologies For Intelligent Transportation Systems

Prof. Bahram Ravani  
Department of Mechanical and Aeronautical Engineering  
University of California, Davis

Optimal Mainstream Traffic Flow Control of Large Scale Motorway Networks

Prof. Markos Papageorgiou  
Dynamic Systems & Simulation Laboratory  
Technical University of Crete, University Campus
Awards

2008 IEEE ITS Society
Best Dissertation Award

First Prize
Dr. Shinko Y. Cheng
University of California, San Diego

Title: A Multilevel Framework for Human Body Structure and Pose Estimation and Human Gesture Analysis using Volumetric Scene Reconstructions with Applications in Driver Assistance Systems

Left to Right: Dr. Sudarshan Chawathe, VP Financial Activities; Dr. Cheng; Dr. Fei-Yue Wang, ITSC 08 General Chair

Second Prize
Dr. Caspar Chorus
Technical University Delft, The Netherlands

Title: Traveler Response to Information

Left to Right: Dr. Sudarshan Chawathe, VP Financial Activities; Dr. Chorus; Dr. Fei-Yue Wang, ITSC 08 General Chair
California PATH was established in 1986. It is administered by the Institute of Transportation Studies (ITS), University of California, Berkeley, in collaboration with California Department of Transportation (Caltrans). PATH is a multi-disciplinary program with staff, faculty and students from universities statewide, and cooperative projects with private industry, state and local agencies, and non-profit institutions.

PATH's mission is to develop solutions to the problems of California's surface transportation systems through cutting edge research. PATH develops these solutions by harnessing the knowledge of transportation researchers, working in conjunction with experts in the fields of information technology, electrical engineering, mechanical engineering, economics, transportation policy and behavioral studies. The PATH charter includes conducting leading research, planning and evaluating field operational tests, developing partnerships between academia, the public sector and private companies, and educating both students and practitioners.

The PATH Program emphasizes research directions that offer potentially large improvements in the operations of the transportation system, relative to those that can make only incremental improvements. At the same time that PATH addresses the relatively long-term, high-impact solutions, it also addresses the evolutionary steps that will be necessary to get to the long-term solutions.
PATH research is divided into four program areas:
- Policy and Behavioral Research
- Transportation Safety Research
- Traffic Operations Research
- Transit Operations Research

Caltrans provides a portion of PATH funding; the remaining funding comes from the US Department of Transportation, other state and local agencies and private industry. PATH has 45 full-time staff members, including program management and administration as well as a core group of research staff. PATH supports the research of nearly 50 faculty members and 90 graduate students.

Alexander Skabardonis, Professor in the Department of Civil and Environmental Engineering at UC Berkeley is the PATH Director.

2007 IEEE ITS Society Outstanding ITS Application Award

Dr. Panos G. Michalopoulos

Left to Right: Dr. Charles Herget, ITS Society Newsletter Editor; Dr. Michalopolous; Dr. Fei-Yue Wang, ITSC 08 General Chair

Panos Michalopoulos has been a professor of Traffic and Transportation Engineering at the University of Minnesota since 1977. Prior to this position, he was professor at Rensselaer Polytechnic Institute and research associate at the University of Florida. He has 38 years of research, teaching and consulting experience in traffic engineering, operations, surveillance and management. He also worked as a traffic engineer. His major fields of interest include traffic flow theory, modeling, simulation and control. His has consulted in projects related to traffic studies, management and ATS design and deployment in the U.S. and abroad. He also played a pivotal role in founding the Center for Transportation Studies and the Traffic Observatory at the Uni-
versity of Minnesota, received a number of professional and research awards and has many publications in the field. It is this background that led him to the conceptual design and development of Autoscope, a machine vision sensor for wide area vehicle detection and traffic parameter extraction. In order to commercialize the technology he founded Image Sensing Systems where he served as chairman, chief scientific adviser and board member. The company went public in 1995 and is currently acquiring or developing additional technologies such as radar for the next generation traffic control systems, surveillance and security applications.

Currently Professor Michalopoulos’ research interests include development of a new generation controller based on wide area detection, coordinated freeway control strategies, a portable low cost device for extracting turning movements and other measurements at intersections and advanced signal control logic based on wide area detection.

2007 IEEE ITS Society Outstanding ITS Research Award

Dr. Markos Papageorgiou

Markos Papageorgiou is a Professor and Director of the Dynamic Systems and Simulation Laboratory at the Technical University of Crete, Greece. He received the Diplom-Ingenieur and Doktor-Ingenieur (honors) degrees in Electrical Engineering from the Technical University of Munich, Germany, in 1976 and 1981, respectively. In 1988-1994 he was a Professor of Automation at the Technical University of Munich. He has been a Visiting Professor at the Politecnico di Milano (1982), the Ecole Nationale des Ponts et Chaussées (ENPC) in Paris (1985-1987) and the Massachusetts Institute of Technology (MIT) in Boston (1997, 2000). His research interests include automatic control, optimisation, and their application to traffic and transportation systems and water networks. He is the Editor-in-Chief of Transportation Research – Part C, and an Associate Editor of IEEE Transactions on Intelligent Transportation Systems and of IEEE

12th International
IEEE Conference on Intelligent Transportation Systems
(ITSC 09)

October 3-7, 2009

St. Louis, Missouri, USA

Marriott Union Station
St. Louis, Missouri USA
http://www.explorestlouis.com
http://www.stlouisunionstation.com

For Conference Information Contact:
Steve E. Watkins
Missouri University of Science and Technology
steve.e.watkins@ieee.org
Call for Papers

2009 IEEE Intelligent Vehicles Symposium
Sponsored by the IEEE Intelligent Transportation Systems Society
Hosted by Xian Jiaotong University & Institution Automation, Chinese Academy of Sciences
June 3-5, 2009, Xi’an International Conference Center, Xi’an, Shaanxi, China

THE INTELLIGENT VEHICLES SYMPOSIUM (IV’09) is an annual forum sponsored by the IEEE INTELLIGENT TRANSPORTATION SYSTEMS SOCIETY (ITSS). It gathers researchers from industry and universities 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’09.

Program Topics

- Driver Assistance Systems
- Automated Vehicles
- Active and Passive Safety
- Integrated Safety Systems
- Vehicle Environment Perception
- System Architecture
- Smart Infrastructure
- Impact on Traffic Flows
- Cooperative Vehicle-Highway Systems
- Collision Avoidance
- Inter-Vehicle Communications
- Floating Car Data for Safety
- Dedicated Short Range Communications
- IVI
- Sensors
- Image, Radar, Lidar Signal Processing
- Information Fusion
- Vehicle Control
- Telematics
- Decision and Expert Systems
- Communications and Networks
- Human Factors
- Human Machine Interaction
- Others

Important Dates

<table>
<thead>
<tr>
<th>Event</th>
<th>Deadline</th>
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</thead>
<tbody>
<tr>
<td>Paper submission deadline</td>
<td>Dec. 15, 2008</td>
</tr>
<tr>
<td>Notification of acceptance</td>
<td>Feb. 28, 2009</td>
</tr>
<tr>
<td>Camera-ready manuscript due for proceedings</td>
<td>Mar. 25, 2009</td>
</tr>
<tr>
<td>Workshop proposal deadline</td>
<td>Feb. 1, 2009</td>
</tr>
<tr>
<td>Demo proposal deadline</td>
<td>Mar. 15, 2009</td>
</tr>
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</table>

Demonstrations

On June 5, the road right next to the conference venue will be closed for normal traffic in order to provide a perfect site for demonstrations of intelligent vehicles. The demonstration conditions and program will be published on the website.

Further Information

Further information can be found on our website [www.ieeeiv.net](http://www.ieeeiv.net). If you want to organize a special session, workshop or demonstration you can contact the organization committee at [ieeeiv2009@gmail.com](mailto:ieeeiv2009@gmail.com) or [iv09@aiar.xjtu.edu.cn](mailto:iv09@aiar.xjtu.edu.cn).

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NanNing Zheng
Xian Jiaotong Univ.
nzheng@mail.xjtu.edu.cn

Program Chair
Fei-Yue Wang
Univ. of Arizona & CAS
feiyue@sie.arizona.edu
Conference Calendar

by Massimo Bertozzi and Paolo Grisleri

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

2008

November 5-8
8th International Conference on Transport Systems Telematics
Katowice-Ustro, Poland

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

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

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

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

2009

January 5-8
VISAPP 2009 - International Conference on Computer Vision Theory and Applications
Lisboa, Portugal
Submissions due by: October 27, 2008
http://www.visapp.org
February 4-5
ATEC-ITS France Congress
Paris, France
http://www.atec-tec.net/fr/its_accueil_f7.asp

March 23-26
6th International Symposium on Mechatronics and its Applications (ISMA09)
Sharjah, United Arab Emirates (UAE)
Submissions due by: October 21, 2008
http://www.isma-conf.org/

March 24-25
6th International Workshop on Intelligent Transportation (WIT2009)
Hamburg, Germany
Submission due by: November 14, 2008
http://wit.tu-harburg.de

April 26-29
IEEE 69th Vehicular Technology Conference (VTC2009-Spring)
Barcelona, Spain
Submission due by: December 15, 2009
http://www.ieeevtc.org/vtc2009spring/

May 11-13
IEEE International Conference on Virtual Environments, Human Computer Interfaces and Measurement System (VECIMS2009)
Hong Kong, China
Submission due by: January 15, 2009
http://vecims.ieee-ims.org/

May 13-17
2009 IEEE International Conference on Robotics and Automation
Kobe, Japan
http://www.icra2009.org/

July 8-10
3rd IEEE Multi-conference on Systems and Control (MSC2009)
Saint Petersburg, Russia
Submission due by: December 15, 2008
http://conf.physcon.ru/msc09/index.html

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

6th International Workshop on
Intelligent Transportation (WIT 2009)
March 24 - 25, 2009
Hamburg, Germany

The importance of communication and sensor technologies in the automotive sector grows dynamically. Therefore it is essential to be up to speed with the latest research results and technical experiences. This workshop provides an outstanding opportunity to get in touch with experts in the fields of transportation, communication and sensor technologies and to present own research results. Located near the famous “Landungsbrücken” of Hamburg, Germany, the workshop takes place on March 24 and 25, 2009.

The focus of the workshop is on new developments and system considerations in the field of transportation systems.

The main topics are:

1. **Vehicle Communication**
   - Wireless Access in Vehicular Environments (WAVE)
   - Personal Communication
   - Inter-Vehicle Communication (IVC)
   - Roadside to Vehicle Communication (RVC)
   - Concepts, Protocols, and Architectures

2. **Smart Sensors**
   - Automotive Radar
   - Image and Video Processing
   - Information Fusion and Classification

3. **Driver Assistance**
   - Active and Passive Safety Systems
   - Adaptive Cruise Control (ACC)
   - Travel and Traffic Information

**Paper Submission**

Authors are invited to submit a two-page extended abstract, including the author’s full contact information (name, email and phone) until November 14, 2008.

For further information about this workshop, please visit our website at: [http://wit.tu-harburg.de](http://wit.tu-harburg.de)

**Workshop Organizers**
Markus Böhning, Henning Ritter
Dept. of Telecommunications
Hamburg University of Technology

**Conference Chair**
Prof. Hermann Rohling
Dept. of Telecommunications
Hamburg University of Technology
IEEE ITSS Best Ph.D. Dissertation Award

Purpose and Selection Criteria
The prestigious IEEE ITSS Best Ph.D. Dissertation Award is given annually for the best dissertation in any ITS area that is innovative and relevant to practice. This award is established to encourage doctoral research that combines theory and practice, makes in-depth technical contributions, or is interdisciplinary in nature, having the potential to contribute to the ITSS and broaden the ITS topic areas from either the methodological or application perspectives.

Application material
Each application must consist of the following material:
1. A doctoral dissertation written by the applicant in any language no more than 18 months prior to the submission deadline and not previously submitted.
2. A summary of the dissertation in English of up to 3 pages in length written by the Ph.D. candidate highlighting the significance of the problem, the technical approach taken, application context and potential, and the scope of the dissertation.
3. A self-contained paper in English based on the dissertation written primarily by the Ph.D. candidate following the Transactions on ITS regular paper requirements.
4. A letter of recommendation from the applicant’s dissertation advisor that comments on the significance of the research, attests to the originality of the work, and comments on the engagement of the student in the field of ITS.

IEEE ITSS Best Practice Award for Engineers

Purpose and Selection Criteria
The IEEE ITSS Best Practice Award for ITS Engineers is given annually for ITS engineers and teams who have developed and deployed successful ITS systems or implementations. This award is established to recognize, promote, and publicize major application innovations with real-world impact.

Application material
Each application must consist of the following material:
1. A 5-page summary of the ITS application providing sufficient detail for evaluation of the novelty and impact of the work.
2. At most 3 letters of recommendation from the customers or users of the developed application attesting to its significance and practical impact.

Application and Selection Process for either Award
Please upload the application packet in pdf-format until May 1, 2009 to the following internet address: http://www.mrt.uni-karlsruhe.de/itssAward

Applications by email are not accepted.

Dedicated selection committees will evaluate the applications for the IEEE ITSS Awards and propose candidates for final approval by the ITSS Board of Governors. The first prize winners will receive awards of USD 1000 each. The second prize winner of the Best Ph.D. Dissertation Award will receive USD 500. Award certificates will be given out at the ITSC 2009 conference where the recipients will be asked to give a brief presentation of their work.
ITS Society Board of Governors Election

Each year, the Society holds an election for membership on the Board of Governors, the governing body of the Society. Near the end of each year, the members of the Society vote to elect five members to serve for a three year term starting on January 1 of the following year. This year, the Society’s nominations committee nominated a slate of eight candidates to run for the five positions starting January 1, 2009. Members of the Society will receive ballots from IEEE some time in November.

The names of the candidates, photos and brief biographical sketches follow.

Tankut Acarman received his BSc degree in Electrical Engineering and his M.Sc. degree in Computer and Control Engineering in 1993 and 1996 from Istanbul Technical University Istanbul, Turkey and his PhD degree in Electrical Engineering from The Ohio State University, Columbus, USA in 2002. He has been in the Computer Engineering department of Galatasaray University where he is currently an assistant professor. He was director of the center of computing resources in 2004 and 2005, and he is the vice director of the Institute of Science at Galatasaray University, Istanbul, Turkey.

His current research interests include driver assistance systems, autonomy in vehicles, vehicle dynamics controller design and validation, hybrid electric vehicle control and vehicle-to-vehicle communication for actively safe, clean and efficient road vehicles.

He was a faculty member in a potential center for network of excellence funded by EU-FP6. He is the faculty member and researcher in a national project aiming to reduce traffic accidents by improving driving and driver prudence through signal processing and advanced information technologies, and he is an consultant for the automotive industry including hybrid electric vehicle prototype development and driver assistance systems integration.

He was the finance chair and an associate editor of the Intelligent Vehicle Symposium in 2007. He is the publication chair of the International Conference on Vehicular Electronics and Safety in 2008.

Matthew J. Barth is the Yeager Families Professor at the College of Engineering, University of California, Riverside. He is part of the intelligent systems faculty in Electrical Engineering and is also serving as the Director for the Center for Environmental Research and Technology (CE-CERT), UCR’s largest multi-disciplinary research center. He received his B.S. degree in Electrical Engineering/Computer Science from the University of Colorado in 1984, and M.S. (1985) and PhD (1990) degrees in Electrical and Computer Engineering from the University of California, Santa Barbara. Dr. Barth joined the University of California, Riverside in 1991, conducting research in Intelligent Systems.
Dr. Barth's research focuses on applying engineering system concepts and automation technology to Transportation Systems, and in particular how it relates to energy and air quality issues. His current research interests include ITS and the Environment, Transportation/Emissions Modeling, Vehicle Activity Analysis, Advanced Navigation Techniques, Electric Vehicle Technology, and Advanced Sensing and Control. At UC-Riverside, he has developed new curriculum in intelligent transportation systems and is an active faculty participant in the California Partners for Advanced Transit and Highways (PATH). He has conducted and managed numerous ITS research projects for the past 16 years with total funding level of multi-million dollars, sponsored by both public and private agencies.

Dr. Barth has published approximately 50 journal papers, 140 peer-reviewed conference papers, and several book chapters. He also holds 7 U.S. patents and 6 international patents. He is very active in the U.S. Transportation Research Board serving in a variety of roles in several committees. He recently won the Pyke Johnson Award for TRB outstanding paper. He has also served on a number of National Research Council (NRC) Committees.

Dr. Barth has also been active in IEEE ITS Society conferences for many years as a presenter, invited session organizer, session moderator, reviewer, associate editor, and on international program committees. He is currently the lead program co-chair for ITSC’08 in Beijing China.

If Dr. Barth is elected to the Board of Governors of the IEEE ITSS, he will play an active role in promoting the importance of ITS in helping solve energy and environmental problems that are at the forefront of today’s society, e.g., greenhouse gas emissions. This role would include organizing special sessions at IEEE ITS conferences, a transaction special issue, and educating IEEE ITS student members.

Harry H. Cheng is a Professor in the Department of Mechanical and Aeronautical Engineering, Graduate Group in Computer Science, and Graduate Group in Electrical and Computer Engineering at the University of California, Davis. He is the Director of the Integration Engineering Laboratory. He is the Graduate Advisor for continuing graduate students in the Department of Mechanical and Aeronautical Engineering. Before joining the faculty at the University of California, Davis in 1992, he worked as a Senior Engineer on robotic automation systems at the Research and Development, United Parcel Service, Inc. from 1989 to 1992. He received his M.S. degree in Mathematics in 1986 and PhD degree in Mechanical Engineering in 1989 from the University of Illinois at Chicago. He is the founder of SoftIntegration, Inc. which provides infrastructure software and services for rapid development and deployment of application software.

Dr. Cheng has published over 130 papers in refereed journals and conference proceedings. He won several best paper awards. At UC Davis, he has established research programs in mobile agent systems, intelligent mechatronic and embedded systems, intelligent transportation systems, computer-aided design and manufacturing, and robotics. His research projects on highway vehicle detection systems have been funded by the California Department of Transportation and PATH Program at the University of California at Berkeley for over ten years and his patented research results are currently in the process being commercialized. He is the original
designer and implementer of an embeddable C/C++ interpreter Ch for cross-platform scripting, shell programming, 2D/3D plotting, numerical computing, and embedded scripting. He participated in revision of the latest C standard called C99 through ANSI X3J11 and ISO S22/WG14 C Standard Committees and made major contributions to new C99 numerical features of complex numbers, variable length arrays, and IEEE floating-point arithmetic, which had been implemented in his C/C++ interpreter. His C/C++ interpreter has been widely used by major universities worldwide for teaching and research and by many companies, including Lockheed-Martin, Agilent Technology, Magna, TeleCommunication Systems, LG Electronics, JDS Uniphase Corporation, ABB, Moog, and ITT.

Dr. Cheng is a Fellow of the American Society of Mechanical Engineers. He has been very active in ASME and served as chairs of various technical committees as well as an Associate Editor of ASME Trans, Journal of Computing and Information Science in Engineering. He presented tutorials on real-time Linux for the control of mechatronic systems at the ASME IDETC. Dr. Cheng has been also active in the IEEE ITS Society. He has been playing a major role in founding and organizing the IEEE ITS Society sponsored IEEE/ASME and ASME/IEEE International Conferences on Mechatronic and Embedded Systems and Applications (MESA). MESA is becoming one of major forums that bring multi-disciplinary researchers in different fields together to contribute to and influence the future directions of design and applications of information technology and mechatronic and embedded systems in ITS. He served as the Program Chair of the 2006 IEEE/ASME MESA, Conference Co-Chair of the 2007 ASME/IEEE MESA, and Conference Chair of the 2008 IEEE/ASME MESA. He is the General Chair of the 2009 ASME/IEEE MESA. He has also served as the Chair of the Technical Committee on Mechatronic and Embedded Systems in the IEEE ITS Society since 2006. He served as a Guest Editor for a special issue of IEEE/ASME Transactions on Mechatronics focused on Intelligent Mechatronic and Embedded Systems with selected papers presented at the 2006 IEEE/ASME MESA.

**Position Statement:** It will be an honor for me to serve as a Member of the Board of Governors of the IEEE ITS Society. The IEEE ITS Society benefits from an unsurpassed worldwide reputation of the IEEE. However, as a new society, it needs to rapidly and effectively offer services that are responsive to specific needs of different constituent communities. New activities in emerging and cross-disciplinary technologies and new models of operation that can attract new members and volunteers are vital to the society’s success. My past experience has taught me the needs and aspirations of professionals in different fields around the globe. I intend to bring this experience to the Board of Governors to enhance the society’s progress toward serving all professionals in ITS both in industry and academia with undisputed excellence.

**Yaobin Chen** is Professor and Chair of Electrical and Computer Engineering at Purdue School of Engineering and Technology, IUPUI. He is also the director of Transportation Active Safety Institute, a university-wide multidisciplinary research center. He received his BS degree from Nanjing Institute of Technology, Nanjing, China in 1982, MS and PhD degrees from Rensselaer Polytechnic Institute, Troy, New York, in 1986 and 1988 respectively, all in electrical engineering. From 1988 to 1990, Dr. Chen was with the faculty of electrical engineering and computer science at the George Washington Uni
versity, Washington, DC. Since 1990, Dr. Chen has been with Purdue School of Engineering and Technology, IUPUI, where he also served as Associate Dean for Research from 2003 to 2005.

Dr. Chen’s areas of research interest include modeling, control, and optimization of advanced transportation and vehicle systems, intelligent systems and applications. His current research focuses on HMI and driver-automation interaction for active safety control systems, intelligent energy management and vehicle system controller design for hybrid vehicles. He has published more than 90 technical papers in refereed journals and conference proceedings. For the last 17 years he has been awarded a total of $5.0M in grants and contracts by federal and state agencies as well as private companies. He was a recipient of the National Science Foundation Research Initiation Award in 1991. He is a co-inventor of three U.S. patents.

Dr. Chen has been actively involved in professional service. He has served as a frequent reviewer for many international conferences and journals including several IEEE Transactions. He has served as a member of international program committee and session co-chair for many international conferences. He has served as an associate editor for Intelligent Automation and Soft Computing- An International Journal (since 1995), International Journal of Intelligent Systems and Control (since 1996), and International Journal of Alternate Propulsion Systems (since 2004). Dr. Chen is also a member of SAE and ASEE. He serves as a faculty advisor to the IEEE Student Chapter.

Dr. Chen is interested to serve on the Board of Governors of IEEE ITSS. If elected, he would like to work with other board members to promote the field of ITS by developing related curriculum in ITS with focus in active safety to educate next generation engineers. He would also like to focus on the development of common human-machine interface protocols and common metrics as well as associated test and validation methods to assess and quantify active system performance. The ultimate goal is to advance the use of vehicle active safety systems to reduce vehicle crashes and save lives. Dr. Chen is ready to play an important role in this emerging area for ITSS based on his profound understanding of the challenges, his knowledge of active safety systems, and his unique experience in collaborating with the automotive industry and government agencies.

Petros A. Ioannou is a Professor of Electrical Engineering-Systems, Director of the Center for Advanced Transportation Technologies, Associate Director for Research of the University Transportation Center METRANS and holds a joint appointment with the Department of Aerospace and Mechanical Engineering, all at the University of Southern California. His current interests include intelligent transportation systems, freight transportation, vehicle dynamics and control, robust adaptive control and applications and control of high performance aircraft. Professor Ioannou received a BSc degree in Mechanical Engineering with first class honors, from University College London in 1978, an MS degree in Mechanical Engineering in 1980, and a PhD degree in Electrical Engineering in 1982, both from the University of Illinois at Urbana Champaign.

Professor Ioannou has held visiting Professor positions at the Technical University of Crete,
University of New South Wales Australia, the Australian National University and the University of Cyprus. In 1995, during a leave from the University of Southern California, he served as the first Dean of the School of Pure and Applied Sciences at the University of Cyprus where he initiated the establishment of the School of Engineering. In 1992 he founded the Center for Advanced Transportation Technologies as an organized research unit at the University of Southern California and in 1998 he co-founded the University Transportation Center METRANS funded by the Department of Transportation. His Center was one of the founders of IVHS American which later on became ITS America.

Professor Ioannou is the author of 2 text books, 6 edited books, 15 book chapters, 96 Journal papers, 170 conference papers and 1 patent. He gave numerous short courses on intelligent transportation systems at conferences and research centers. He has been an invited and plenary speaker at several international conferences.

Professor Ioannou's honors include a Presidential Young Investigator Award, an IEEE Control System Society Outstanding Transactions Paper Award (with P. Kokotovic), and a prestigious Commonwealth Scholarship. His teaching awards include the Outstanding Teacher of the Year Award by The Latter-day Saint Student Association.

He is a Fellow of the IEEE and Fellow of the International Federation of Automatic Control (IFAC).

He served as Associate Editor of IEEE Transactions on Automatic Control, IEEE Transactions on Intelligent Transportation Systems, International Journal of Control and Automatica. He is currently Associate Editor at Large of the IEEE Trans. on Automatic Control. He served as the Chair of the Technical Committee on Transportation Systems of IFAC and he is currently a member of the Board of Governors of the Mediterranean Control Association and the IEEE Intelligent Transportation Society. He has served as a consultant at several Transportation, Aerospace, Automotive, and Disk Drive companies and he is a member of the advisory board of Glacier Bay Inc. He graduated 24 PhD students 11 of whom are in Academia, 3 of them are Fellows of the IEEE and 4 of them have their own companies.

Professor Ioannou has been active in IEEE ITS Society conferences and activities for many years as a presenter, invited session organizer, session chair, reviewer, associate editor, and on international program committees. He served as the Program Chairman of the 3rd IEEE Conference on Intelligent Transportation Systems, 2000 and was the Guest Editor of the Special Issue on Adaptive Cruise Control, IEEE Transactions on Intelligent Transportation Systems, Sept. 2003. He served as the Chair of IEEE ITS Society Fellow committee during the last three years and he is a member of the Board of Governors of the IEEE ITSS. In addition he served as Organizer and Program Chair of several transportation conferences that include the 2007 intelligent vehicle conference, the 2nd Annual National Urban Freight Conference in 2007, and the 2008 International Freight and Trade Transportation conference.

As a member of the Board of Governors of the IEEE ITSS Professor Ioannou will continue his IEEE ITS Society activities and service. His research activities on ITS for freight and port ap
Applications will help promote ITS in these areas by organizing special sessions at ITS conferences, book editing etc. These activities will help attract more people into the IEEE ITSS in addition to helping solve important transportation problems.

Lefei Li 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 PhD (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 Logistics System.

At Tsinghua University, Dr. Li has managed and actively participated in several urban transportation and logistics/service network design projects, sponsored by major logistics companies or public agencies in China. Dr. Li has published many journal papers and peer-reviewed conference papers in the areas of 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. He is currently one of the program co-chairs for ITSC’08 and local arrangement chair for SOLI’08 in Beijing China.

Position Statement: If elected to the Board of Governors of the IEEE ITSS, I will continuously devote my time and effort to serve ITSS members and its activities, and also try to promote the communications within our membership, particularly by supporting discussion forums in local chapters or online forums for specific interest groups.

Jeffrey Miller is currently an Assistant Professor in the Computer Engineering department at the University of Alaska, Anchorage. Prior to joining UAA in 2007, he was an Adjunct Professor in the Computer Science department at California State University, Los Angeles for 5 years. In 2003, he was voted Professor of the Year by the students in the Computer Science department at Cal State LA.

Dr. Miller earned the Bachelor of Science degree in Computer Engineering and Computer Science in 2002, the Master of Science degree in Computer Science in 2002, and the PhD degree in Computer Science in 2007, all from the University of Southern California. His research while at USC was under the advisement of Professor Ellis Horowitz, Professor Petros Ioannou, and Professor Ming-Deh Huang. His research interests include vehicle-to-vehicle and vehicle-to-infrastructure communication, and distributed algo
Dr. Miller’s current work focuses on parameterizing distributed architectures to determine a priori advantages to different applications based on the architecture used. He is also focused on gathering ITS data from individual vehicles through vehicle-tracking devices installed in the vehicles to provide a test bed for other researchers to exploit the data for their own use. The simulator he developed, FreeSim, allows live data to be fed in from loop detectors or individual vehicles, which then allows fastest path algorithms or other ITS applications to be run on that data.

Dr. Miller has published papers at the Intelligent Transportation Systems Conference (ITSC) for the past 3 years and at the Intelligent Vehicles Symposium (IVS) for the past 2 years, including the Vehicle-to-Vehicle Communications (V2VCOM) workshop that is held in conjunction with IVS. He has served on the Technical Program Committee for V2VCOM in 2008 and for the IEEE Vehicular Technology Conference (VTC) in 2009. He has chaired sessions at ITSC in 2007 and 2008 as well. In addition, he has been a reviewer for the IEEE Communications Magazine, the IEEE Transactions on Intelligent Transportation Systems, the IEEE Workshop on Automotive Networking and Applications in 2008, the IEEE Intelligent Transportation Systems Conference in 2007 and 2008, the IEEE Intelligent Transportation Systems Symposium in 2008, the Vehicle-to-Vehicle Communications Workshop in 2008, and the International Symposium on Transport Simulation in 2008.

In addition to his role in ITS research, he has also authored introductory programming classes and enterprise architectures classes, as well as sat on numerous committees reviewing curriculum, hiring faculty, and preparing for accreditation. For almost 10 years, he has consulted with numerous companies, from startups to large telecommunication corporations, as well as starting his own company to sell handheld point-of-sale systems to the restaurant industry.

Dr. Miller currently resides in Anchorage, Alaska, where he lives with his dog, Twinkie, and his two cats, Brownie and Mochi.

Urbano Nunes received the Licenciatura and PhD degrees in electrical engineering from the University of Coimbra, Portugal, in 1983 and 1995, respectively. He is currently an Associate Professor with the Faculty of Sciences and Technology of the University of Coimbra and the Head of the Computer and Electrical Engineering Department of the same Faculty. He is also a researcher of the Institute for Systems and Robotics (ISR-UC), where he is the coordinator of the Automation and Mobile Robotics Group and the coordinator of the Mechatronics Laboratory. Dr. Nunes has been involved and responsible for several funded projects, at both National and International levels, in the areas of mobile robotics, intelligent vehicles and cyber-cars.

**ITS interests and activities:**

Dr. Nunes has research interests involving robotics technologies for intelligent vehicles. Topics include environment perception, vehicle localization, autonomous navigation, collision predic
tion and avoidance, vision and laser-based perception and sensor fusion, machine learning and ITS simulation. He is an Associate Editor of the IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS (since 2007) and Co-Chair of the Technical Committee on Autonomous Ground Vehicles and ITS of the IEEE Robotics and Automation Society. He was with several conferences and workshops: International Conference on Advanced Robotics, General Co-Chair (2003); IEEE Intelligent Transportation Systems Conference, Program Chair (2006); IEEE Intelligent Transportation Systems Conference, Program Co-Chair (2008); Workshop on Planning, Perception and Navigation for Intelligent Vehicles held in conjunction with IEEE ICRA and IROS conferences, Co-Organizer (2007 and 2008); Workshop on Safe Navigation in Open and Dynamic Environments, Co-Organizer (2007); IEEE International Conference on Vehicular Electronics and Safety, Program Chair (2007); Dr. Nunes was Guest Editor, with other colleagues, of journal special issues on the thematic of ITS (Special Issue on ITSC 2006 of the IEEE Transactions on Intelligent Transportation Systems, vol. 9, nº1, March 2009) and intelligent vehicles (Special Issue on Robotics Technologies for Intelligent Road Vehicles of the Autonomous Robots, vol.19, nº2, Sept. 2005). He organized several special sessions on cybercars and intelligent vehicles technologies at IEEE ITSC 2006 and IEEE/RSJ IROS conferences. Dr. Nunes was awarded the IEEE ITS Society Outstanding Service Award in 2006; as Co-Chair of RAS TC on ITS, the IEEE RAS Society Most Active TC Award in 2006; as co-author, awarded as a winner of NiSIS Competition 2007 “Problem Task: Analysis and Classification of the DaimlerChrysler Automotive Dataset Images”.

Statement for services to ITSS:
Dear ITSS members, if elected, I’ll be here to serve you. I’ll be pleased to serve on required task of different areas, namely on conferences, technical activities and publications. Our two major conferences, the IEEE ITSC and the IEEE IV are in good shape as well as other ITS sponsored conferences, but it is desirable that with new ideas and dedication, higher levels of quality and higher worldwide participation be achieved. I’ll be pleased to look for, and work on, solutions that lead to a higher participation of students in ITS conferences, as well as to work to motivate existing ITS TCs to be more active in ITS conferences and journals namely by organizing workshops, tutorials, exhibitions and special issues. New TCs on emerging areas and others to promote crossing areas with other IEEE Societies should be encouraged. I commit myself to fertilize cross relations and realizations between IEEE ITS and IEEE Robotics and Automation Society (RAS) with mutual gains. You can also count with me to collaborate on other activities, if I am enrolled to any, like the establishment of the Board of Conference Associate Editors; activities related with the society journals, webpage, establishment of best awards in ITS conferences, etc.

Rosaldo Rossetti joined the Faculty of Engineering at University of Porto, Portugal, as assistant professor in 2006, initially in the Informatics Section of the Department of Electrical and Computer Engineering. As of January 2008, however, he moved to the recently created Department of Informatics Engineering, where he also serves as the coordinator of the ERASMUS Exchange Programmes and University Partnerships. He is also a research fellow at LIACC, within the Distributed Artificial Intelligence and Robotics Group, at the same University. From 2002 to 2006, he was with Atlantica University, in Lisbon, where he served as director of the Computing and
Systems Management BSc (Hons) Programme. There he co-founded the Computing and Systems Management Laboratory in 2003, a R&D unit he coordinated until 2006. Dr Rossetti received a BEng (Hons) in Civil Engineering from UFC (2005) and holds a PhD in Computer Science from UFRGS, Brazil (2002). From 1998 to 2000, he carried out his doctoral studies as a PhD research student at Leeds University’s Institute for Transport Studies, UK, within the Network Modelling Group. His areas of interest generally include complex systems analysis, systems optimisation and stochastic processes control, computer simulation, engineering software and CAD. Currently he is focusing on the application of Distributed Artificial Intelligence (DAI) techniques to tackle engineering problems, and specially on using multi-agent systems (MAS) as a modelling metaphor to address issues in Artificial Transportation Systems. He has been engaged as member of technical committees in many conferences within the AI, MAS, and Simulation communities, and has been invited as reviewer for journals such as Transportation Research Part C, ASCE, Transactions of SCS International, and the Journal of Intelligent Transportation Systems: Technology, Planning, and Operations. Dr Rossetti was a co-organiser of the 1st Workshop on AI Applications for Sustainable Transportation Systems (EPIA’07) and the Special Session on Artificial Transportation Systems and Simulation at IEEE ITSC’07; he is also co-organising the 3rd Workshop on Artificial Transportation Systems and Simulation at this year’s edition of IEEE ITSC, and is a guest editor for a forthcoming special issue of IEEE Transactions on ITS. Rosaldo Rossetti is a member of IEEE, ACM and the Portuguese Society for Artificial Intelligence.

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


Abstract: License plate recognition (LPR) algorithms in images or videos are generally composed of the following three processing steps: 1) extraction of a license plate region; 2) segmentation of the plate characters; and 3) recognition of each character. This task is quite challenging due to the diversity of plate formats and the nonuniform outdoor illumination conditions during image acquisition. Therefore, most approaches work only under restricted conditions such as fixed illumination, limited vehicle speed, designated routes, and stationary backgrounds. Numerous techniques have been developed for LPR in still images or video sequences, and the purpose of this paper is to categorize and assess them. Issues such as processing time, computational power, and recognition rate are also addressed, when available. Finally, this paper offers to researchers a link to a public image database to define a common reference point for LPR algorithmic assessment.

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Jiangtao Cao; Honghai Liu; Ping Li; Brown, D.J., “State of the Art in Vehicle Active Suspension Adaptive Control Systems Based on Intelligent Methodologies,” pp.392-405

Abstract: This paper reviews computational-intelligence-involved approaches in active vehicle suspension control systems with a focus on the problems raised in practical implementations by their nonlinear and uncertain properties. After a brief introduction on active suspension models, the paper explores the state of the art in fuzzy inference systems, neural networks, genetic algorithms, and their combination for suspension control issues. Discussions and comments are provided based on the reviewed simulation and experimental results. The paper is concluded with remarks and future directions.

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Ho Gi Jung; Young Ha Cho; Pal Joo Yoon; Jaihie Kim, “Scanning Laser Radar-Based Target Position Designation for Parking Aid System,” pp.406-424

Abstract: Recently, customers have shown a growing interest in parking aid products. A parking aid system consists of target position designation, path planning, and parking guidance by user interface or path tracking by active steering. For target position designation, various sensors and signal processing technologies have been tried. In the case of parallel parking, an ultrasonic sensor-based method plays a dominant role. In the case of perpendicular parking, a graphical user interface (GUI)-based method and a parking slot marking-based method have been commercialized. However, methods developed for the recognition of free parking space between vehicles have their respective drawbacks. This paper proposes a method for the recognition of free parking space between vehicles using scanning laser radar. This proposed method consists of range data preprocessing, corner detection, and target parking position designation. The authors developed a novel corner-detection method consisting of rectangular corner detection and round corner detection. The newly developed corner detection is unaffected by cluster orientation and the range data interval and is robust to noise. Experimental results showed that even in situations where other methods failed, the proposed scanning laser radar-based method could designate target parking position to viable free parking space. The recognition rate was 98.21%, and the average processing time was about 600 ms. Finally, it is argued that the proposed method will eventually be a practical solution because of the decreasing price of scanning laser radar and multiple-function integration strategies.

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Abstract: This paper presents two different types of visual activity analysis modules based on vehicle tracking. The highway monitoring module accurately classifies vehicles into eight different types and collects traffic flow statistics by leveraging tracking information. These statistics are continuously accumulated to maintain daily highway models that are used to categorize traffic flow in real time. The path modeling block is a more general analysis tool that learns the normal motions encountered in a scene in an unsupervised fashion. The spatiotemporal motion characteristics of these motion paths are encoded by a hidden Markov model. With the path definitions, abnormal trajectories are detected and future intent is predicted. These modules add real-time situational awareness to highway monitoring for high-level activity and behavior analysis.

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Abstract: The automation of the overtaking maneuver is considered to be one of the toughest challenges in the development of autonomous vehicles. This operation involves two vehicles (the overtaking and the overtaken) cooperatively driving, as well as the surveillance of any other vehicles that are involved in the maneuver. This operation consists of two lane changes—one from the right to the left lane of the road, and the other is to return to the right lane after passing. Lane-change maneuvers have been used to move into or out of a circulation lane or platoon; however, overtaking operations have not received much coverage in the literature. In this paper, we present an overtaking system for autonomous vehicles equipped with path-tracking and lane-change capabilities. The system uses fuzzy controllers that mimic human behavior and reactions during overtaking maneuvers. The system is based on the information that is supplied by a high-precision Global Positioning System and a wireless network environment. It is able to drive an automated vehicle and overtake a second vehicle that is driving in the same lane of the road.

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Abstract: In this paper, we have developed a novel azimuth-estimation technique for 76-GHz adaptive-cruise-control radar systems. To resolve the rank deficiency of the signal covariance matrix and to decrease the influence of dominant noise components, we used an improved SS technique. To balance computational cost with azimuth resolution for in-vehicle implementation, we introduced a projection matrix kernel, which formally is similar to that of beamforming (BF) and semantically similar to that of the propagator method. Our technique is called the PPropagator method based on an Improved Spatial-smoothing Matrix (PRISM). Incorrectly estimating the number of targets causes the conventional BF, subspace-based (SB), or maximum-likelihood methods to produce many false spectrum peaks on the relative azimuth-to-distance plane. We omitted the process of estimating the number of targets, which requires high computational power, because our projection matrix kernel strongly suppresses these false peaks. We conducted numerical experiments using an electronic-scan radar system to examine the performance of PRISM. Compared to conventional SB methods, PRISM requires SNRs that are 2–3 dB higher but has competitive azimuth resolution at a centesimal fraction of the computational cost.

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Wu, C.; Tsimhoni, O.; Liu, Y., “Development of an Adaptive Workload Management System Using the Queueing Network-Model Human Processor (QN-MHP),” pp.463-475

Abstract: The risk of vehicle collisions significantly increases when drivers are overloaded with information from in-vehicle systems. One of the solutions to this problem is developing adaptive workload management systems (AWMSs) to dynamically control the rate of messages from these in-vehicle systems. However, existing AWMSs...
do not use a model of the driver cognitive system to estimate workload and only suppress or redirect in-vehicle system messages, without changing their rate based on driver workload. In this paper, we propose a prototype of a new queueing network-model human processor AWMS (QN-MHP AWMS), which includes a queueing network model of driver workload that estimates the driver workload in several driving situations and a message controller that determines the optimal delay times between messages and dynamically controls the rate of messages presented to drivers. Given the task information of a secondary task, the QN-MHP AWMS adapted the rate of messages to the driving conditions (i.e., speeds and curvatures) and driver characteristics (i.e., age). A corresponding experimental study was conducted to validate the potential effectiveness of this system in reducing driver workload and improving driver performance. Further development of the QN-MHP AWMS, including its use in in-vehicle system design and possible implementation in vehicles, is discussed.

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Abstract: This paper presents an efficient technique for estimating the pose of an onboard stereo vision system relative to the environment’s dominant surface area, which is supposed to be the road surface. Unlike previous approaches, it can be used either for urban or highway scenarios since it is not based on a specific visual traffic feature extraction but on 3-D raw data points. The whole process is performed in the Euclidean space and consists of two stages. Initially, a compact 2-D representation of the original 3-D data points is computed. Then, a RANdom SAmple Consensus (RANSAC) based least-squares approach is used to fit a plane to the road. Fast RANSAC fitting is obtained by selecting points according to a probability function that takes into account the density of points at a given depth. Finally, stereo camera height and pitch angle are computed related to the fitted road plane. The proposed technique is intended to be used in driver-assistance systems for applications such as vehicle or pedestrian detection. Experimental results on urban environments, which are the most challenging scenarios (i.e., flat/uphill/downhill driving, speed bumps, and car’s accelerations), are presented. These results are validated with manually annotated ground truth. Additionally, comparisons with previous works are presented to show the improvements in the central processing unit processing time, as well as in the accuracy of the obtained results.

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Damousis, I.G.; Tzovaras, D., “Fuzzy Fusion of Eyelid Activity Indicators for Hypovigilance-Related Accident Prediction,” pp.491-500

Abstract: In this paper, a fuzzy expert system (FES) for the detection of the physiological manifestations of extreme hypovigilance is presented. A large number of features that describe the eyelid activity of drivers is examined, and fuzzy logic is used for the fusion of the most prominent features to not only increase the accident prediction accuracy but also provide a reliable system that generates a small number of false warnings. For the development and testing of the system, driving simulator data from 35 drowsy subjects were used. In addition, a secondary control group of 13 alert drivers was used for the estimation of the trained system’s false alarm ratio. The results show that a fuzzy combination of eyelid activity parameters may lead to a system with high sensitivity and specificity in predicting sleep onset and related accidents.

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Tang-Hsien Chang; Chih-Sheng Hsu; Chieh Wang; Li-Kai Yang, “Onboard Measurement and Warning Module for Irregular Vehicle Behavior,” pp.501-513

Abstract: This paper develops an onboard decision module for issuing appropriate warnings when the equipped vehicle’s traveling trajectory is irregular. Potential vehicle accidents exist if the driver is distracted by fatigue, drowsiness, food, phone use, and talking or is under the influence of alcohol or drugs, etc. Usual freeway accidents include lateral and rear-end collisions. Detecting vehicle behavior is a good way to measure the security of driving. This paper presents two modules. An Unexpected Lane Departure Avoidance Module is utilized to prevent lateral collision. This module issues warnings when the vehicle approaches an irregular departure from the middle of the
lane. Radial basis probability networks are applied to distinguish between normal lane change and lane departure. A Rear-End Collision Avoidance Module is used to issue warnings to avoid longitudinal accidents. This module reflects driver perceptions of environmental influence with a warning value and the warning threshold by neural networks and fuzzy membership functions, respectively. The proposed modules are satisfactory according to simulations and field tests.

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Zito, P.; Haibo Chen; Bell, M.C., “Predicting Real-Time Roadside CO and $\text{NO}_2$ Concentrations Using Neural Networks,” pp.514-522

Abstract: The main aim of this paper is to develop a model based on neural network (NN) theory to estimate real-time roadside CO and $\text{NO}_2$ concentrations using traffic and meteorological condition data. The location of the study site is at a road intersection in Melton Mowbray, which is a town in Leicestershire, U.K. Several NNs, which can be classified into three types, namely, the multilayer perceptron, the radial basis function, and the modular network, were developed to model the nonlinear relationships that exist in the pollutant concentrations. Their performances are analyzed and compared. The transferability of the developed models is studied using data collected from a road intersection in another city. It was concluded that all NNs provide reliable estimates of pollutant concentrations using limited information and noisy data.

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Chao Wang; Coifman, B., “The Effect of Lane-Change Maneuvers on a Simplified Car-Following Theory,” pp.523-535

Abstract: This paper investigates the linearity of empirically observed spacing–speed relations for various drivers in the context of car-following theory and how lane-change maneuvers perturb the relation. It is shown that the impacts of lane-change maneuvers are not balanced, and the response time to an exiting vehicle is much longer than the response time to an entering vehicle. This accommodation imbalance will propagate upstream, and as discussed herein, it appears to be a source of speed and flow fluctuations (or oscillations) within a queue. This paper is motivated by Newell's simplified car-following theory, namely, that during congested periods, the trajectory of a given vehicle is essentially identical to the preceding vehicle's trajectory, except for a translation in space and time. One of the basic assumptions in Newell's presentation is that spacing and speed are linearly related. While other researchers have found macroscopic evidence supporting Newell's theory, they have also found that it fails in the presence of frequent lane-change maneuvers. This paper takes a microscopic approach, employing vehicle trajectory data. This paper provides support for Newell's assumed linear relation between spacing and speed over a large range of speeds when vehicles are not impacted by lane-change maneuvers. It also offers a possible explanation for the degraded performance of Newell's theory in the presence of heavy lane-change maneuvers. Although the focus is on Newell's simplified car-following theory, the empirical results of this paper have similar implications for many other car-following theories as well.

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Wunderlich, R.; Cuibi Liu; Elhanany, I.; Urbanik, T., “A Novel Signal-Scheduling Algorithm With Quality-of-Service Provisioning for an Isolated Intersection,” pp.536-547

Abstract: There have been countless efforts directed toward efficiently controlling the flow of vehicular traffic through an intersection. This paper describes an algorithm designed for the signal control problem that employs concepts drawn from the field of packet switching in computer networks. The novel method proposed utilizes a maximal weight matching algorithm to minimize the queue sizes at each approach, yielding significantly lower average vehicle delay through the intersection. Of particular interest are scenarios in which differentiated services are offered to vehicle classes with differing priorities. Lyapunov function-based analysis is provided, deriving the conditions under which the system is guaranteed to be stable. The algorithm is compared to an optimized fixed-time controller and a vehicle-actuated controller using the VISSIM traffic simulation environment. Simulation results demonstrate the performance gain obtained when using the proposed scheme, particularly in the scenario in
which vehicle routes are unequally distributed, and multiple classes of service are desired.

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Abstract: This paper proposes a very simple method for enhancing the performance of infrared electronic-toll-collection systems. Using two typical low-cost commercial LEDs with different half-intensity angles $\Phi_{1/2} = 22^\circ$ and $10^\circ$, the radiation pattern of the emitting module of an infrared short-range communication system for electronic-toll-collection applications is designed. This enables us to construct a system that has an extended communication region and can withstand high signal attenuation. When the module is fabricated with a proper combination of the numbers of these two different LEDs, together with a suitable mounting angle of each LED, an effective radiation pattern is obtained. The mounting angle of each LED is found with the aid of an optimization algorithm. The performances of three different designs are compared in terms of signal strength, communication length, and 2-D communication region. The results show that a module consisting of ten LEDs divided into three groups, with each group having a proper mounting angle and containing an appropriate number of LEDs, can have much better performance than conventional single-group unidirectional designs. The influence of the defect of the radiation pattern, which may happen on many LEDs, on system performance is also discussed. The results of the analysis are confirmed by experimental measurements.

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Keemin Sohn; Keeyeon Hwang, “Space-Based Passing Time Estimation on a Freeway Using Cell Phones as Traffic Probes,” pp.559-568

Abstract: This paper examines the usability of mobile cellular networks to obtain traffic information on a freeway. The question of whether a mobile station (cell phone) can play an acceptable role as a probe for collecting traffic information on a freeway is examined. A space-based approach, wherein the probe vehicles transmit information to roadside devices as they pass through reference points, is exploited rather than a time-based approach, wherein the probe vehicles report information for every specific instant of time. The latter has been of concern to most researchers interested in the use of a mobile cellular network for collecting traffic data. First, a simple analytical model is introduced to address the usability of cell phones as traffic probes and to pinpoint which factors affect the qualification of probe phones when the space-based approach is adopted. Second, simulation experiments are also employed to deal with more realistic traffic conditions as supplementary tools for the analytical model. Finally, the actual traffic data on a freeway was considered to validate the above two hypothesized traffic conditions. The findings show that there are three main factors that affect the qualification of cell phones as a traffic probe: 1) the speed profile of the probe phone in cell coverage; 2) the variability of handoff location where the probe phone switches its jurisdictional cell; and 3) the locational relationship between a reference point and a speed jump (or drop) point in cell coverage.
The European Community to Invest in VisLab from Parma University

Prof. Alberto Broggi, selected amongst the best European researchers, to receive a large grant for his research in the vehicular robotics field

Parma, October 21, 2008 --- Prof. Alberto Broggi has been selected by ERC (European Research Council, erc.europa.eu) as one of the best European researchers and will receive a grant of about 1.8 million Euro (2.5 million USD) to continue and strengthen his research in the field of enhancing road safety by means of innovative driving assistance systems and automatic driving.

The European Community’s aim, through the ERC Advanced Grant, is to promote particularly innovative research streams with high scientific and strategic interest on themes proposed by the researchers themselves who must have at least ten years of leadership in their research area.

The European Research Council received more than 2100 project proposals, and after a peer review handled by experts in the field, selected only a few projects that will be 100% funded by the European Community. In the field of computer engineering, only three Italian researchers were selected.

The project proposed by Prof. Broggi stems from the intense research activity that his group, the VisLab (www.vislab.it), has been successfully conducting for more than fifteen years. After the successes obtained in the international arena such as the ARGO project (milestone in the history of worldwide vehicular robotics), the realization of the TerraMax vehicle, and other challenges among the most important laboratories worldwide, the new project will focus on high risk research, i.e. on themes of strong industrial interest but characterized by a high economical risk due to the product realization distance.

Besides offering the possibility to conduct research on highly innovative themes, the grant will allow VisLab to anticipate the industrial needs, so to be ready to offer its know-how as soon as the application of the newly developed technologies will be of direct interest to companies. The research results of the new VisLab spinoff, which has just been invited to settle itself in Parma’s upcoming scientific park (www.cittadellescienze.it), are attracting the interest of companies from all over the world, now considering to start a local office on-campus in order to ease their direct cooperation with VisLab.

The project funded by ERC is aimed at acquiring three new vehicles to join those already available to VisLab and developing innovative perception systems in order to provide them with automatic driving. The project will last five years and will support the hiring of about six researchers.
Links to Further Information

Photos:
Prototype with automatic braking capabilities: www.vislab.it/prototypes/grandeur.jpg
Prototype with X-by-wire capabilities: www.vislab.it/prototypes/sonata.jpg
The VisLab research group: www.vislab.it/galleries/staff
Example of VisLab product: www.vislab.it/prototypes/Volvo

Movies:
Automatic braking in front of a pedestrian: www.vislab.it/mov/frenata-automatica.avi
Driverless driving – VisLab X-by-wire vehicle: www.vislab.it/mov/sonata.avi
Description of some of VisLab driving assistance systems: www.vislab.it/mov/IV08demo.avi
10th anniversary of ARGO test and future challenges: www.vislab.it/mov/video-mm-compact.avi (in english)

VisLab web site: www.vislab.it
Email: comunicati@vislab.it
VisLab brochure: www.vislab.it/pdf/Brochure_VisLab_Group-3.51LR.pdf

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