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Feature Topic on Cyber-Attack Detection and Resilient Control of ICVs

Intelligent and connected vehicles (ICVs), as critical future products of the automotive industry, have developed rapidly in recent years. The insertion of a cyber chain between vehicle to vehicle would bring considerable benefits such as sharing the perception information, improving traffic efficiency, enhancing vehicle safety, saving energy, and reducing carbon emissions.

However, several accidents have shown that highly skilled attacks can bypass the security mechanisms to control ICVs remotely. Cyber attack has become a major concern. Therefore, there is a growing need for cyber-attack detection and resilient control techniques such that highly skilled attacks can be detected effectively and the corresponding security operations can be applied. Though there are some existing theoretical works on the topics in the literature, the results are far from enough to detect complex attacks on the practical applications.

This Feature Topic hopes to bring together experts from the industry and academia to discuss the progress of the latest works on cyber-attack detection and resilient control of ICVs and to give readers a clear picture of the advances that are to come. Welcome topics include, but are not strictly limited to, the following:

- New security mechanisms of V2X
- Modeling of cyber attacks
- Model-based and data-based efficient attack detection methods
- Attack resilient control approaches
- Attack mitigation algorithms

Important Dates

Submission Deadline: June 30, 2022

Final Manuscript Due: December 30, 2022

Guest Editors:

- **Prof. Hui Zhang**, Beihang University, huizhang285@gmail.com
- **Prof. Manjiang Hu**, Hunan University, manjiang_h@hnu.edu.cn
- **Dr. Anh-Tu Nguyen**, Université Polytechnique Hauts-de-France, nguyen.trananhtu@gmail.com
- **Prof. Yunpeng Wang**, Beihang University, ypwang@buaa.edu.cn
- **Prof. Yang Shi**, University of Victoria, yshi@uvic.ca

Guest Editors' Introduction:

Hui Zhang is with the Department of Automotive Engineering, Beihang University, China. His research interests include vehicle dynamics and control, mechatronics, robust control and filtering, networked control systems, and signal processing. He is the author/co-author of over100 peer-reviewed papers on journals and conference proceedings. Dr. Zhang is a recipient of the 2017 IEEE Transactions on Fuzzy Systems Outstanding Paper Award, 2018 SAE Ralph R. Teetor Educational Award, IEEE Vehicular Technology Society 2019 Best Vehicular Electronics Paper Award, and 2019 SAE International Intelligent and Connected Vehicles Symposium Best Paper Award. He is a member of SAE International, a senior member of IEEE, and a member of ASME. Dr. Zhang serves and served as an Associate Editor for IEEE Transactions on Vehicular Technology, Journal of The Franklin Institute, SAE International Journal of Vehicle Dynamics, Stability, and NVH, SAE International Journal of Connected and Automated Vehicles, and ASME Transactions Journal of Dynamic Systems, Measurement and Control; Board member of International Journal of Hybrid and Electric Vehicles, Mechanical Systems and Signal Processing.

Manjiang Hu is with the State Key Laboratory of Advanced Design and Manufacturing for Vehicle Body, College of Mechanical and Vehicle Engineering, Hunan University, China. His research interests include intelligent sensing, decision-making, and control of connected and automated vehicles. He is an author/co-author of over 30 peer-reviewed papers on journal and conference proceedings. Dr. Hu is a recipient of the 2019 SAE International Intelligent and Connected Vehicles Symposium Best Paper Award and the 2020 CRRC ZIC National College Essay Competition Best Paper Award. He serves as a member of the Intelligent and Connected Vehicle Technical Committee of SAE International.

Anh-Tu Nguyen is an Associate Professor at the INSA Hauts-de-France, Université Polytechnique Hauts-de-France, Valenciennes, France. He received a degree in engineering and an M.Sc. degree in automatic control from Grenoble Institute of Technology, France, in 2009, and a Ph.D. degree in automatic control from the University of Valenciennes, Valenciennes, France, in 2013. Dr. Nguyen is a Senior Member of the IEEE. He has served as an Associate Editor for the IEEE Transactions on Intelligent Transportation Systems, an Early Career Advisory Board member of the IFAC journal Control Engineering Practice, an Associate Editor of the IET Journal of Engineering, and a Guest Editor for special issues in various international journals. Dr. Nguyen's research interests include robust control and estimation, human-machine shared control with a special emphasis on mechatronics applications, see more information at https://sites.google.com/view/anh-tu-nguyen.

Yunpeng Wang is with the School of Transportation Science and Engineering, Beihang University, Beijing, China. He received the B.Sc., M.Sc., and Ph.D. degrees from Jilin University, Changchun, China, in 1988, 1994, and 1997, respectively. From 1988 to 2008, he served as the Dean of School of Transportation, Jilin University, the Director of the Science and Technology Department, Jilin University, and the Vice President of the Changchun University of Technology. Since 2009, he has been a Professor with the School of Transportation Science and Engineering, Beihang University, Beijing, China. He is currently the Vice President of Beihang University. He is also a Cheung Kong Scholar Professor, the Subject Expert of the National High Technology Research and Development Program ("863" Program) of China. He

has published over 100 research articles. His research interests include intelligent transportation control, cooperative vehicle infrastructure systems, and traffic emergency management systems. In 2015, he won the 2nd Prize of National Science and Technology Progress Awards.

Yang Shi is with the Department of mechanical engineering, University of Victoria, British Columbia, Canada. He received a Ph.D. degree in electrical and computer engineering from the University of Alberta, Edmonton, AB, Canada, in 2005. From 2005 to 2009, he was a Faculty Member with the Department of Mechanical Engineering, University of Saskatchewan, Saskatoon, SK, Canada. He is currently a Professor with the Department of Mechanical Engineering, University of Victoria, Victoria, BC, Canada. He was a Visiting Professor with The University of Tokyo, Tokyo, Japan, in 2013. His current research interests include networked and distributed systems, model predictive control, distributed optimization, robotics and mechatronics, industrial cyber-physical systems, optimization and controls for energy-efficient applications, navigation and control of autonomous vehicles, and energy system applications. Dr. Shi is a fellow of the Canadian Society for Mechanical Engineering, the American Society of Mechanical Engineers, and the Engineering Institute of Canada, and a Registered Professional Engineer in the Province of British Columbia, Canada. He was a recipient of the University of Saskatchewan Student Union Teaching Excellence Award in 2007, the Faculty of Engineering Teaching Excellence Award from the University of Victoria in 2012, the Craigdarroch Silver Medal for Excellence in Research of the University of Victoria in 2015, the 2017 IEEE TRANSACTIONS ON FUZZY SYSTEMS Outstanding Paper Award for his co-authored paper, and the Humboldt Research Fellowship for Experienced Researchers in 2018. He is a member of the IEEE IES Administrative Committee in 2017–2019 and is currently the Chair of the IEEE IES Technical Committee on Industrial Cyber-Physical Systems. He is currently the Coeditor-in-Chief of the IEEE Transactions on Industrial Electronics. He also serves as an Associate Editor for Automatica, the IEEE Transactions on Control Systems Technology, the IEEE/ASME Transactions on Mechatronics, and the IEEE Transactions on Cybernetics.

Submission Guidelines

The paper submission & review process will be handled through Automotive Innovation

1. Please submit online via www.springer.com/42154, be sure to select Topical Collection: Cyber-Attack Detection and Resilient Control of ICVs.
2. Papers should be submitted in two separate .doc files: 1) Blinded Manuscript (paper title, abstract, key words, and full text); 2) Title Page (paper title, author affiliation, acknowledgement, and any other information related with the authors' identification).
3. All manuscripts will be peer reviewed and evaluated based on quality, originality, novelty, and relevance to the topics.
4. If any problems, please feel free to contact the journal editorial office via email: jai-editor@sae-china.org .

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The journal provides a forum for the research of principles, methodologies, designs, theoretical background, and cutting-edge technologies in connection with the development of vehicle and mobility. The main topics cover: energy-saving, electrification, intelligent and connected, safety, and emerging vehicle technologies.

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