Quest Journals
Journal of Research in Mechanical Engineering
Volume 8 ~ Issue 4 (2022) pp: 18-28
ISSN(Online) : 2321-8185
www.questjournals.org

Research Paper

Current and Future Trends in Automotive Industry

*Sujoy Kumar Saha
Mechanical Engineering Department
IIEST Shibpur, Howrah, India
Corresponding Author: Sujoy Kumar Saha

ABSTRACT: *In this paper, current situation and innovation analysis and future development trend of automotive control system is discussed. Automotive radar has been visited from first efforts in this direction to future systems. The future of fossil and alternative fuels used in automotive industry, reuse of automotive software, from cloned variants to managed software product lines, variability identification and representation for automotive Simulink models, definition of information driven greenfield approach to future electrical and electronic architecture framework for automotive systems and safety have been dealt with. Experience in the development of ISO 11783 compliant agricultural systems has been shared. Safety driven development and ISO 26262 are included. C-ITS and security discussion has been introduced to cooperative intelligent transportation systems, in-vehicle networks and security, security for V2X, intelligent transportation system infrastructure and software challenges are dealt with. The article ends with the discussion of future trends in electric vehicles enabled by internet connectivity, solar and battery technology and the state-of-the-art, future trends and challenges in designing modern autonomous vehicles.*

KEYWORDS: *Innovation Analysis, ISO 11783, ISO 26262, C-ITS, V2X, Autonomous Vehicle*

R*eceived 12 Apr, 2022;* ***R****evised 26 Apr, 2022;* ***A****ccepted 28Apr, 2022 © The author(s) 2022.*
P*ublished with open access at* ***www.questjournals.org***

I. INTRODUCTION

Electronic, especially the dynamic control system (CS) in automobile is gathering momentum. Electronic Stability Control (ESC) is an active safety and the key executive layer of intelligent driving system. Vehicle state parameters are the basis of ESC control and have a direct impact on the intervention effect of ESC related functions. The ESC dynamic CS helps understanding the functional modules of the dynamic CS, including the information interface module, the parameter estimation module, the functional logic module, the functional coordination module, the pressure control module and the functional safety module. These deals with basic control principle, control target object, and studies its vehicle yaw rate algorithm. The greater the yaw moment is, the earlier the ESC dynamic CS intervenes to protect vehicle safety. Based on big data, it analyzes the ESC loading rate, and uses chart analysis method to understand the rising of ESC loading rate and the analysis of vehicle yaw steering wheel angle and speed. The ESC CS of automobile has connected the steering, braking and power systems together. It has been proved to be one of the main active safety technologies to effectively reduce automobile traffic accidents. It is of great significance to carry out the research and evaluation of ESC CS.

II. FUTURE TECHNOLOGY TRENDS

The automotive industry is evolving in many ways in response to technological development and consumer behavior. Most are in the realm of safety, but some are pure convenience. Typically, innovative features from the manufacturers are offered on higher-end cars as options and eventually trickle down to less expensive vehicles as cost declines, awareness increases and demand grows. The Automotive industry is a wide range of companies and organizations involved in the design, development, manufacturing, marketing, and selling of motor vehicles. The automotive industry does not include industries dedicated to the maintenance of automobiles following delivery to the end-user, such as automobile repair shops and motor fuel filling stations. The word ‘automotive’ is from the Greek autos (self), and Latin motivus (of motion) to refer to any form of self-powered vehicle. In a broader sense, all repair and fuel stations also come under automotive industry. All sellers, marketers and manufacturers are also included in automotive industry. As automobile is anything that moves on

its own on roads, all motorcycles get included in the umbrella term and also the scooters and mopeds that have their own engine and run on two wheels. Even a three wheeler is referred to as an 'auto'. Foresight analysis for the next few decades would mean an automotive innovation is sophisticated consumers, intelligent vehicle, dynamic operation, integrated business, and ecosystem. For a new vehicle, major design criteria are fuel consumption, vehicle safety, crashworthiness, durability, ride comfort, handling behaviors, ergonomics, aerodynamics and noise, vibration and harshness (NVH) concepts. The competitive nature of automotive industry forces original equipment manufacturers (OEMs) to make critical decisions among these design parameters. The trend is to build lighter and more energy efficient vehicles. Lightweight materials are one of the foremost research topics in automotive engineering. Autonomous vehicle technology aims to minimize traffic accidents and to reduce energy consumption and air pollution. Yet another important topic in automotive engineering is noise, vibration and harshness (NVH). The mechanism of noise and vibration is the same in the way that both of them occur through oscillatory motions. In vehicles, the sources and potential solutions are very similar for interior and exterior noise. Exterior noise problems, such as pass-by-noise and traffic noise are regulated due to legislation. On the other hand, interior noise quality and comfort come into question mainly due to customer expectations and competition among OEMs. The new trends in automotive electronics, such as autonomous vehicle technology, human machine interaction, vehicle networks and automotive security require an entirely different system architecture and development process than are pursued today for OEMs. In the next decade, only the OEMs that are innovating in electric and autonomous vehicle technologies will be the global leaders of the automotive industry. Technology trends include: 1) More Intelligent driver assistance systems such as safety functions, comfort functions, traffic efficiency improvement and environmental effect reduction; 2) Body technology determined by the used materials with competition between multi-materials, steel, and carbon fibers; 3) Chassis technology improved by integrated vehicle dynamics control, active suspension components and material application; 4) Drive trains converted into hybrid-drives with intelligent solutions on the horizon for these hybrid gearboxes, but also for four-wheel drive systems; 5) Electronic control focusing on central control modules, the mobile phone for quite new applications and inventions for car lighting. Based on the studies conducted by international oil companies and independent energy organizations, it is predicted that oil reserves will be depleted in near future. Paris Agreement aims to reduce fossil fuels and oil use in order to reduce air pollution. Studies are being carried out on how to meet energy needs for the areas such as electricity, heat and transportation by renewable energy sources. Alternative fuels are likely to be used in future vehicles. Kyoto Protocol and the Paris Agreement are likely to reduce harmful emissions to the environment. Hybrid vehicles work with internal combustion engines and need petroleum. Electric vehicles have problems due of battery for long range use. LPG, CNG, methanol, ethanol and biodiesel fuels are used as an alternative fuel in internal combustion engines. Resource diversity should be given due consideration.

III. AUTOMOTIVE SOFTWARE REUSE, E/E ARCHITECTURE AND SAFETY AND C-ITS AND SECURITY

Software reuse, electrical and electronic architecture and safety and C-ITS and security are modern topics of automotive industry.

IV. CONCLUSION

This paper has dealt with current and future trends in automotive industry. The readers' are drawn to the following compendium of references.

REFERENCES

[1]. Naur P, Randell B. Software engineering: Report on a conference. In: Nato science committee NATO; 1969; Garmisch, Germany:231.

[2]. Erdogmus H, Medvidovic N, Paulisch F. 50 years of software engineering. SOFTW. 2018;35(5).

[3]. McIlroy MD. Mass produced software components. Peter Naur and Brian Randell, eds. Nato science committee NATO. Belgium: Scientific Affairs Division NATO; 1969:1–136.

[4]. Bigerstaff TJ, Perlis AJ. Software reusability. Vol I: concepts and models. New York: ACM Press; 1989.

[5]. Kath, O., Schreiner, R. and Favaro, J., 2009, September. Safety, security, and software reuse: A model-based approach. In Proceedings of the fourth international workshop in software reuse and safety.

[6]. Latour L, Wheeler T, Frakes W. Descriptive and predictive aspects of the 3cs model: Seta1 working group summary. In: Workshop: Methods and tools for Reuse Syracuse University CASE Center; 1990.

[7]. Weide B, Ogden WF, Zweben SH. Reusable software components, advances in computers. Transp Res Rec: J Transp Res Board. 1991; 33:1- 65.

[8]. Jézéquel JM, Meyer B. Design by contract: the lessons of ariane. COMPUT. 1997;30(2):129- 130.

[9]. Favaro, John, and Maurizio Morisio. "Safe and Secure Software Reuse." Pisa: Springer (2013).

[10]. Capilla, R., Gallina, B., Cetina, C. and Favaro, J., 2019. Opportunities for software reuse in an uncertain world: From past to emerging trends. Journal of Software: Evolution and Process, 31(8), p.e2217.

[11]. Prieto- Díaz R. Domain analysis for reusability. Compsac'87 IEEE; 1987:23- 29.

[12]. Prieto- Díaz R. The dissapearance of software reuse. In: Third International Conference on Software Reuse: Advances in Software Reusability, Rio de Janeiro, Brazil; 1994.

[13]. Krueger CW. Software reuse. ACM Computing Surveys. 1992;24(2):131- 183.
[14]. Prieto- Diaz R, Freeman P. Classifying software for reusability. IEEE Softw. 1987;4(1):6- 16.
[15]. Simos MA. Organization domain modeling (ODM): formalizing the core domain modeling life cycle. In: Proceedings of the 1995 Symposium on Software Reusability (SSR) ACM, Seattle, USA; 1995:196- 205.
[16]. Capilla R. Application of domain analysis to knowledge reuse. 8th Workshop on Institutionalizing Software Reuse; 1996:1- 6.
[17]. Arango GF. Domain engineering for software reuse. PhD thesis. Irvine: University of California, California, USA; 1988.
[18]. Prieto- Diaz R, Arango GF. Domain analysis and software systems modeling: IEEE Press; 1991.
[19]. Frakes W, Prieto- Diaz R, fox C. Dare: domain analysis and reuse environment. Ann Softw Eng. 1998;5(1):125- 141.
[20]. Neighbors JM. The draco approach for constructing reusable components. IEEE Trans Softw Eng. 1984;10:564- 574.
[21]. Batory D, O'Malley S. The design and implementation of hierarchical software systems with reusable components. ACM Trans Softw Eng Methodol. 1992;4:355- 398.
[22]. Czarnecki K, Eisenecher U. Generative programming: methods, tools, and applications. Reading, MA, USA: Addison- Wesley; 2000.
[23]. Bigerstaff TJ, Perlis AJ. Software reusability. Vol II: applications and experience. New York: ACM Press; 1989.
[24]. Anderson W. What COTS and software reuse teach us about SOA. In: 6th International IEEE Conference on Commercial- off- the- Shelf (COTS)- Based Software Systems (ICCBSS'07) IEEE, Banff, Alberta, Canada; 2007:1- 6.
[25]. Barnes B, Durek T, Gaffney J, Pyster A. A framework and economic foundation for software reuse. Software Reuse: Emering Technology: IEEE, Los Alamitos, California, USA; 1988:77- 78.
[26]. Gaffney J. E:, Durek TA. Software reuse—key to enhanced productivity: some quantitative models. Inf Softw Technol. 1989;31(5):258- 267.
[27]. Favaro J. What price reusability? First Symposium on Environments and Tools for Ada. Redondo Beach, California, USA; 1990:115- 124.
[28]. Poulin JS. Measuring software reuse: principles, practices, and economic models. Reading, MA, USA: Addison- Wesley Longman; 1996.
[29]. Lim WC. Managing software reuse. New Jersey: Prentice Hall; 1994.
[30]. Favaro JM, Favaro KE, Favaro PF. Value based software reuse investment. Ann Softw Eng. 1998;5(1):5- 52.
[31]. Biffl S, Aurum A, Boehm B, Erdogmus H, Grünbacher P. Value- based software engineering. Berlin, Heidelberg: Springer Verlag; 2006.
[32]. Clements PC, Northrop L. Software product lines: practices and patterns, SEI Series in Software Engineering: Addison- Wesley; 2002.
[33]. Ternité T. Process lines: a product line approach designed for process model development. In: 2009 35th Euromicro Conference on Software Engineering and Advanced Applications; 2009; Patras, Greece:173- 180.
[34]. Gallina B, Sljivo I, Jaradat O. Towards a safety- oriented process line for enabling reuse in safety-critical systems development and certification. In: 2012 35th Annual IEEE Software Engineering Workshop; 2012:148- 157.
[35]. Berger T, Rublack R, Nair D, Atlee JM, Becker M, Czarnecki K, Wąsowski A. A survey of variability modeling in industrial practice. In: Proceedings of the Seventh International Workshop on Variability Modelling of Software- Intensive Systems VaMoS'13. ACM; 2013; New York, NY, USA:7:1- 7:8.
[36]. Pham NH, Nguyen HA, Nguyen TT, Al- Kofahi JM, Nguyen TN. Complete and accurate clone detection in graph- based models. In: Proceedings of the 31st International Conference on Software engineering ICSE '09. IEEE Computer Society; 2009; Washington, DC, USA:276- 286.
[37]. Assunção WesleyK. G., Lopez- Herrejon RE, Linsbauer L, Vergilio SR, Egyed A. Reengineering legacy applications into software product lines: a systematic mapping. Empir Softw Eng. 2017;22(6):2972- 016.
[38]. Martinez J, Assunção WKG, Ziadi T. EPLA: a catalog of extractive spl adoption case studies. In: Proceedings of the 21st International Systems and Software Product Line Conference - Volume B SPLC'17 ACM; 2017; New York, NY, USA:38- 41.
[39]. Round- trip engineering and variability management platform and process (revamp2 itea3project). Identification of relevant state of the art. http://www.revamp2project.eu/images/documentation/ REVAMP2_D3.1_v05.pdf; 2017.
[40]. Beuche D, Schulze M, Duvigneau M. When 150% is too much: supporting product centric viewpoints in an industrial product line. In: Proceedings of the 20th International Systems and Software Product Line Conference SPLC '16. ACM; 2016; New York, NY, USA:262- 269.
[41]. Martinez J, Ziadi T, Bissyandé TF, Klein J, Le Traon Y. Bottom- up technologies for reuse: automated extractive adoption of software product lines. In: 2017 IEEE/ACM 39th International Conference on Software Engineering Companion (ICSE- C); 2017; Buenos Aires, Argentina:67- 70.
[42]. CAN in Automation. Controller Area Network (CAN) – an overview. http://www.can-cia.de/can/, Mar. 2003.
[43]. Carnegie Mellon Software Engineering Institute. Software Product Lines. http://www.sei.cmu.edu/plp/product_line_overview.html, Feb. 2003.
[44]. P. Clemens and L. Northop. Software Product Lines -Practices and Patterns. Addison-Wesley, Boston, 2002.
[45]. EAST-EEA. Embedded Electronic Architecture. http://www.east-eea.net, Apr. 2004.
[46]. B. Hardung, M. Wernicke, A. Krüger, G. Wagner, and F. Wohlgemuth. Development Process for Networked Electronic Systems. VDI-Berichte 1789, VDI Congress Electronic Systems for Vehicles, Baden-Baden, pages 77 – 97, Sept. 2003.
[47]. J. Hartmann, S. Huang, and S. Tilley. Documenting Software Systems with Views II: An Integrated Approach Based on XML. Proceedings of the 19th Annual International Conference on Computer Documentation, Santa Fe, New Mexico, USA, pages 237 – 246, Oct. 2001.
[48]. H. Heinecke, A. Schedl, J. Berwanger, M. Peller, V. Nieten, R. Belschner, B. Hedenetz, P. Lohrmann, and C. Bracklo. FlexRay – ein Kommunikationssystem für das Automobil der Zukunft. Elektronik Automotive, pages 36 – 45, Sept. 2002.
[49]. HIS – Hersteller Initiative Software, Volkswagen AG. HIS /Vector CAN-Driver Specification V1.0. http://www.automotive-his.de, Aug. 2003.
[50]. R. Kirner, R. Lang, G. Freiberger, and P. Puschner. Fully Automatic Worst-Case Execution Time Analysis for Matlab/Simulink Models. Proc. 14th Euromicro International Conference on Real-Time Systems, Vienna, Austria, pages 31 – 40, June 2002.
Krüger, G. Wagner, N. Ehmke, and S. Prokop. Economic Considerations and Business Models for Automotive
[51]. Font J, Arcega L, Haugen O, Cetina C. Achieving feature location in families of models through the use of search- based software engineering. IEEE Trans Evol Comput. 2018;22(3):363- 377.
[52]. Font J, Arcega L, Haugen O, Cetina C. Feature location in models through a genetic algorithm driven by information retrieval techniques. In: Proceedings of the ACM/IEEE 19th International Conference on Model Driven Engineering Languages and Systems MODELS '16. ACM; 2016; New York, NY, USA:272- 282.

[53]. Kang KC, Cohen SG, Hess JA, Novak WE, Peterson AS. Feature- oriented domain analysis (foda) feasibility study. CMU/SEI-90- TR- 21, Carnegie- Mellon University Software Engineering Institute; 1990.
[54]. Bosch J. Design and use of software architectures: adopting and evolving a product- line approach. New York, NY, USA: ACM Press/Addison- Wesley Publishing Co; 2000.
[55]. J. Schuller and M. Haneberg. Funktionale Analyse – Eine Methode für den Entwurf hochvernetzter Systeme. Vortrag, VDI-Mechatronik-Konferenz, Fulda, May 2003.
[56]. F. Simonot-Lion. In Car Embedded Electronic Architectures: How to Ensure their Safety. 5th IFAC International Conference on Fieldbus Systems and their Applications -FeT'2003, Aveiro, Portugal, pages 1 – 8, July 2003.
[57]. Telelogic. Telelogic Doors Overview. http://www.telelogic.com/products/doorsers/doors/, Apr.2004.
[58]. S. Thiel and A. Hein. Modeling and Using Product Line Variability in Automotive Systems. IEEE Software, pages 66 – 72, July 2002.
[59]. T. Thurner, J. Eisenmann, U. Freund, R. Geiger, M. Haneberg, U. Virnich, and S. Voget. The EAST-EEA project – A Middleware Based Software Architecture for Networked Electronic Control Units in Vehicles. VDI-Berichte 1789, VDI Congress Electronic Systems for Vehicles, Baden-Baden, pages 545 – 563, Sept. 2003.
Desmet B, Vallejos J, Costanza P, Meuter WD, D'Hondt T. Context- oriented domain analysis. In: 10th International and Interdisciplinary Conference on Modeling and Using Context. Cambridge, UK: Sprnger; 2007:178- 191.
[60]. Radio Technical Commission for Aeronautics (RTCA). DO- 297 - integrated modular avionics (IMA) development guidance and certification considerations; 2005.
[61]. International Organization for Standardization. ISO 26262: Road vehicles — Functional safety; 2011.
[62]. AUTOSAR Website. AUTOSAR (AUTomotive Open System ARchitecture). http://www.autosar.org
[63]. AUTOSAR Website. Specification of safety extensions AUTOSAR CP release 4.4.0). https://www.autosar.org/standards/classic-platform/classic-platform-440/
[64]. European cooperation for space standardization. ECSS- Q- HB- 80- 01A: Space product assurance - Reuse of existing software; 2011.
[65]. Hardung B, Kölzow T, Krüger A. Reuse of software in distributed embedded automotive systems. In: Fourth ACM International Conference on Embedded Software (emsoft 2004) September 27- 29, 2004, Pisa; 2004; Italy ACM:203- 210.
[66]. Chrisofakis E, Junghanns A, Kehrer C, Rink A. Simulation- based development of automotive control software with modelica. In: 8th International Modelica Conference Linköping University Electronic Press; 2011; Dresden, Germany:1- 7.
[67]. Nešić D, Nyberg M, Gallina B. Constructing product- line safety cases from contract- based specifications. In: Proceedings of the 34th ACM/SIGAPP Symposium on Applied Computing SAC '19 ACM; 2019; New York, NY, USA:2022- 2031. http://doi.acm.org/10.1145/3297280.3297479
[68]. Favaro J, Savoia G, D'Allessandro M. Adabeans: an architecture for component- based development of aerospace applications, using uml as a visual composition language. DASIA- Data Systems in Aerospace, 25- 28 May, 1998, Athens, Greece Edited by B. KaldeichSchürmann. ESA SP- 422. Paris, European Space Agency.
[69]. Panunzio M, Vardanega T. A component- based process with separation of concerns for the development of embedded real- time software systems. J Syst Softw. 2014;96:105- 121.
[70]. AMASS Consortium. AMASS (Architecture- driven, multi- concern and seamless assurance and certification of cyber- physical systems). (Last accessed: July 3, 2019). http://www.amass-ecsel.eu.
[71]. Javed MA, Gallina B. Safety- oriented process line engineering via seamless integration between EPF composer and BVR tool. In: Proceedings of the 22Nd International Systems and Software Product Line Conference (SPLC) - Volume 2. ACM Digital Library; 2018; Gothenburg, Sweden, New York, NY, USA:23- 28.
[72]. Javed MA, Gallina B, Carlsson A. Towards variant management and change impact analysis in safety- oriented process- product lines. In: Proceedings of the 34thACM/SIGAPP Symposium on Applied Computing SAC'19. ACM; 2019; New York, NY, USA:2372- 2375. http://doi.acm.org/10.1145/3297280.3297634
[73]. Gallina B. Quantitative evaluation of tailoring within spice- compliant security- informed safety- oriented process lines. J Soft Evol Process. 2019.
[74]. The Consultative Committee for Space Data Systems (CCSDS). Report concerning space data system standards. spacecraft onboard interface services, INFORMATIONAL REPORT CCSDS 850.0- G- 2, GREEN BOOK, Washington DC, USA; 2013.
[75]. EEIG ERTMS Users Group. ERTMS/ETCS RAMS requirements specification: chapter 2 - RAM. http://docplayer.net/20959132-Ertms-etcs-ramsrequirements-specification-chapter-2-ram.html
[76]. Shift2Rail Joint Undertaking. Multi- annual action plan. https://shift2rail.org/
[77]. ter Beek MH, Fantechi A, Gnesi S. Product line models of large cyber- physical systems: the case of ERTMS/ETCS. In: Proceeedings of the 22nd International Systems and Software Product Line Conference - Volume 1, SPLC 2018; Spring September 10; Gothenburg, Sweden:208- 214.
[78]. Jakovljevic M, Geven A, Simanic- John N, Saatci DM. Next- gen train control / management (TCMS) architectures: drive- by- data system integration approach. In: Proceeedings of the 9th European Congress on Embedded Real Time Software and Systems ERTS Toulouse; 2018; France.
[79]. K. Kitajima, T. Higuchi, K. Terasaka, and K. Oshima, "On-board device, automatic toll collection machine, toll collection system, and toll collection method," U.S. Patent App. 16/080 487, Jun. 2020.
[80]. "Cybercrime damages $6 trillion by 2021," 2016. Accessed: Mar. 7, 2020. [Online]. Available: https://cybersecurityventures.com/hackerpocalypsecybercrime-report-2016/
[81]. L. Hrtan and C. Dobre, "Blockchain privacy-preservation in intelligent transportation systems," in Proc. IEEE Int. Conf. Comput. Sci. Eng., Bucharest, Romania, Oct. 2018, pp. 177–184.
[82]. J. Wu, M. Dong, K. Ota, J. Li, and W. Yang, "Application-aware consensus management for software-defined intelligent blockchain in IoT," IEEE Netw., vol. 34, no. 1, pp. 69–75, Jan./Feb. 2020.
[83]. C. N. Van Phu and N. Farhi, "Estimation of urban traffic state with probe vehicles," IEEE Trans. Intell. Transp. Syst., to be published, doi: 10.1109/TITS.2020.2975120.
[84]. Y. Lv, Y. Duan, W. Kang, Z. Li, and F. Wang, "Traffic flow prediction with big data: A deep learning approach," IEEE Trans. Intell. Transp. Syst., vol. 16, no. 2, pp. 865–873, Ap. 2015.
[85]. H. Yang, T. S. Dillon, and Y. P. Chen, "Optimized structure of the traffic flow forecasting model with a deep learning approach," IEEE Trans. Neural Netw. Learning Syst., vol. 28, pp. 2371–2381, Oct. 2017.
[86]. P. Kachroo, S. Gupta, S. Agarwal, and K. Ozbay, "Optimal control for congestion pricing: Theory, simulation, and evaluation," IEEE Trans. Intell. Transp. Syst., vol. 18, no. 5, pp. 1234–1240, May 2017.

[87]. K. Zhang, Z. Zhou, Y. Qi, and Y. Wang, "Dynamic pricing strategy for high occupancy toll lanes based on random forest and nested model," IET Intell. Transp. Syst., vol. 13, no. 4, pp. 636–643, 2019.

[88]. D.Gross and J. M. Thompson, Fundamentals of Queueing Theory. 4th ed. New York, NY, USA: Wiley, 2009.

[89]. P. Bhattacharya, S. Tanwar, R. Shah, and A. Ladha, "Mobile edge computing-enabled blockchain framework—A survey," in Proceedings of ICRIC 2019, P. K. Singh, A. K. Kar, Y. Singh, M. H. Kolekar, and S. Tanwar, Eds., (Cham), Berlin, Germany: Springer, 2020, pp. 797–809.

[90]. P. Bhattacharya, A. Singh, A. Kumar, A. K. Tiwari, and R. Srivastava, "Comparative study for proposed algorithm for all-optical network with negative acknowledgement (ao-nack)," in Proc. 7th Int. Conf. Comput. Commun. Technol., New York, NY, USA, 2017, pp. 47–51.

[91]. F. R. B. Cruz, M. F. S. V. D'Angelo, and T. V. Woensel, "Traffic intensity estimation in finite markovian queueing systems,"Hindawi Math. Problems Eng., vol. 2018, pp. 1–15, Jun. 2018, doi:10.1155/2018/3018758.

[92]. N. Y. S. T. Authority, "Open data NY." 2019. Accessed: Jan. 2020. [Online]. Available: https://data.ny.gov/Transportation/NYS-ThruwayOrigin-and-Destination-Points-for-All-/chzq-388p

[93]. N. Oceanic and A. Administration, "NOAA," 2020. Available: https://www.ncdc.noaa.gov/cdo-web/search

[94]. J. Srinivas, A. K. Das, N. Kumar, and J. Rodrigues, "Cloud centric authentication for wearable healthcare monitoring system," IEEE Trans. Dependable Secure Comput., vol. 17, no. 5, pp. 942–956, Sep./Oct. 2020.

[95]. J. J. Hathaliya, S. Tanwar, S. Tyagi, and N. Kumar, "Securing electronics healthcare records in healthcare 4.0: A biometric-based approach," Comput. Elect. Eng., vol. 76, pp. 398–410, 2019.

[96]. X. Deng and T. Gao, "Electronic payment schemes based on blockchain in vanets," IEEE Access, vol. 8, pp. 38296–38303, 2020.

[97]. J. Qiu, L. Du, D. Zhang, S. Su, and Z. Tian, "Nei-TTE: Intelligent traffic time estimation based on fine-grained time derivation of road segments for smart city," IEEE Trans. Ind. Inform., vol. 16, no. 4, pp. 2659–2666, Apr. 2020.

[98]. J. W. C. van Lint, "A reliable real-time framework for short-term freeway travel time prediction," J. Transp. ASCE, vol. 132, no. 12, pp. 921–932, Dec. 2006.

[99]. J. W. C. van Lint, S. P. Hoogendoorn, and H. J. van Zuylen, "Accurate travel time prediction with state-space neural networks under missing data," Transp. Res. C, Emerg. Technol., vol. 13, no. 5/6, pp. 347–369, Oct.–Dec. 2005.

[100]. W.-H. Lin and H. Liu, "Enhancing realism in modeling merge junctions in analytical models for system-optimal dynamic traffic assignment," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 4, pp. 838–845, Dec. 2010.

[101]. L. Zhao, X. Peng, L. Li, and Z. Li, "A fast signal timing algorithm for individual oversaturated intersections," IEEE Trans. Intell. Transp. Syst.,vol. 12, no. 1, pp. 280–283, Mar. 2011.

[102]. Alonso-Ayuso, L. F. Escudero, and F. J. Martín-Campo, "Collision avoidance in air traffic management: A mixed-integer linear optimization approach," IEEE Trans. Intell. Transp. Syst., vol. 12, no. 1, pp. 47–57, Mar. 2011.

[103]. M. Mulder, D. A. Abbink, M. M. van Paassen, and M. Mulder, "Design of a haptic gas pedal for active car-following support," IEEE Trans. Intell. Transp. Syst., vol. 12, no. 1, pp. 268–279, Mar. 2011.

[104]. W.-Y. Shieh, C.-C. Hsu, S.-L. Tung, P.-W. Lu, T.-H. Wang, and S.-L. Chang, "Design of infrared electronic-toll-collection systems with extended communication areas and performance of data transmission," IEEE Trans. Intell. Transp. Syst., vol. 12, no. 1, pp. 25–35, Mar. 2011.

[105]. Mahmud N, Seceleanu C, Ljungkrantz O (2015) Resa: an ontology-based requirement specification language tailored to automotive systems. In: 10th IEEE international Symposium on Industrial Embedded Systems (SIES), 2015. IEEE, Piscataway, pp 1–10

[106]. Manhart P, Schneider K (2004) Breaking the ice for agile development of embedded software: an industry experience report. In: Proceedings of the 26th international conference on software engineering. IEEE Computer Society, Washington, pp 378–386

[107]. Mellegård N, Staron M (2008) Methodology for requirements engineering in model-based projects for reactive automotive software. In: 18th ECOOP doctoral symposium and PhD student workshop, p 23

[108]. Mellegård N, Staron M (2009) A domain specific modelling language for specifying and visualizing requirements. In: The first international workshop on domain engineering, DE@ CAiSE, Amsterdam

[109]. Mellegård N, Staron M (2010) Characterizing model usage in embedded software engineering: a case study. In: Proceedings of the fourth European conference on software architecture: companion volume. ACM, New York, pp 245–252

[110]. Mellegård N, Staron M (2010) Distribution of effort among software development artefacts: an initial case study. In: Enterprise, business-process and information systems modeling. Springer, Berlin, pp 234–246

[111]. Mellegård N, Staron M (2010) Improving efficiency of change impact assessment using graphical requirement specifications: an experiment. In: Product-focused software process improvement. Springer, Berlin, pp 336–350

[112]. Ott D (2012) Defects in natural language requirement specifications at mercedes-benz: an investigation using a combination of legacy data and expert opinion. In: 2012 20th IEEE international Requirements Engineering conference (RE). IEEE, Piscataway, pp 291–296

[113]. Ott D (2013) Automatic requirement categorization of large natural language specifications at mercedes-benz for review improvements. In: Requirements engineering: foundation for software quality. Springer, Berlin, pp 50–64

[114]. Peraldi-Frati MA, Albinet A (2010) Requirement traceability in safety critical systems. In: Proceedings of the 1st workshop on critical automotive applications: robustness & safety. ACM, New York, pp 11–14

[115]. Pernstål J, Gorschek T, Feldt R, Florén D (2013) Software process improvement in interdepartmental development of software-intensive automotive systems–a case study. In: Productfocused software process improvement. Springer, Berlin, pp 93–107

[116]. Rana R, Staron M, Berger C, Hansson J, Nilsson M, Törner F (2013) Improving fault injection in automotive model based development using fault bypass modeling. In: GI-Jahrestagung. Chalmers University of Technology, Gothenburg, pp 2577–2591

[117]. Rana R, Staron M, Mellegård N, Berger C, Hansson J, Nilsson M, Törner F (2013) Evaluation of standard reliability growth models in the context of automotive software systems. In: Product-focused software process improvement. Springer, Berlin, pp 324–329

[118]. Rana R, Staron M, Berger C, Hansson J, Nilsson M, Törner F (2013) Increasing efficiency of ISO 26262 verification and validation by combining fault injection and mutation testing with model based development. In: ICSOFT 2013, pp 251–257

[119]. Sagstetter F, Lukasiewycz M, Steinhorst S, Wolf M, Bouard A, Harris WR, Jha S, Peyrin T, Poschmann A, Chakraborty S (2013) Security challenges in automotive hardware/software architecture design. In: Proceedings of the conference on design, automation and test in Europe, EDA consortium, pp 458–463

[120]. Siegl S, Russer M, Hielscher KS (2015) Partitioning the requirements of embedded systems by input/output dependency analysis for compositional creation of parallel test models. In: 9th annual IEEE international Systems Conference (SysCon), 2015. IEEE, Piscataway, pp 96–102

[121]. SimulinkDemo (2012) Modeling an anti-lock braking system. The MathWorks, Inc, Natick. Copyright 2005-2010

[122]. Sinha P (2011) Architectural design and reliability analysis of a fail-operational brake-by-wire system from iso 26262 perspectives. Reliab Eng Syst Saf 96(10), 1349–1359

[123]. Staron M (2017) Automotive software architectures: an introduction. Springer, Cham
[124]. Törner F, Ivarsson M, Pettersson F, Öhman P (2006) Defects in automotive use cases. In: Proceedings of the 2006 ACM/IEEE international symposium on empirical software engineering. ACM, New York, pp 115–123
[125]. Vogelsanag A, Fuhrmann S (2013) Why feature dependencies challenge the requirements engineering of automotive systems: an empirical study. In: 2013 21st IEEE international Requirements Engineering conference (RE). IEEE, Piscataway, pp 267–272
[126]. Weber M, Weisbrod J (2002) Requirements engineering in automotive developmentexperiences and challenges. In: 2002 IEEE international Requirements Engineering conference (RE). IEEE, Piscataway, pp 331–340
[127]. Wright A (2011) Hacking cars. Commun ACM 54(11):18–19
[128]. Ali NM, Hosking J, Grundy J (2013) A taxonomy and mapping of computer-based critiquing tools. IEEE Trans Softw Eng 39(11):1494–1520
[129]. Azuma M, Coallier F, Garbajosa J (2003) How to apply the bloom taxonomy to software engineering. In: Eleventh annual international workshop on software technology and engineering practice, 2003. IEEE, Piscataway
[130]. Babar MA, Gorton I (2004) Comparison of scenario-based software architecture evaluation methods. In: 11th Asia-Pacific software engineering conference, 2004. IEEE, Piscataway
[131]. Blom H, Hagl F, Papadopoulos Y, Reiser MO, Sjöstedt CJ, Chen DJ, Kolagari R (2012) EAST-ADL - an architecture description language for automotive software-intensive systems. International Standard
[132]. Blum BI (1994) A taxonomy of software development methods. Commun ACM 37(11):82–94
[133]. Bock F, Homm D, Siegl S, German R (2016) A taxonomy for tools, processes and languages in automotive software engineering. In: Zizka J, Nagamalai D (eds) Computer science & information technology. AIRCC Publishing Corporation, Chennai
[134]. Bock F, Sippl C, German R (2017) Fully automated vehicles: challenges, expectations and methods. In: Bargende M, Reuss HC, Wiedemann J (eds) Proceedings of 17th Internationales Stuttgarter Symposium: Automobil- und Motorentechnik, Stuttgart, Germany
[135]. Bröhl A (1993) The V-model. In: Software - application delevopment - information systems. Oldenbourg, Munich
[136]. Broy M, Feilkas M, Herrmannsdoerfer M, Merenda S, Ratiu D (2010) Seamless model-based development: from isolated tools to integrated model engineering environments. Proc IEEE 98(4):526–545
[137]. Caspi P, Pilaud D, Halbwachs N, Plaice JA (1987) LUSTRE: a declarative language for realtime programming. In: Proceedings of the 14th ACM SIGACT-SIGPLAN symposium on principles of programming languages, New York, NY, USA, POPL '87
[138]. Cheu RL, Tan Y, Lee D (2003) Comparison of paramics and GETRAM/AIMSUN microscopic traffic simulation tools. In: 83rd annual meeting of the transportation research board
[139]. Dajsuren Y, van den Brand MG, Serebrenik A, Roubtsov S (2013) Simulink models are also software: modularity assessment. In: Proceedings of the 9th international ACM sigsoft conference on quality of software architectures. ACM, New York, pp 99–106
[140]. Di Natale M, Sangiovanni-Vincentelli AL (2010) Moving from federated to integrated architectures in automotive: the role of standards, methods and tools. Proc IEEE 98(4):603–620
[141]. Djanatliev A, Dulz W, German R, Schneider V (2011) Veritas - a versatile modelling environment for test-driven agile simulation. In: Proceedings of the 2011 winter simulation conference, Phoenix, AZ, USA, WSC 2011
[142]. Eckhoff D (2016) Simulation of privacy-enhancing technologies in vehicular ad-hoc networks. PhD thesis, University of Erlangen
[143]. Fürst S, Bechter M (2016) Autosar for connected and autonomous vehicles: the autosar adaptive platform. In: 2016 46th annual IEEE/IFIP international conference on Dependable Systems and Networks Workshop (DSN-W)
[144]. Fürst S, Mössinger J, Bunzel S, Weber T, Kirschke-Biller F, Heitkämper P, Kinkelin G, Nishikawa K, Lange K (2009) Autosar–a worldwide standard is on the road. In: 14th international VDI congress electronic systems for vehicles, Baden-Baden, vol 62
[145]. Guo Y, Jones RP (2009) A study of approaches for model based development of an automotive driver information system. In: 3rd annual IEEE systems conference, 2009. IEEE, Piscataway
[146]. Hoffmann H (2014) Systems engineering best practices with the rational solution for systems and software engineering
[147]. IO for Standardization (2009) ISO/DIS 26262-1 - Road vehicles - functional safety - part 1 glossary
[148]. Kielar PM, Biedermann DH, Borrmann A (2016) MomenTUMv2: a modular, extensible, and generic agent-based pedestrian behavior simulation framework. TUM-I1643, Technische Universität München
[149]. Klauda M, Hamann R, Kriso S (2013) ISO 26262 – Muss das Rad neu erfunden werden?, Springer Fachmedien Wiesbaden, Wiesbaden, pp 224–227
[150]. Knauss A, Schröder J, Berger C, Eriksson H (2017) Paving the roadway for safety of automated vehicles: an empirical study on testing challenges. In: 2017 IEEE Intelligent Vehicles symposium (IV)
[151]. Kornecki AJ, Zalewski J (2003) Design tool assessment for safety-critical software development. In: Conference: software engineering workshop, 2003
[152]. Kotusevski G, Hawick K (2009) A review of traffic simulation software. Res Lett Inf Math Sci. 13
[153]. Lachmann R, Schaefer I (2013) Herausforderungen beim Testen von Fahrerassistenzsystemen. In: GI-Jahrestagung
[154]. Mubasher MM, ul Qounain JSW (2015) Systematic literature review of vehicular traffic flow simulators. In: 2015 international conference on Open Source Software Computing (OSSCOM)
[155]. Rasshofer RH, Gresser K (2005) Automotive radar and lidar systems for next generation driver assistance functions. Adv Radio Sci 3:205–209
[156]. Ronaldo A, Ismail T (2012) Comparison of the two micro-simulation software AIMSUN & SUMO for highway traffic modelling, Linköping University, Communications and Transport Systems, The Institute of Technology, p 96. http://www.diva-portal.org/smash/get/diva2: 555913/FULLTEXT01.pdf
[157]. Schneider V, German R (2013) Integration of test-driven agile simulation approach in serviceoriented tool environment. In: Proceedings of the 46th annual simulation symposium, San Diego, CA, USA, ANSS 2013
[158]. Alves V, Matos P, Cole L, Vasconcelos A, Borba P, Ramalho G (2007) Extracting and evolving code in product lines with aspect-oriented programming. In: Transactions on aspect-oriented software development IV. Springer, Berlin, pp 117–142
[159]. Apel S, Kästner C (2009) An overview of feature-oriented software development. J Object Technol 8(5):49–84
[160]. Bak K, Czarnecki K, W ˛asowski A (2011) Feature and meta-models in Clafer: mixed, specialized, and coupled. In: Proceedings of the international conference on software language engineering (SLE), SLE '11. Springer, Berlin, pp 102–122
[161]. Batory D (2004) Feature-oriented programming and the AHEAD tool suite. In: Proceedings of the international conference on software engineering (ICSE), ICSE '04. IEEE, Piscataway, pp 702–703
[162]. Berger T, Rublack R, Nair D, Atlee JM, Becker M, Czarnecki K, W ˛asowski A (2013) A survey of variability modeling in industrial practice. In: Proceedings of the international workshop on variability modeling in software-intensive systems (VaMoS), VaMoS '13. ACM, New York, pp 7:1–7:8

[163]. Berger T, Lettner D, Rubin J, Grünbacher P, Silva A, Becker M, Chechik M, Czarnecki K (2015) What is a feature? a qualitative study of features in industrial software product lines. In: Proceedings of the international software product line conference (SPLC), SPLC '15. ACM, New York, pp 16–25

[164]. Beuche D (2012) Modeling and building software product lines with pure:variants. In: Proceedings of the international software product line conference (SPLC), SPLC '12. ACM, New York, pp 255–255

[165]. Clements PC, Northrop LM (2001) Software product lines: practices and patterns. AddisonWesley, Boston

[166]. Czarnecki K, Eisenecker UW (2000) Generative programming: methods, tools, and applications. Addison-Wesley, Boston

[167]. Damiani F, Lienhardt M (2016) On type checking delta-oriented product lines. In: Proceedings of the international conference on integrated formal methods (iFM), iFM '16. Springer, Berlin, pp 47–62

[168]. Damiani F, Lienhardt M (2016) Refactoring delta oriented product lines to enforce guidelines for efficient type-checking. In: Proceedings of the international symposium on leveraging applications of formal methods, verification and validation (ISoLA), ISoLA'16. Springer, Berlin

[169]. Dubinsky Y, Rubin J, Berger T, Duszynski S, Becker M, Czarnecki K (2013) An exploratory study of cloning in industrial software product lines. In: Proceedings of the European conference on software maintenance and reengineering (CSMR), CSMR '13. IEEE, Piscataway, pp 25–34

[170]. Figueiredo E, Cacho N, Sant'Anna C, Monteiro M, Kulesza U, Garcia A, Soares S, Ferrari F, Khan S, Dantas F (2008) Evolving software product lines with aspects. In: Proceedings of the international conference on software engineering (ICSE), ICSE '08. IEEE, Piscataway, pp 261–270

[171]. Greenfield J, Short K (2003) Software factories: assembling applications with patterns, models, frameworks and tools. In: Proceedings of the international conference on object-oriented programming, systems, languages and applications (OOPSLA), OOPSLA '03. ACM, New York, pp 16–27

[172]. Hackers remotely kill a jeep on the highway – with me in it. WIRED. http://www.wired.com/2015/07/hackers-remotely-kill-jeep-highway/

[173]. Remote exploitation of an unaltered passenger vehicle. Dr. Charlie Miller and Chris Valasek. http://illmatics.com/Remote%20Car%20Hacking.pdf

[174]. Sens. Markey, blumenthal introduce legislation to protect drivers from auto security, privacy risks with standards & "cyber dashboard" rating system.http://www.markey.senate.gov/news/press-releases/sens-markey-blumenthal-introduce-legislation-to-protect-drivers-from auto security-privacy-risks-with-standards-and-cyber-dashboard-rating-system

[175]. Tracking & hacking: security & privacy gaps put American drivers at risk. Ed Markey, United States Senator for Massachusetts; February2015.http://www.markey.senate.gov/imo/media/doc/2015-02-06_MarkeyReportTracking_Hacking_CarSecurity%202.

[176]. The STRIDE threat model. https://msdn.microsoft.com/en-us/library/ee823878(v=cs.20).aspx

[177]. Hacking a Tesla model S: what we found and what we learned. Lookout Blog. https://blog.lookout.com/blog/2015/08/07/hacking-a-tesla/

[178]. The 'Heartbleed' security flaw that affects most of the Internet. CNN.com. http://edition.cnn.com/2014/04/08/tech/web/heartbleed-openssl/

[179]. How the poodle computer bug impacts business? Fortune.com. http://fortune.com/2014/11/12/poodle-bug/

[180]. FREAKing hell: all windows versions vulnerable to SSL snoop. The Register. https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2015-0204

[181]. Vehicle electrical system security committee. http://www.sae.org/works/committeeHome.do?comtID=TEVEES18

[182]. Birolini, Alessandro, Reliability Engineering. Theory and Practice, Springer-Verlag, Berlin, Heidelberg, New York, 1999.

[183]. Birolini, Alessandro, Zuverlässigkeit von Geräten und Systemen, Springer-Verlag, Berlin, Heidelberg, New York, 1997.

[184]. Ehrenberger, Wolfgang, Software-Verifi kation: Verfahren für den Zuverlässigkeitsnachweis von Software, Carl Hanser Verlag, Munich, Vienna, 2002.

[185]. U.S. Environmental Protection Agency, Control of Air Pollution from Motor Vehicles and New Motor Vehicles; Modifi cation of Federal On-Board Diagnostic Regulations for Light-Duty Vehicles and Light-Duty Trucks; Extension of Acceptance of California OBD II Requirements, December 1998.

[186]. Halang, W.A., and Konakovsky, R., Sicherheitsgerichtete Echtzeitsysteme, R. Oldenbourg Verlag, Munich, Vienna, 1999.

[187]. Lin, Shu, and Costello, Daniel J., Error Control Coding, Prentice-Hall, Englewood Cliffs, NJ, 1983.

[188]. Leveson, Nancy G., Safeware. System Safety and Computers. A Guide to Preventing Accidents and Losses Caused by Technology, Addison-Wesley, New York, 1995.

[189]. Storey, Neil, Safety-Critical Computer Systems, Prentice-Hall, Harlow, England, 1996.

[190]. Deutsches Institut für Normung e.V., DIN 25448—Ausfalleffektanalyse (Fehler-Möglichkeits- und Einfl uss-Analyse), May 1990.

[191]. "Der neue BMW 7er," Automobiltechnische Zeitschrift/Motortechnische Zeitschrift, ATZ/MTZ Extra (special issue), November 2001.

[192]. International Organization for Standardization, ISO 11519: Straßenfahrzeuge—Serielle Datenübertragung mit niedriger Übertragungsrate, 1994.

[193]. Bytefl ight, www.bytefl ight.de.

[194]. MOST Media Orientated System Transport, www.mostcooperation.com.

[195]. "Die neue Mercedes-Benz-E-Klasse," Automobiltechnische Zeitschrift/Motortechnische Zeitschrift, ATZ/MTZ Extra (special issue), May 2002.

[196]. Bluetooth, www.bluetooth.com.

[197]. LIN Local Interconnect Network, www.lin-subbus.de.

[198]. Boy, J., Dudek, C., and Kuschel, S., Projektmanagement. Grundlagen, Methoden und Techniken, Zusammenhänge, Gabal-Verlag, Offenbach, Germany, 1998.

[199]. The Motor Industry Software Reliability Association, Development Guidelines for Vehicle Based Software, 1994, http://www.misra.org.uk.

[200]. International Council on Systems Engineering, http://www.incose.org.

[201]. Balzert, Helmut, Lehrbuch der Software-Technik, 2nd Edition, Spektrum Akademischer Verlag, Heidelberg—Berlin, Germany, 2000.

[202]. ETAS GmbH (Ed.), ASCET V5.0 User's Guide. ETAS GmbH, Stuttgart, Germany, 2004.

[203]. Selic, B., Gullekson, G., and Ward, P.T., Real-Time Object-Oriented Modeling, John Wiley & Sons, New York, 1994.

[204]. Stoer, Josef, Numerische Mathematik 1, 8th Edition, Springer-Verlag, Berlin, Heidelberg, New York, 1999.

[205]. Kernighan, B.W., and Ritchie, D.M., Programmieren in C, 2nd Edition, Carl Hanser Verlag, Munich, Germany, 1990.

[206]. Broy, Manfred, Informatik. Eine grundlegende Einführung, Vols. 1/2, Springer-Verlag, Berlin, Heidelberg, New York, 1998.

[207]. Wirth, N., Grundlagen und Techniken des Compilerbaus, Addison-Wesley, Bonn, Germany, and Paris, France, 1996.
[208]. Manufacturer Supplier Relationship, Working Groups MEGMA and MEDOC, http://www.msr-wg.de.
[209]. The Motor Industry Software Reliability Association, Guidelines for the Use of the C Language in Vehicle-Based Software, 1998.
[210]. van Basshuysen, Richard, and Schäfer, Fred (Eds.), Handbuch Verbrennungsmotor. Grundlagen, Komponenten, Systeme, Perspektiven, 1st Edition, Vieweg-Verlag,
[211]. Wiesbaden, Germany, 2002; also published as van Basshuysen, Richard, and Schäfer, Fred (Eds.), Internal Combustion Engine Reference Handbook, SAE International, Warrendale, PA, 2004.
[212]. Pauli, B., and Meyna, A., "Zuverlässigkeitsprognosen für elektronische Steuergeräte im Kraftfahrzeug" ("Reliability of Electronic Control Units in Motor Vehicles"; orginal German), in Proceedings of the 7th International Congress "Electronic Systems for
[213]. Vehicles," Baden-Baden, Germany, September 13, 1996, ed. by VDI Society Vehicle and Transportation Technology, VDI-Berichte 1287, VDI-Verlag, Düsseldorf, Germany, 1996, pp. 87–105.
[214]. Beer, A., and Schmidt, M., "Funktionale Sicherheit Sicherheitsrelevanter Systeme im Kraftfahrzeug" ("Functional Safety of Safety Relevant Systems in Vehicles"; original German), in Proceedings of the 9th International Congress "Electronic Systems for Vehicles," Baden-Baden, Germany, October 5–6, 2000, ed. by VDI Society Vehicle and Transportation Technology, VDI-Berichte 1547, VDI-Verlag, Düsseldorf, Germany, 2000, pp. 391–409.
[215]. UML Unifi ed Modeling Language™, www.uml.org.
[216]. Harel, D., Statecharts. A Visual Formalism for Complex Systems, Science of Computer Programming, Vol. 8, Elsevier Science Publishers, North Holland, 1987.
[217]. ETAS GmbH (Ed.), ERCOSEK V4.2 User's Guide, ETAS GmbH, Stuttgart, Germany, 2002.
[218]. V. Kastrinaki, M. Zervakis, and K. Kalaitzakis, "A survey of video processing techniques for traffic applications," Image Vis. Comput., vol. 21, no. 4, pp. 359–381, Apr. 2003.
[219]. C.-C. R. Wang and J.-J. J. Lien, "Automatic vehicle detection using local features—A statistical approach," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 1, pp. 83–96, Mar. 2008.
[220]. B. T. Morris and M. M. Trivedi, "Learning, modeling, and classification of vehicle track patterns from live video," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, pp. 425–437, Sep. 2008.
[221]. S. Munder, C. Schnörr, and D. M. Gavrila, "Pedestrian detection and tracking using a mixture of view-based shape–texture models," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 2, pp. 333–343, Jun. 2008.
[222]. L. Bi, O. Tsimhoni, and Y. Liu, "Using image-based metrics to model pedestrian detection performance with night-vision systems,"IEEE Trans. Intell. Transp. Syst., vol. 10, no. 1, pp. 155–164, Mar. 2009.
[223]. C.-N. E. Anagnostopoulos, I. E. Anagnostopolous, I. D. Psoroulas, V. Loumos, and E. Kayafas, "License plate recognition from still images and video sequences: A survey," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, pp. 377–391, Sep. 2008.
[224]. N. Barnes, A. Zelinsky, and L. S. Fletcher, "Real-time speed sign detection using the radial symmetry detector," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 2, pp. 322–332, Jun. 2008.
[225]. X. Baró, S. Escalera, J. Vitrià, O. Pujol, and P. Radeva, "Traffic signrecognition using evolutionary AdaBoost detection and forest-ECOC classification," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 1, pp. 113–126, Mar. 2009.
[226]. J. F. Khan, S. M. A. Bhuiyan, and R. R. Adhami, "Image segmentation and shape analysis for road-sign detection," IEEE Trans. Intell. Transp. Syst., vol. 12, no. 1, pp. 83–96, Mar. 2011.
[227]. Z. Kim, "Robust lane detection and tracking in challenging scenarios," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 1, pp. 16–26, Mar. 2008.
[228]. T.-H. Chang, C.-S. Hsu, C. Wang, and L.-K. Yang, "On board measurement and warning module for irregular vehicle behavior,"IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, pp. 501–513, Sep. 2008.
[229]. J. K. Burgoon, D. P. Twitchell, M. L. Jensen, T. O. Meservy, M. Adkins, J. Kruse, A. V. Deokar, G. Tsechpenakis, S. Lu, D. N. Metaxas, J. F. Nunamaker, and R. E. Younger, "Detecting concealment of intent in transportation screening: A proof of concept," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 1, pp. 103–112, Mar. 2009.
[230]. M. S. Shehata, J. Cai, W. M. Badawy, T. W. Burr, M. S. Pervez,
[231]. R. J. Johannesson, and A. Radmanesh, "Video-based automatic incident detection for smart roads: The outdoor environmental challenges regarding false alarms," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 2, pp. 349–360, Jun. 2008.
[232]. M. Balcilar and A. C. Sonmez, "Extracting vehicle density from background estimation using Kalman filter," in Proc. 23rd Int. Symp. Comput. Inf. Sci., 2008, pp. 1–5.
J. Zhang, B. Tan, F. Sha, and L. He, "Predicting pedestrian counts in crowded scenes with rich and high-dimension al features," IEEE Trans. Intell. Transp. Syst., vol. 12, no. 4, pp. 1037–1046, Dec. 2011.
[233]. B. Tan, J. Zhang, and L. Wang, "Semisupervised elastic net for pedestrian counting," Pattern Recog., vol. 44, no. 10-11, pp. 2297–2304, 2011.
[234]. S. Atev, G. Miller, and N. P. Papanikolopoulos, "Clustering of vehicle trajectories," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 3, pp. 647–657, Sep. 2010.
[235]. Z. Sun, G. Bebis, and R. Miller, "On-road vehicle detection: A review,"IEEE Trans. Pattern Anal. Mach. Intell., vol. 28, no. 5, pp. 694–711, May 2006.
[236]. S. Sivaraman and M. M. Trivedi, "A general active-learning framework for on-road vehicle recognition and tracking," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 2, pp. 267–276, Jun. 2010.
[237]. S. Cherng, C.-Y. Fang, C.-P. Chen, and S.-W. Chen, "Critical motion detection of nearby moving vehicles in a vision-based driver-assistance system," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 1, pp. 70–82, Mar. 2009.
[238]. T. Gandhi and M. M. Trivedi, "Pedestrian protection systems: Issues, survey, and challenges," IEEE Trans. Intell. Transp. Syst., vol. 8, no. 3, pp. 413–430, Sep. 2007.
[239]. J. Zhang, J. Pu, C. Chen, and R. Fleischer, "Low-resolution gait recognition," IEEE Trans. Syst., Man, Cybern. B: Cybern., vol. 40, no. 4, pp. 986–996, Aug. 2010.
[240]. Broggi, P. Cerri, S. Ghidoni, P. Grisleri, and H. G. Jung, "A new approach to urban pedestrian detection for automatic braking," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 4, pp. 594–605, Dec. 2009.
[241]. X.-B. Cao, H. Qiao, and J. Keane, "A low-cost pedestrian-detection system with a single optical camera," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 1, pp. 58–67, Mar. 2008.
[242]. M. Enzweiler and D. M. Gavrila, "Monocular pedestrian detection: Survey and experiments," IEEE Trans. Pattern Anal. Mach. Intell., vol. 31, no. 12, pp. 2179–2195, Dec. 2009.
[243]. D. Gerónimo, A. M. López, A. D. Sappa, and T. Graf, "Survey of pedestrian detection for advanced driver assistance systems," IEEE Trans. Pattern Anal. Mach. Intell., vol. 32, no. 7, pp. 1239–1258, Jul. 2010.

[244]. J. C. McCall and M. M. Trivedi, "Video-based lane estimation and tracking for driver assistance: Survey, system, and evaluation," IEEE Trans. Intell. Transp. Syst., vol. 7, no. 1, pp. 20–37, Mar. 2006.
[245]. Y. Wang, L. Bai, and M. Fairhurst, "Robust road modeling and tracking using condensation," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 4, pp. 570–579, Dec. 2008.
[246]. H. Gómez-Moreno, S. Maldonado-Bascón, R. Gil-Jiménez, and S. Lafuente-Arroyo, "Goal evaluation of segmentation algorithms for traffic sign recognition," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 4, pp. 917–930, Dec. 2010.
[247]. Ruta, Y. Li, and X. Liu, "Robust class similarity measure for traffic sign recognition," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 4, pp. 846–855, Dec. 2010.
[248]. M. Bertozzi, A. Broggi, A. Fascioli, T. Graf, and M.-M. Meinecke, "Pedestrian detection for driver assistance using multiresolution infrared vision," IEEE Trans. Veh. Technol., vol. 53, no. 6, pp. 1666–1678, Nov. 2004.
[249]. J. Ge, Y. Luo, and G. Tei, "Real-time pedestrian detection and tracking at nighttime for driver-assistance systems," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 2, pp. 283–298, Jun. 2009.
[250]. J. H. Lim, O. Tsimhoni, and Y. Liu, "Investigation of driver performance with night vision and pedestrian detection systems—Part 1: Empirical study on visual clutter and glance behavior," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 3, pp. 670–677, Sep. 2010.
[251]. J. H. Lim, O. Tsimhoni, and Y. Liu, "Investigation of driver performance with night-vision and pedestrian-detection systems—Part 2: Queuing network human performance modeling," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 4, pp. 765–772, Dec. 2010.
[252]. M. V. Chitturi, J. C. Medina, and R. F. Benekohal, "Effect of shadows and time of day on performance of video detection systems at signalized intersections," Transp. Res. C, Emerging Technol., vol. 18, no. 2, pp. 176–186, Apr. 2010.
[253]. J. M. Clanton, D. M. Bevly, and A. S. Hodel, "A low-cost solution for an integrated multisensor lane departure warning system," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 1, pp. 47–59, Mar. 2009.
[254]. J. Huang and H.-S. Tan, "DGPS-based vehicle-to-vehicle cooperative collision warning: Engineering feasibility viewpoints," IEEE Trans. Intell. Transp. Syst., vol. 7, no. 4, pp. 415–428, Dec. 2006.
[255]. J. Huang and H.-S. Tan, "Error analysis and performance evaluation of a future-trajectory-based cooperative collision warning system," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 1, pp. 175–180, Mar. 2009.
[256]. J. Kianfar and P. Edara, "Optimizing freeway traffic sensor locations by clustering Global-Positioning-System-derived speed patterns," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 3, pp. 738–747, Sep. 2010.
[257]. D. Chen, Y.-S. Fu, B. Cai, and Y.-X. Yuan, "Modeling and algorithms of GPS data reduction for the Qinghaitibet Railway," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 3, pp. 753–758, Sep. 2010.
[258]. D. Schleischer, L. M. Bergasa, M. Ocaña, R. Barea, and M. E. López, "Real-time hierarchical outdoor slam based on stereovision and GPS fusion," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 3, pp. 440–452, Sep. 2009.
[259]. J.-I. Meguro, T. Murata, J.-I. Takiguchi, Y. Amano, and T. Hashizume, "GPS multipath mitigation for urban area using omnidirectional infrared camera," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 1, pp. 22–30, Mar. 2009.
[260]. H. G. Jung, Y. H. Cho, P. J. Yoon, and J. Kim, "Scanning laser-radarbased target position designation for parking aid system," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, pp. 406–424, Sep. 2008.
[261]. S. Gidel, P. Checchin, C. Blanc, T. Chateau, and L. Trassoudaine, "Pedestrian detection and tracking in an urban environment using a multilayer laser scanner," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 3, pp. 579–588, Sep. 2010.
[262]. P. Zito, H. Chen, and M. C. Bell, "Predicting real-time roadside CO and NO2 concentrations using neural networks," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, pp. 514–522, Sep. 2008.
[263]. K. Sohn and K. Hwang, "Space-based passing time estimation on a freeway using cell phones as traffic probes," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, pp. 559–568, Sep. 2008.
[264]. F. Calabrese, M. Colonna, P. Lovisolo, D. Parata, and C. Ratti, "Real-time urban monitoring using cell phones: A case study in Rome," IEEE Trans. Intell. Transp. Syst., vol. 12, no. 1, pp. 141–151, Mar.2011.
[265]. T. Gandhi and M. Trivedi, "Vehicle surround capture: Survey of techniques and a novel vehicle blind spots," IEEE Trans. Intell. Transp. Syst., vol. 7, no. 3, pp. 293–308, Sep. 2006.
[266]. T. Gandhi, R. Chang, and M. M. Trivedi, "Video and seismic sensor based structural health monitoring: Framework, algorithms, and implementation," IEEE Trans. Intell. Transp. Syst., vol. 8, no. 2, pp. 169–180, Jun. 2007.
[267]. T. Ehlgen, T. Pajdla, and D. Ammon, "Eliminating blind spots for assisted driving," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 4, pp. 657–665, Dec. 2008.
[268]. V. Agarwal, N. V. Murali, and C. Chandramouli, "A cost-effective ultrasonic sensor-based driver-assistance system for congested traffic conditions," IEEE Trans. Intell. Transp. Syst., vol. 10, no. 3, pp. 486–498, Sep. 2009.
[269]. S. Jwa, U. Özgüner, and Z. Tang, "Information-theoretic data registration for UAV-based sensing," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 1, pp. 5–15, Mar. 2008.
[270]. X. Gong and X. Liu, "A data-mining-based algorithm for traffic network flow forecasting," in Proc. Int. Conf. Integr. Knowl. Intensive Multiagent Syst., 2003, pp. 243–248.
[271]. T. Hoppe, S. Kiltz, and J. Dittmann, "Security threats to automotive
[272]. CAN networks—Practical examples and selected short-term countermeasures," in Computer Safety, Reliability, and Security. Heidelberg, Germany: Springer, 2008, pp. 235–248.
[273]. S. Checkoway et al., "Comprehensive experimental analyses of automotive attack surfaces," in Proc. USENIX Security Symp., San Francisco,CA, USA, 2011, p. 6.
[274]. F. Sagstetter et al., "Security challenges in automotive hardware/software architecture design," in Proc. Conf. Design Autom. Test Europe (DATE), Grenoble, France, 2013, pp. 458–463.
[275]. M. Müter and N. Asaj, "Entropy-based anomaly detection for in-vehicle networks," in Proc. Intell. Veh. Symp. (IV), Baden-Baden, Germany, 2011, pp. 1110–1115.
[276]. T. Hoppe, S. Kiltz, A. Lang, and J. Dittmann, "Exemplary automotive attack scenarios: Trojan horses for electronic throttle control system (ETC) and replay attacks on the power window system," in Proc. Autom. Security VDI-Berichte Nr. VDI/VW Gemeinschaftstagung Autom. Security, Wolfsburg, Germany, 2007, pp. 165–183.
[277]. T. Hoppe and J. Dittman, "Sniffing/replay attacks on CAN buses: A simulated attack on the electric window lift classified using an adapted cert taxonomy," in Proc. 2nd Workshop Embedded Syst. Security (WESS), Salzburg, Austria, 2007, pp. 1–6.
[278]. N. H. T. S. Administration. (2016). Cybersecurity Best Practices for Modern Vehicles. [Online]. Available: http://www.nhtsa.gov/About-NHTSA/Press-Releases
[279]. S. Chakraborty et al., "Automotive cyber–physical systems: A tutorial introduction," IEEE Des. Test, vol. 33, no. 4, pp. 92–108, Aug. 2016.
[280]. Nissan LEAF Owner's Manual—Section LAN Systems, Nissan Motor Company Ltd., Yokohama, Japan, 2013. [Online]. Available: https://carmanuals2.com/brand/nissan/leaf-2014-374

[281]. R. Roderick. (2015). A Look Inside Battery-Management Systems. [Online]. Available: http://electronicdesign.com/power/look-insidebattery-management-systems
[282]. K. Koscher et al., "Experimental security analysis of a modern automobile," in Proc. IEEE Symp. Security Privacy (SP), Oakland, CA, USA, 2010, pp. 447–462.
[283]. U. Klehmet, T. Herpel, K.-S. Hielscher, and R. German, "Delay bounds for CAN communication in automotive applications," in Proc. Conf. Meas. Model. Eval. Comput. Commun. Syst. (MMB), Dortmund,Germany, 2008, pp. 1–15.
[284]. S. Chakraborty, S. Kunzli, and L. Thiele, "A general framework for analysing system properties in platform-based embedded system designs," in Proc. Conf. Design Autom. Test Europe (DATE), Munich, Germany, 2003, pp. 190–195.
[285]. S. Kuenzli and L. Thiele, "Generating event traces based on arrival curves," in Proc. Conf. Meas. Modelling and Eval. Comput. Commun. Syst. (MMB), Nuremberg, Germany, 2006, pp. 1–18.
[286]. S. Baruah, G. Buttazzo, S. Gorinsky, and G. Lipari, "Scheduling periodic task systems to minimize output jitter," in Proc. Int. Conf. Real Time Comput. Syst. Appl. (RTCSA), Hong Kong, 1999, pp. 62–69.
[287]. T. Nolte, H. Hansson, and C. Norstrom, "Minimizing CAN response time jitter by message manipulation," in Proc. IEEE Real Time Embedded Technol. Appl. Symp. (RTAS), San Jose, CA, USA, 2002, pp. 197–206.
[288]. U. Suppiger, S. Perathoner, K. Lampka, and L. Thiele, "A simple approximation method for reducing the complexity of modular performance analysis," ETH at Zurich, Zürich, Switzerland, Tech. Rep. 329, 2010.
[289]. Albert, "Comparison of event-triggered and time-triggered concepts with regard to distributed control systems," in Proc. Embedded World Conf., Nuremberg, Germany, 2004, pp. 235–252.
[290]. P. Mundhenk, S. Steinhorst, M. Lukasiewycz, S. A. Fahmy, and S. Chakraborty, "Security analysis of automotive architectures using probabilistic model checking," in Proc. Design Autom. Conf. (DAC), San Francisco, CA, USA, 2015, pp. 1–6.
[291]. P. Waszecki, M. Lukasiewycz, and S. Chakraborty, "Decentralized diagnosis of permanent faults in automotive E/E architectures," in Proc. Int. Conf. Embedded Comput. Syst. Archit. Model. Simulat. (SAMOS), 2015, pp. 189–196.
[292]. J.-Y. L. Boudec and P. Thiran, Network Calculus: A Theory of Deterministic Queuing Systems for the Internet, vol. 2050. Heidelberg, Germany: Springer, 2001.
[293]. K. Huang, C. Buckl, G. Chen, and A. Knoll, "Conforming the runtime inputs for hard real-time embedded systems," in Proc. Design Autom. Conf. (DAC), San Francisco, CA, USA, 2012, pp. 430–436.
[294]. K. Lampka, S. Perathoner, and L. Thiele, "Analytic real-time analysis and timed automata: A hybrid methodology for the performance analysis of embedded real-time systems," Design Autom. Embedded Syst., vol. 14, no. 3, pp. 193–227, 2010.
[295]. M. Lukasiewycz and F. Reimann. OpenDSE—Open Design Space Exploration Framework. Accessed on Nov. 2016. [Online]. Available:http://opendse.sf.net/
[296]. Gurobi Optimization, Inc. (2015).Gurobi Optimizer Reference Manual.[Online]. Available: http://www.gurobi.com/
[297]. M. Lukasiewycz, S. Steinhorst, and S. Chakraborty, "Priority assignment for event-triggered systems using mathematical programming,"in Proc. Conf. Design Autom. Test Europe (DATE), Grenoble, France, 2013, pp. 982–987.
[298]. L. B. Othmane, R. Fernando, R. Ranchal, B. Bhargava, and E. Bodden, "Likelihood of threats to connected vehicles," Int. J. Next Gener. Comput., vol. 5, no. 3, pp. 290–303, 2014.
[299]. S. C. Bono et al., "Security analysis of a cryptographically-enabled RFID device," in Proc. USENIX Security Symp., vol. 5. Baltimore, MD, USA, 2005, pp. 1–16.
[300]. X.-L. Huang et al., "Historical spectrum sensing data mining for cognitive radio enabled vehicular ad-hoc networks," IEEE Trans. Depend. Secure Comput., vol. 13, no. 1, pp. 59–70, Jan./Feb. 2015.
[301]. C. Lyu, D. Gu, Y. Zeng, and P. Mohapatra, "PBA: Prediction-based authentication for vehicle-to-vehicle communications," IEEE Trans. Depend. Secure Comput., vol. 13, no. 1, pp. 71–83, Jan./Feb. 2016.
[302]. G. Calandriello, P. Papadimitratos, J.-P. Hubaux, and A. Lioy, "On the performance of secure vehicular communication systems," IEEE Trans. Depend. Secure Comput., vol. 8, no. 6, pp. 898–912, Nov./Dec. 2011.
[303]. P. J. Fernández, J. Santa, F. Bernal, and A. F. Gomez-Skarmeta, "Securing vehicular IPv6 communications," IEEE Trans. Depend. Secure Comput., vol. 13, no. 1, pp. 46–58, Jan./Feb. 2016.
[304]. Stierand, S. Malipatlolla, S. Fröschle, A. Stühring, and S. Henkler, "Integrating the security aspect into design space exploration of embedded systems," in Proc. Int. Symp. Softw. Rel. Eng. Workshops (ISSREW), Naples, Italy, 2014, pp. 371–376.
[305]. C.-W. Lin, Q. Zhu, C. Phung, and A. Sangiovanni-Vincentelli,"Security-aware mapping for CAN-based real-time distributed automotive systems," in Proc. Int. Conf. Comput.-Aided Design (ICCAD), San Jose, CA, USA, 2013, pp. 115–121.
AADL (Architecture Analysis and Design Language), SAE standard, 2011.http://www.aadl.info/aadl/currentsite
[306]. ASSERT (Automated proof-based System and Software Engineering for Real-Time systems) project, 2010. http://assert-project.net
[307]. ATESST2 (Advancing Traffic Efficiency and Safety through Software Technology) project, 2010. http://www.atesst.org
[308]. AUTOSAR – AUTomotive Open System ARchitecture. http://www. autosar.org
[309]. Biehl, M., Chen, D., To¨rngren, M.: Integrating Safety Analysis into the Model-based
[310]. Development Toolchain of Automotive Embedded Systems. In: ACM SIGPLAN/SIGBED Conf on Languages, Compilers and Tools for Embedded Systems, LCTES 2010 Stockholm, Sweden. April. 2010.
[311]. CESAR (Cost-efficient methods and processes for safety relevant embedded systems) project, 2011. http://www.cesarproject.eu/
[312]. Chen, D., Johansson, R., Lo¨ nn, H., Papadopoulos, Y., Sandberg, A., To¨rner, F., To¨rngren, M.: Modelling Support for Design of Safety-Critical Automotive Embedded Systems. In: SAFECOMP 2008. LNCS, vol. 5219, pp. 72–85. Springer. 2008.
[313]. EAST-ADL. EAST-ADL Domain Model Specification. Version M.2.1.9 2011-01-30. http://www.maenad.eu/public/EAST-ADL-Specification. 2011.
[314]. ISO International Organization for Standardization: ISO/DIS 26262. 2010.
[315]. MAENAD (Model-based Analysis and Engineering of Novel Architectures for Dependable Electric Vehicles) project, 2011. http://www.maenad.eu
[316]. MARTE (Modeling and Analysis of Real-time and Embedded systems), OMG, 2010. http://omgmarte.org
[317]. Papadopoulos, Y. and McDermid, J. A.: Hierarchically performed hazard origin and propagation studies. In: SAFECOMP 1999. LNCS, vol. 1698, pp. 139–152. Springer. 1999.
[318]. Chen, D., Rolf Johansson, Henrik Lönn, Hans Blom, Martin Walker, Yiannis Papadopoulos, Sandra Torchiaro, Fulvio Tagliabo, and Anders Sandberg. "Integrated safety and architecture modeling for automotive embedded systems." e & i Elektrotechnik und Informationstechnik 128, no. 6 (2011): 196-202.
[319]. Papadopoulos, Y., Walker, M., Reiser, M.-O., Weber, M., Chen, D., To¨rngren, M., Servat, D., Abele, A., Stappert, F., Lo¨ nn, H., Berntsson, L., Johansson, R., Tagliabo, F., Torchiaro, S., A. Sandberg: Automatic allocation of safety integrity levels. In: ACM Proceedings of the 1st Workshop on Critical Automotive applications: Robustness and Safety, Pages: 7–10, CARS2010, Valencia, Spain, 27 April 2010.

[320]. Peikenkamp, T., Cavallo, A., Valacca, L., Bo¨ de, E., Pretzer, M., Hahn, E. M.: Towards a Unified Model-Based Safety Assessment. In: SAFECOMP 2006, LNCS, vol. 4166, pp. 275–288. 2006.
[321]. SAFEDOR (design, operation and regulation for safety) project, 2004. http://safedor.org