DONGIK LEE, *BEng, MEng, PhD*

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PROFILE

More than 25 years of experience in real-time embedded control systems design and software/ hardware implementation. Worked in industry internationally on various safety-critical applications, including intelligent automobiles, industrial networks, submarine control systems, autonomous underwater vehicles, wind turbines, and jet engines. Received a PhD in Dependable Embedded Control Systems. Experience in preparing R&D/business plans, managing research projects and supervising student projects. Co-founder of DRTS Ltd (UK). Professor in College of IT Engineering at Kyungpook National University, Republic of Korea.

EDUCATION

- **PhD** (Apr. 2002) in Control & Systems Engineering, Sheffield University, Sheffield, U.K.
- **M.Eng** (Feb. 1990) in Control Theory, Kyungpook National University, Korea
- **B.Eng** (Aug. 1987) in Electronics Engineering, Kyungpook National University, Korea

RESEARCH AND WORK HISTORY – SUMMARY

Apr 2005 – Present (Professor)	College of IT Eng., Kyungpook National University, Korea Main duties and achievements: - Managed wide range of international collaborations with more than 15 universities, including TNUT(Vietnam), UTSA(USA), HIT(China), BME(Hungary), WUT(Poland), ECE (France), Sheffield (U.K.) and Makerere (Uganda). - Collaborative research with OPTIMUS project supported by EU-FP7. - As the leader of "Dependable Embedded Control Systems Lab.", managed wide range of research projects in network-based safety-critical complex control systems. - Served as the supervisor for more than 10 PhD Degree students and 30 Master students. - Co-authored more than 30 research articles with peer-reviewed journals.
Jan 2002 – Mar 2005 (Co-founder, Technical Director)	Dependable Real Time Systems (DRTS) Ltd, Sheffield, U.K. Main duties and achievements: - Developed Lecture notes and laboratory systems for Undergraduate/Master Courses in Real-Time Systems (Module1: Embedded Control Systems & Module2: Distributed Systems) under the contract with Sheffield University. - Delivered industrial training courses in Distributed Real Time Systems. - Developed S-CAN (Secure Controller Area Network): A highly reliable communication protocol implemented on top of the standard CAN bus.
Mar 1990 – Sep 1997 (Research Engineer)	Agency for Defense Development (ADD), Jinhae, Korea Main duties and achievements: - An intelligent control system (Expert System & Fuzzy) for Autonomous Underwater Vehicles using parallel processors - Software & hardware for an integrated autopilot system for submarines - A submarine depth control system with sea trials (*Prize awarded*) - Submarine training simulators (*Worked in Germany for 15months*)

SELECTED PUBLICATIONS

Publications with International Journals

[1] "Adaptive Fuzzy IMM Algorithm for Uncertain Target Tracking," *International Journal of Control Automation and Systems*, Vol.7, No.6, pp.1001-1008, 2010.

[2] "Sliding mode high-gain observers for a class of uncertain nonlinear systems," *Applied Mathematics Letter*, Vol.24, pp.329-334, 2011.

[3] "Robust nonlinear dynamic inversion control for electric throttle," *IEICE Electronics Express*, Vol.8, No.8, pp.549-555, 2011.

[4] "Nonlinear sliding mode high-gain observers for fault estimation," *International Journal of Systems Science*, Vol.42, No.7, pp.1065-1074, 2011.

[5] "Fault-tolerant clock synchronization for time-triggered wireless sensor network," *Studies in Computational Intelligence*, 2011.

[6] "Synchronization of chaotic gyros based on robust nonlinear dynamic inversion," *Journal of Applied Mathematics*, 2013.

[7] "Designing a Robust Nonlinear Dynamic Inversion Controller for Spacecraft Formation Flying," *Mathematical Problems in Engineering*, 2014.

[8] "Accommodation of Actuator Fault using Local Diagnosis and IMC-PID," *International Journal of Control Automation and Systems*, Vol.12, No.6, pp.1139-1149, 2014.

[9] "Reconfiguration Criterion for Fault-Tolerant Control," *Mathematical Problems in Engineering*, 2015.

[10] "Networked Fault-Tolerant Control Allocation for Multiple Actuator Failures," *Mathematical Problems in Engineering*, 2015.

[11] "Rotor Speed-Based Bearing Fault Diagnosis (RSB-BFD) Under Variable Speed and Constant Load," *IEEE Transactions on Industrial Electronics*, Vol.62, No.10, pp.6486-6495, 2015.

[12] "Time-Delay Robust Nonlinear Dynamic Inversion for Chaos Synchronization with Application to Secure Communications," *Mathematical Problems in Engineering*, pp.1-10, 2015.

[13] "Principal Component Analysis Based Signal-to-noise Ratio Improvement for Inchoate Faulty Signals: Application to Ball Bearing Fault Detection," *International Journal of Control, Automation and Systems,* pp. 506-517, 2017.

[14] "Android-Based Secure Monitoring System for Industrial Power Plants," *International Refereed Journal of Engineering and Science*, Vol.6, No.4, pp.1-7, Apr. 2017.

Publications with Domestic Journals

[15] "Actuator failure diagnosis and accommodation using sliding mode control for submersible vehicle," *Journal of Institute of Control Robotics and Systems*, Vol.16, No.7, pp.661-668, 2010.

[16] "A study on automatic compensation for head lamps cut-off line under load variation," *Transactions of KSAE*, Vol.19, No.2, pp.92-97, 2011.

[17] "Compensating Transmission Delay and Packet Loss in Networked Control System for Unmanned Underwater Vehicle," *IEMEK Journal*, Vol.6, No.3, pp.149-156, 2011.

[18] "Fault-tolerant control system for unmanned aerial vehicle using smart actuators and control allocation," *Journal of Institute of Control Robotics and Systems*, Vol.17, No.10, pp.967-982, 2011.

[19] "Fault-Tolerant Networked Control Systems Using Control Allocation for Failures in Multiple Control Surfaces," *Journal of Institute of Control Robotics and Systems*, Vol.17, No.11,

pp.1067-1073, 2011.

[20] "Development of alarm system using fault tree analysis for pumping station and reservoir of waterworks," *Journal of Korean Society of Water and Wastewater*, Vol.25, No.6, pp.847-859, 2011.

[21] "Nonlinear dynamic inversion based control for electronic throttle," *Transactions of KSAE*, Vol.20, No.2, pp.8-14, 2012.

[22] "Analysis of transmission delay and fault recovery performance with EtherCAT for in-vehicle network," *Journal of Korea Information and Communications Society*, Vol.37C, No.11, pp.1036, 2012.

[23] "Fault Tolerant Control of Wind Turbine with Sensor and Actuator Faults," *Journal of Sensor Science and Technology*, Vol.22, No.1, pp.28-37, 2013.

[24] "Improving network utilization in FlexRay using reallocation of static message," *Transactions of KSAE*, Vol.21, No.5, pp.113-120, 2013.

[25] "Daisy chain method for control allocation based fault-tolerant control," *IEMEK Journal*, Vol.8, No.5, pp.265-273, 2013.

[26] "System reliability evaluation using dynamic fault tree analysis," *IEMEK Journal*, Vol.8, No.5, pp.243-248, 2013.

[27] "Reliability analysis of dual-channel CAN bus for submarine combat system," *Journal of Korea Information and Communications Society*, Vol.38C, No.12, pp.1170-1178, 2013.

[28] "Implementing IEEE1588 based clock synchronization for networked embedded system," *IEMEK Journal*, Vol.9, No.1, pp.33-41, 2014.

[29] "Implementation of IEEE1588 for Clock Synchronization," *Journal of Korea Information and Communications Society*, Vol.39B, No.2, pp.123-132, 2014.

[30] "Analysis of the Bearing Fault Effect on the Stator Current of an AC Induction Motor," *Journal of Institute of Control Robotics and Systems*, Vol.20, No.6, pp.635-640, 2014.

[31] "The Effectiveness of MOOS-IvP based Design of Control System for Unmanned Underwater Vehicles," *IEMEK Journal*, Vol.9, No.3, pp.157-163, 2014.

[32] "Resilience Evaluation of Vehicle Driving System Depending on System Architecture," *IEMEK Journal*, Vol.10, No.5, pp.273-279, 2015.