DS-Lab: The Dependable Software Laboratory

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Under the supervision of Prof. Yong-Kee Jun, DS-Lab has fostered specialists in dependability of *concurrent* embedded software such as airborne software that controls, manages, and applies avionics. DS-Lab has produced approximately fifty masters for teachers as well as engineers, and eleven doctorates for professors as well as researchers in (international) four-year universities, major industries, and research institutes.

Research

DS-Lab is especially interested in dynamically detecting and repairing concurrency faults in the embedded software such airborne software that is identified with ARP-4754/4761, DO-297, ARINC-653, FACE, and DO-178. Concurrency faults are represented with the most notorious and mysterious harmful race conditions and deadlocks.

The research is related to a wide range of academic means on dynamic analysis, in which DS-Lab has been internationally recognized as the state-of-the-arts on some topics regarding logical time and detection protocols. The DS-Lab's achievement is introduced in *Software Quality Journal*, Springer, 2016: "10 Years of Research on Debugging Concurrent and Multicore Software: a Systematic Mapping Study." This achievement is not possible, if not the following eleven doctorates who obtained their degrees from DS-Lab:

Dr. Dong-Gook Kim, NTSIT Co.
Dr. Hee-Dong Park, Joongbu University
Dr. Jeong-Si Kim, ETRI
Dr. Young-Cheol Kim, Korea Int'l University
Dr. So-Hee Park, JNU of Education
Dr. Mi-Young Park, Iowa State University
Dr. Young-Joo Kim, ETRI
Dr. Byung-Chul Kim, STX Offshore & Shipbuilding
Dr. Mun-Hye Kang, Gyeongsang National Univ.
Dr. Ok-Kyoon Ha, Gyeongwoon University
Dr. Guy Martin Tchamgoue, U. of Waterloo, Canada

DS-Lab has worked to apply its achievements to relevant industries, including airborne software industry. Research activities for the application includes the developments of

- software for multicore-based avionics
- IMA platform for commercial 90-seat aircraft
- IMA software for supersonic aircraft
- data synchronization for fighter aircraft
- real-time repairing of airborne software errors
- SCF architecture of KF-X airworthiness
- manufacturing readiness for weapon software

Supervisor

Prof. Yong-Kee Jun established his doctorate under the powerful supervision of the late Prof. Kern Koh, Dept. of Computer Engineering, Seoul National University. He performed post-doctoral research in data race detection at University of California at Santa Cruz under the supervision of Prof. Charles E. McDowell who is one of the authorities in the field. And, he was a research associate in Electronics and Telecommunications Research Institute, Korea.

Prof. Jun is a full professor teaching courses on computer operating systems and airborne software engineering in Department of Informatics that he founded and Department of Aerospace and Software Engineering. In GNU, he served as the vice-dean of Academic Affairs in 2003-2005, the first director of Research Institute of Computer and Information Communication in 2001-2003, the first operating director of Virtual College in 2008-2001, the founding director of a national Information Technology Research Center titled Embedded Software Center for Avionics in 2009-2013, and the director of Center of Information Services in 2013-2015.

Professionally, Prof. Jun has been a professional member of ACM since 1994. He edited some special issues of international journals and refereed/chaired for scores of international conferences. Domestically, he served as a chair of the academic committee of Korean Institute of Information Scientists and Engineers, a vice president of Korea Information Processing Society, and the 8-th president of the Institute of Embedded Engineering of Korea. □