

# Driver-Adaptive Vehicle Interaction System for the Advanced Digital Cockpit

Jin-Kyu Choi, Kyongho Kim, Dohyun Kim, Hyunkyun Choi, Byungtae Jang  
Intelligent Robotics Research Division  
Electronics and Telecommunications Research Institute (ETRI), Korea  
{jkchoi, kkh, dohyun, choihk, jbt}@etri.re.kr

**Abstract**— in this paper, we introduce three key components of the next-generation digital cockpit system to provide the driver-customized driving environment, which indicates automotive sensor network, driver-adaptive interaction engine, and advanced digital cockpit platform. Our concept of driver-adaptive vehicle interaction system includes driving performance evaluation, driver status recognition, and driver emotion recognition. To realize driver-adaptive interaction engine of the advanced digital cockpit system, we explain the hierarchical customization levels and the cycle of the driver-vehicle interaction process.

**Keyword**— Driver-vehicle interaction, DVI, driver behavior analysis, digital cockpit



**Jin-Kyu Choi** is a principal researcher of the Intelligent Robotics Research Division, Electronics and Telecommunications Research Institute, Daejeon, Rep. of Korea. He received his B.S. degree in electronic engineering in 1999 and M.S. degree in electronics, communications and electromagnetics engineering from Hanyang University, Seoul, Rep. of Korea in 2001, and his Ph.D degree in electronic engineering from Chungbuk National University, Cheongju, Rep. of Korea, in 2018. Since 2001, he has been with ETRI. His current research topics include vehicular communications, ITS (Intelligent Transport System), HMI (Human-Machine Interaction), and AI (Artificial Intelligence).



**Kyong-Ho Kim** is a principal researcher of the Intelligent Robotics Research Division, Electronics and Telecommunications Research Institute, Daejeon, Rep. of Korea. He received his BS and MS degrees in electronic engineering from Kyungpook National University, Daegu, Rep. of Korea, in 1993 and 1995, respectively, and his Ph.D degree in computer science from the Korea Advanced Institute of Science and Technology, Daejeon, Rep. of Korea, in 2010. Since 1994, he has been with ETRI. His current research topics include intelligent vehicles, HCI (Human-Computer Interaction), HUD (Head-Up Displays), and AR (Augmented Reality) applications in vehicles.



**Dohyun Kim** is a principal researcher of the Intelligent Robotics Research Division, Electronics and Telecommunications Research Institute, Daejeon, Rep. of Korea. He received his BS and MS degree degrees in computer engineering in 1995 and 1997, respectively, and his Ph.D degree in computer science from Pusan National University, Pusan, Rep. of Korea, in 2017. His current research topics include LBS (Location-Based Service), Telematics, USN (Ubiquitous Sensor Network), Smart factory, and AI (Artificial Intelligence).



**Hyunkyun Choi** is a director of ETRI-Ulsan Joint Research Section, Electronics and Telecommunications Research Institute, Ulsan, Rep. of Korea. He received his BS and MS degrees in electronic engineering from Kyungpook National University, Daegu, Rep. of Korea, in 1995 and 1997, respectively, and his Ph.D degree in electronic engineering from Chungnam National University, Daejeon, Rep. of Korea, in 2015. He joined ETRI in 2000. His research interests include ITS (Intelligent Transport System), HMI (Human-Machine Interaction), and V2X (Vehicle to Everything) communications.



**Byungtae Jang** is a director of Industry IT Convergence Research Group, Electronics and Telecommunications Research Institute, Daejeon, Rep. of Korea. He received his BS degree in atmospheric science from Seoul National University in Korea in 1989 and MS and Ph.D degrees in computer science from Chungnam National University in 1994 and 2001. From 1989 to 1996, he worked as a Senior Research Member at Software Engineering Research Institute (SERI) in Daejeon, Korea. He joined ETRI in 1997. His current research topics include AR (Augmented Reality), image processing, HCI (Human-Computer Interaction), wireless communications, and smart HSE (health, safety, and environment).