EAI/Springer Innovations in Communication and Computing

M. Kathiresh
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Automotive Embedded Systems

Key Technologies, Innovations, and Applications

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Preface

Over the last two decades, various functions of a vehicle are performed by using electrical and electromechanical systems, which were performed by mechanical linkages in conventional automotive systems. The concept of using electronic control systems as replacement for mechanical control systems in automobiles is called as drive-by-wire or x-by-wire. The main functions such as acceleration, braking, and steering are controlled by the use of mechanical, pneumatic, and hydraulic components in conventional vehicles where are more prone to wear and tear. Thus, the efficiency and performance of such vehicles deteriorates over a period of time. In contrast, the drive-by-wire technology uses sensors, electrical motors, and electromechanical actuators to perform vehicular functions. Moreover, the subsystems in the drive-by-wire technology have a dedicated Electronic Control Unit (ECU) to monitor and control vehicle parameters with the help of appropriate sensors and actuators. These subsystems are called as Automotive Embedded Systems. Embedded systems in automobiles are basically classified into five domains such as Power Train, Body Electronics, Chassis, Human–Machine Interface, and Telematics.

The main objective of Industry 4.0, the Fourth Industrial Revolution is to make everything smart and connected with each other. The tremendous growth in automotive electronics and wireless communication technology has paved a way for new technology called Connected Cars through which many innovative features have been added in a typical car to enhance the comfort of the stake holders.

This book starts with automotive safety systems which is one of the major functional domains. The book discusses the importance of software in automotive systems followed by an insight into Automotive Software Standards, MISRA Coding Standards, and Model-based Software Development Approach. The book further discusses vehicle diagnostics and over-the-air software update processes. The book also illustrates the role of sensors and artificial intelligence in automotive systems. Various innovative applications involving the concept of Internet of Things are also presented in this book. This book is intended for academicians, researchers, and industrialists.

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