

Foreword

Foreword to Special Issue on "Millimeter-Wave Radar for Automotive Applications"

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Statistical data show that the causes of 80% or more of traffic accidents are related to human error, such as judgmental errors and delays in hazard recognition. The majority of traffic accidents caused by human error are rear-end collisions. Tests have revealed that if drivers reacted half a second earlier, the number of rear-end collisions would be halved. Therefore, a safety support device, which will augment the driver's perception of the surroundings of their vehicle to bring about such an improvement in reaction time, is very desirable.

Radar systems and radio communications have long been used in aircraft and shipping to augment the eyes and ears of the pilot or helmsman. These systems are now indispensable to both safety and navigation. However, it is only recently that many organizations around the world have begun to develop any equivalent safety support systems for automobiles. There are different levels of driving safety support systems. These range from cognitive support to hazard alarms to emergency override control of the vehicle. Irrespective of the level of the driving safety support system, it operates by circumstantial judgment of the driving environment which is perceived by radar or a camera. The resolution requirements of sensing have dictated the use of millimeter wave radar, but the development of automotive radar systems, the topic of this special issue, is both difficult and challenging. From a radar sensing perspective, the driving environment is considerably more complicated than the aviation or maritime ones. This is simply due to the vast number of obstacles that are encountered within such short distances and the complexity of the road itself. Thus, the adaptation for various obstacles and environmental conditions is a critical aspect of automotive radar development. There are many other critical aspects including advanced reliability, miniaturization and reducing cost. Therefore, the technical difficulty in developing radar systems for automobiles is exceptionally high. Also, these systems must be acceptable to ordinary drivers who are non-specialists.

I believe it is the duty of all of us to bring about the safest possible driving environment as quickly as possible, despite the daunting technical challenges before us. I sincerely hope that this special issue makes a significant contribution to what is a critical sensing system for driving safety support systems.