IEEE – CIS Conference

Talk title: Background, History, and Technology of Autonomous Vehicles

Abstract:
Autonomous or self-driving cars are now more close to reality than fiction as featured in Hollywood movies (Demolition Man, I-Robot, Minority Report). Advancements in drive-by-wire technology, camera based detection, as well as sensor fusion and artificial intelligence algorithms would make it possible to design and build an autonomous car that can navigate through city and highway traffic safely. Starting from DARPA grand challenge (2004) and urban challenge (2007), the pursuit for a robustly safe and commercially viable autonomous vehicle is still ongoing. While Google and Tesla have demonstrated autonomous navigation of their cars, the failsafe features have not proven to be robust. This talk will focus on the benefits and limitations of the autonomous vehicles. It will also present further technological advancements that will be needed to achieve street and highway safe fully autonomous vehicles. Aspects of self-driving technologies that can be applied to other sectors of transportation such as agricultural robots (AgBot) will be briefly discussed.

Sohel Anwar, PhD, PE

Dr. Anwar is an Associate Professor in the department of Mechanical Engineering, IUPUI. He is also the chair of graduate education and research committee of ME department, and director of Mechatronics research lab. He received his Ph.D. from University of Arizona, Tucson, AZ in 1995. He worked as an R&D engineer at Caterpillar, Inc. between 1995 and 1999 where he focused on X-By-Wire systems design for Wheel Loaders. He then joined Ford Motor Company / Visteon Corporation in 1999 as a Senior R&D engineer where he led the fault tolerant design of Drive-By-Wire systems. After about nine years of stint in the industry, he made a switch to academia and joined the Department of Mechanical Engineering at IUPUI in 2004. He led a research investigation in the more efficient design of Plug-in Hybrid Electric Vehicles (PHEV) through a grant from Indiana Office of Energy and Defense Developments. Two PHEVs were developed under this grant. One of his current research focuses on improving moving object detection from a moving vehicle in the context of autonomous driving. Dr. Anwar has published over 120 papers and 14 patents. Dr. Anwar's research interests are Autonomous Vehicle Systems, Hybrid Vehicle Control, and X-By-Wire system modeling and control. He is a member of ASME, IEEE, and a faculty advisor for SAE. He is on the editorial board for four international journals including IEEE Transactions on Vehicular Technology.