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The CAOS smart camera—empowering automotive and surveillance imaging

Multi-pixel imaging devices such as CCD, CMOS and FPA photo-sensors dominate the imaging world. These photo-detector array (PDA) devices certainly have their merits including increasingly high pixel counts and shrinking pixel sizes, nevertheless, they are also being hampered by limitations in instantaneous linear dynamic range, inter-pixel cross-talk, quantum full well capacity, signal-to-noise ratio, sensitivity, spectral flexibility and in some cases, imager response time. Recently invented is the coded access optical sensor (CAOS) smart camera that works in unison with current PDA technology to counter fundamental limitations of PDA-based imagers while providing extreme linear dynamic range, extreme image security, extreme inter-pixel isolation and high enough imaging spatial resolution and pixel counts to match application needs. This talk describes the basics of the CAOS smart camera invention using the Texas instruments (TI) digital micromirror device (DMD). The talk highlights recent experimental demonstrations of both white light and multi-spectral CAOS-based imaging including CAOS-mode imaging over a 136 dB linear dynamic range. Novel applications of the CAOS smart camera include automotive and surveillance imaging where smartness to identify vital targets in extreme contrast scenarios is vital for both mobile and stationary system operations.

Biography

Nabeel A Riza holds a PhD (1989) from Caltech. His awards includes the 2001 ICO Prize, 2001 Ernst Abbe Medal from Carl Zeiss Foundation-Germany, 2009 and 2010 IEEE Distinguished Lecturer Awards and 1994 GE Gold Patent Medal. In 2011, he was appointed as Chair Professor of Electrical and Electronic Engineering, University College Cork (UCC), Ireland. During 2013-2016, he was Dean of UCC School of Engineering. He has published 404 works that include 46 US issued patents and is a 2017 Inductee of the US National Academy of Inventors (NAI).

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