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The emerging green visible light communications for multitude of applications

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Indoor optical wireless communication systems based on the visible wavelengths (380-780 nm), also known as the visible light communications (VLC), has emerged as one of the premier solutions for the emerging 'last-metre' bottleneck due to the huge, practically unlimited license free bandwidths available in the optical domain, high energy efficiency, and low cost of implementation. This emerging green technology, which uses white light emitting diodes based lighting sources, can be utilized as an additional wireless communications technology similar like WiFi and bluetooth to resolve the spectrum congestion currently being experienced in the radio frequency domain and provide much needed higher data rates especially in areas with high population density within an indoor environment. VLC based systems beside general illumination will also offer data communication, indoor localization as well as sensing in both indoor and outdoor environment. VLC has a multitude of applications including underwater communications, car to car communications, intelligent transportation (planes, trains, etc.) medical, financial sector, to name a few. However, there are a number of challenges facing VLC that needs addressing before its widespread deployment. This talk will give an overview of the VLC technology focusing on the key features, recent progress made, research challenges and applications.

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Reliable intelligent transportation systems for smart cities

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The Vehicular Ad hoc Network (VANET) is a new technology and a key component of the Intelligent Transportation Systems (ITS) architecture that aims at promoting road safety, and providing more entertainment facilities on the road. VANET has received recently great attention from industry, academia and national government agencies. Recent research efforts have placed a strong emphasis on novel VANET design architectures and implementations. Despite many studies on VANETs, most of them focused on discriminating the nodes' mobility environment, i.e., nodes in VANETs are vehicles moving on roads surrounded by obstacles and at higher speeds than that in many other types of MANETs. This distinctive mobility environment makes designing efficient routing protocol a very challenging task. Recently, there has been more interest in using road side units RSUs not only to provide services but also to support routing with the aim of enhancing scalability and mitigating the overhead of the additional requirement a location service places on geographic routing. Despite many studies on the infrastructure-assisted routing protocols found in the literature, this routing strategy is still in its infancy. These available solutions suffer from low readability and deficiency in dealing with both vehicle-to-vehicle (V2V) communications and vehicle-to-infrastructure (V2I) communications. In an attempt to fill in this gap, in this presentation, novel routing protocols within smart city platforms, will be introduced and discussed. These protocols integrate both features of reactive and proactive routing schemes. They maintain proactive routes towards RSUs while they reactively seek for other nearby nodes in the network.

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