Registration Seminar

Seminar Title	: A Cross-Layer Protocol for UAV-Aided VANETs Mitigating the Line-of-Sight Communication
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Venue	: Convention Hall (CS-208)
Date and Time	: 19 Sep 2024 (4:30PM)
Abstract	: A Vehicular Ad hoc NETwork, or VANET, is a crucial component of intelligent transportation systems that improve road safety, traffic management effectiveness, and vehicle entertainment features. Due to roadblocks, high mobility, and rapid topological changes, routing in a VANET is impeded by frequent link disconnection for non-line-of-sight communication. An Unmanned Aerial Vehicle (UAV) with three-dimensional movement capacity may significantly enhance a VANET&rsquos routing experience by boosting the likelihood of a line-of-sight, improving connection, and implementing an effective store-carry-forward mechanism. Mobile Roadside Units (RSUs) implemented through UAVs offers a compelling solution to mitigate the inherent limitations of static RSUs within vehicular networks. While static RSUs provide essential communication

infrastructure and facilitates Mobile Edge Computing (MEC) services their deployment at dense intersections, is fiscally prohibitive an challenging. Additionally, in sparse networks, static RSUs struggle to guarantee reliable, direct line-of-sight communication. UAV-based RSUs offer a solution by leveraging their inherent mobility to dynamically establish flexible network coverage. This maneuverability allows them to bridge communication gaps and and establish robust Line-of-Sight links with vehicles. This also enables efficient data transmission by minimizing free-space path loss, a key contributor to signal degradation. This research proposes a three-pronged approach to address VANET challenges, which includes: implementing a cross-layer congestion-aware routing scheme with UAV-based RSUs for robust LoS communication, optimizing UAV placement for maximized coverage and reliable LoS links, and enhancing UAVs with edge computing capabilities for localized data processing and reduced latency. This comprehensive strategy aims to not only overcome static RSU limitations but also significantly enhance VANET efficiency, reliability, and scalability, paving the way for advanced ITS and innovative V2X applications.