



<b>Thesis Title</b>	“WSN Based Vehicle Tracking and Monitoring System for Oil Transportation”
<b>Research Field</b>	
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<b>Abstract</b>	
<p>Oil industry is one of the major industries in Iraq and it includes many related processes such as: Oil exploration, prospecting, extraction, refining and transportation. Oil transportation using vehicles is considered as a rich area of study because it faces many challenges, especially those ones related to the transportation operation safety, security and reliability. To overcome those challenges this thesis presents a vehicle tracking and monitoring system based on Global Positioning System, Global System for Mobile Communication (GSM) and Bluetooth technologies. This system will also be categorized as a Wireless Sensor Network (WSN) system since it deals with some WSN related issues such as application and physical layer issues.</p> <p>The system comprises three parts which are: Embedded system, Android mobile phone and a central server. It provides a location based cargo locking mechanism as well as a multi-way communication mechanisms and a black box like technique to provide reliability, safety and security to the vehicle and its driver. To secure the GSM link the Advanced Encryption Standard encryption algorithms has been used to increase the security of the communication and preventing any intruding operations. Moreover, the system relies on a rechargeable Li-ion battery.</p> <p>Results of the testing scenarios show that the system is working as needed. In addition to that, the Advanced Encryption Standard (AES) algorithm efficiency was tested, and the results were showing the performance advantages of using this algorithm compared with 3DES algorithm. Equally important, the system was emulated using (OMNET++) network emulation software to test system scalability and reliability with the results as the following: A Utilization of 90% per cell when using 50 vehicles in simulation has been acquired. Also the packet loss ratio was 6% when using the same simulation parameters. The processing delay was equal to one second when using 50 vehicles per cell also.</p>	
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