

ABSTRACT

IMPLEMENTATION OF LOSSLESS COMPRESSION USING HUFFMAN CODING ALGORITHM IN WIRELESS SENSOR NETWORKS (WSN) BASED EMBEDDED SYSTEM

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12/333055/PA/14814

Utilization of speed transmission efficiently has been a main concern in wireless sensor networks (WSN) communication protocol. As sensors system are controlled remotely, bits reduction plays critical role in wireless transmission enhancement. Despite compression techniques always provides the most reliable way in bits reduction, deciding on which techniques and algorithm should be chosen wisely as well. This research have therefore implemented lossless compression techniques using Huffman algorithm in wireless sensor networks based on it's emphasis on sensor networks for environmental monitoring system. The performance of Huffman coding algorithm is calculated including compression ratio and size reduction.

Besides, a simple and low-cost monitoring system that combines Phidgets Single Board Computer 3 (SBC3), temperature/ relative humidity sensors and Wireless Local Area Networks (WLAN) USB adapter have been built to create sensor networks system. This networks runs in real time system and can be monitored through network client over Secure Shell (SSH) platform. With data compression result, smaller data size is being transmitted to the network client over Secure Copy Protocol (SCP). The performance of wireless transmission is calculated as well including data transmission speed to ensure the effectiveness of wireless transmission itself.

From testing process, Huffman coding algorithm show its excellent result in performing compression process for block data stream. The result shows that its compression ratio is up to 62 % with transmission speed reaching up to 70 Kbps.

Keywords : Lossless Compression, Huffman Coding, Wireless Sensor Networks