A Low power Video Compression for Energy Starved Sensor Network Using Partially Fragmented Cosine Transform

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Pulakesh Roy ; Sandip K. Chaurasiya ; Arindam Biswas ; Rajib Banerjee **All Authors**

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Abstract:
Wireless Multimedia Sensor Network (WMSN) is the latest trend of networks with its applicability in multimedia sensing and processing. However, there are some challenges in WMSN, such as lack of power consumption, the requirement of high bandwidth, and storage. In this paper, we propose a new video transmission system using the Partially Fragmented Cosine Transform (PFCT) technique to continuously track the disaster area's information. The proposed system has emerged with the modified DCT-based operation, which is computationally acute in Wireless Multimedia Sensor Networks. The frame-based correlation is measured by applying the PFCT over the selected frames. To reduce the transmitted data and save energy consumption a newly proficient routing technique was implemented along with PFCT by applying the proposed technique over an array of sensor nodes. At the final stage, a colorization model was also implemented to bring back the reconstructed frames with maintaining the quality of the frames. The performance of the proposed technique is measured by analyzing the energy consumption and peak signal-to-noise ratio (PSNR) and through the statistical analysis of the data. The supremacy of the proposed technique over other competing schemes is judged through the simulation results in terms of acceptable reconstruction quality while consuming a lower amount of power.

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Contents

A wireless sensor network (WSN) combines several smart sensor nodes to sense the environment collectively. Each sensor node consists of one or more sensors to sense the environment, a processor to process the data, a memory unit to store the data, a radio unit to transmit or receive the data, and a power unit to provide the energy to operate [1]. Presently, WSN has been deployed in different areas, but still, there are some limitations such as energy consumption, transmission efficiency, processing capabilities, quality of service, etc. Depending on the application, the sensors are classified into different categories such as thermal, seismic, optical, chemical, biological, etc. Therefore, before designing a WSN, we should carefully consider the application for which we use the Wireless Sensor Network. An important part of WSN is the Wireless Multimedia Sensor Network (WMSN) [2] which allows us to work with different applications such as audio, video, image data, etc., and can be used in different applications such as surveillance systems, object tracking for military applications, environment monitoring, forest, underground mines, and disaster areas where proper surveillance is essential.

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