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PICTURE ENCRYPTION FOR WIRELESS MULTIMEDIA SENSOR NETWORKS BY APPLYING (DWT) METHOD: A STATE OF THE ART SURVEY

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Abstract

Wireless Sensor Networks (WSN) is widely deployed in monitoring of some physical activity and/or environmental conditions. Data gathered from WSN is transmitted via network to a central location for further processing. Numerous applications of WSN can be found in smart homes, intelligent buildings, health care, energy efficient smart grids and industrial control systems. In recent years, computer scientists has focused towards findings more applications of WSN in multimedia technologies, i.e. audio, video and digital images. Due to bulky nature of multimedia data, WSN process a large volume of multimedia data which significantly increases computational complexity and hence reduces battery time. With respect to battery life constraints, image compression in addition with secure transmission over a wide ranged sensor network is an emerging and challenging task in Wireless Multimedia Sensor Networks. Due to the open nature of the Internet, transmission of data must be secure through a process known as encryption. As a result, there is an intensive demand for such schemes that is energy efficient as well as highly secure since decades.

Keywords: *Chaotic Encryption, Communication, Data, Digital Image, Wireless Sensor Networks (WSN).*

I. INTRODUCTION

Numerous tools and independent devices called sensor nodes compose the Wireless Sensor Network (WSN). Every node has a hardware computing capability that is guided to a large

communicating network interwoven with high-energy sinks. Energy sinks are known as base stations in literature. Data transfer, aggregation and filtration are carried out at the end of sinks [1].

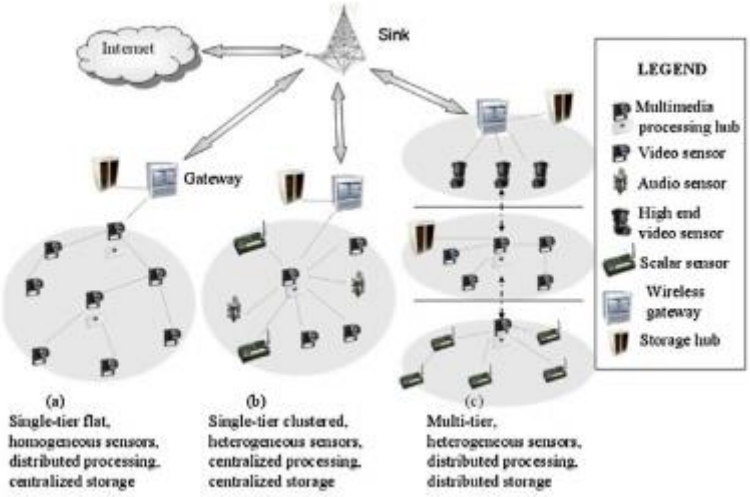

Fig. 1: Illustrates the design of a wireless multimedia sensor network [2]

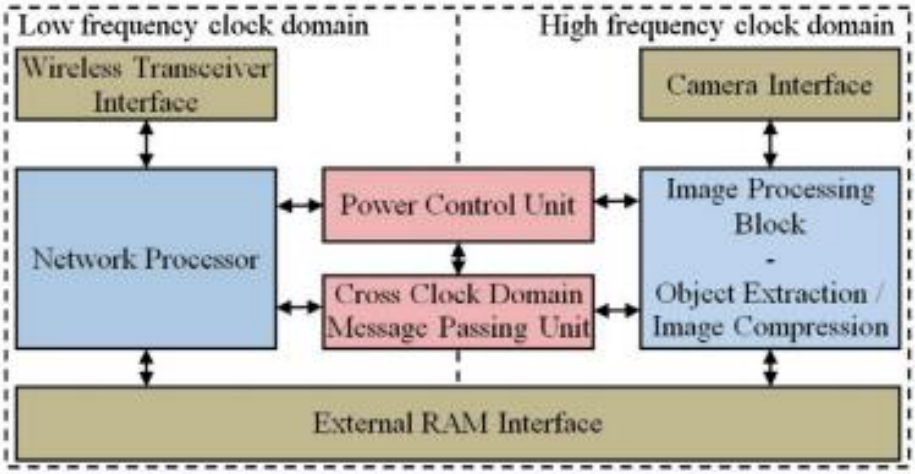

Fig. 2: Illustrates the WMSN processing system architecture [2]

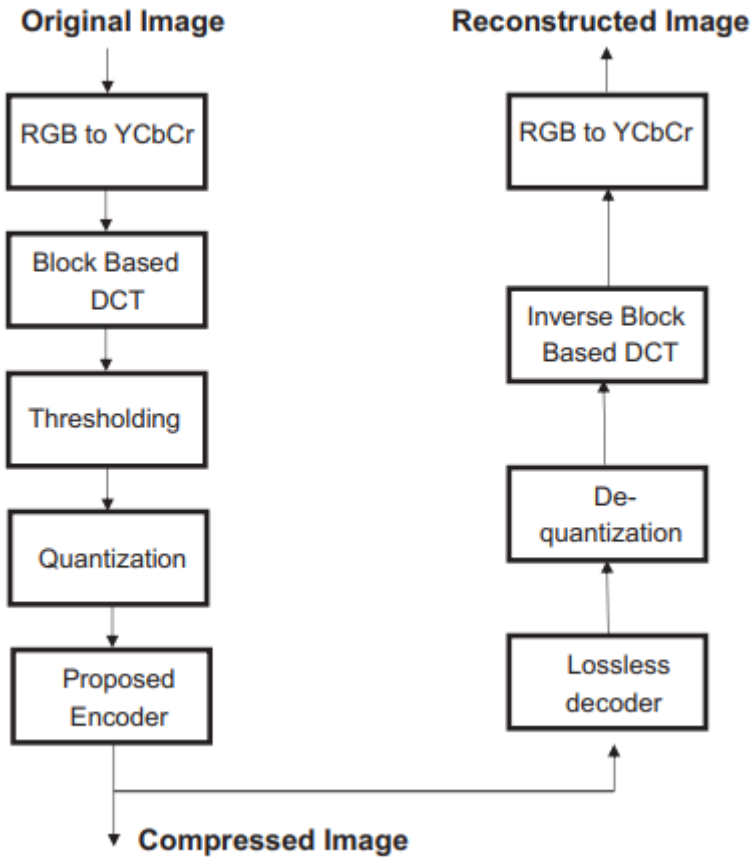

Fig. 3: Depicts the image compression/decompression approach [3]

Low power consumption, higher protection with high throughput are the most desirable attributes for an effective device when transmitting digital image over a wireless multimedia sensor network [4]. There are some schemes in literature that are vulnerable to various kinds of attacks. Many schemes are too slow for real time computation, as recently stated. It is important to build some novel systems that use low power resources but provide greater protection at the same time [5]. In terms of some security parameters reported in our previous research, these schemes need to be highly secure. Figure 1 illustrates the design of a wireless multimedia sensor network. Figure 2 illustrates the WMSN processing system architecture. Figure 3 depicts the image compression/decompression approach [6].

$$E(x) = \frac{1}{N}\sum_{i=1}^{N} x_i$$

$$D(x) = \frac{1}{N}\sum_{i=1}^{N} (x_i - E(x))^2$$

$$cov\,(x,y) = \frac{1}{N}\sum_{i=1}^{N} (x_i - E(x))\;(y_i - E(y))$$

$$r_{xy} = \frac{cov\ (x, y)}{\sqrt{D(x)}\sqrt{D(y)}}$$
$$\sqrt{D(x)}\ \neq 0, \sqrt{D(y)} \neq 0$$

II. LITERATURE REVIEW

A thesis on a stable and safe framework for wireless image transmission was carried out by Saad et al. The great developments in wireless communication networks have led to a strong demand for digital transmission of data. However, unauthorised access to data on cellular networks has become simpler and more prevalent. Data protection has become a vital concern in order to secure sensitive data from undesirable readers. Wireless network features such as noise and burst error are not taken into consideration by encryption techniques, however. A robust and stable partial image encryption approach is proposed in this paper that uses sub-band selection from discrete wavelet transformation to meet the requirements of robust image transmission, and less computationally intensive and high security are used to meet the requirements of secure image transmission by the two chaotic logistic maps. In addition, to resolve the burst error included in wireless, the proposed framework is robustified by channel coding. An effective and safe way for real-time image encryption and transmission over wireless networks is given by the experimental results of the proposed scheme [7].

III. DISCUSSION AND CONCLUSION

In this post, a new chaotic encryption scheme based on maps is proposed. DWT, three maps that are chaotic. In the proposed method, PWLCM, NCA, Intertwining logistic map, and Hussains S-BOX are used. Confusion is one of the basic encryption framework criteria that is met by scrambling columns and rows using PWLCM and NCA maps, respectively. Diffusion is generated through the intertwining logistic map in the proposed scheme. Finally, to add a little extra uncertainty, every pixel is replaced by the Hussain S-Box. Via some typical security parameters, we evaluated the proposed scheme and discovered that our scheme would resist different statistical and differential attacks. In addition, the key feature of the proposed cryptosystem is lower calculation costs and faster processing time. The proposed scheme may be used in WMSN during image transmission due to the faster processing time, statistical and differential resistance.

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