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A Review Paper onWireless Image Transmission

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ABSTRACT:*The need for a mobile radio link is to build an innovative wireless communication system for picture and video signals other than voice signals. The transmission of the pictures through a wireless channel permits an image to be compliant with the characteristics of the channel, such as the bandwidth. A large space in the storage unit occupies the image and video signals and takes a long time to transmit over a wireless channel. In order to reduce the redundant data from an acquired image to make it compliant with channel bandwidth, compression techniques are used. Various compression methods and communication models are analyzed in this article. During image acquisition and in the channel, numerous noises are added. Various compression methods and communication models are analyzed in this article. During image acquisition and in the channel, numerous noises are added. These noises need to be minimized during the transmitter and receiver image formatting and de-formatting process, respectively.*

KEYWORDS: Image Transmission, Image Enhancement, Number of Pixel Change Ratio (NPCR), Unified Average Changed Intensity (UACI),Wireless Channel.

INTRODUCTION

For a better image transmission, less power consumption and higher bitrate with an effective bandwidth are required in order to transmit an image through a wireless channel different characteristics such as decreased propagation time. The wireless channel bandwidth restriction involves a reduction in the data size of the transmitted image. Image data size reduction is referred to as image compression, since the image must be represented in a compressed format. Pre-processing procedures are applied before efficiently compressing the data to enhance image quality. Image enhancement, segmentation and representation are involved in pre-processing techniques[1]. Figure 1 shows the image wireless communication model

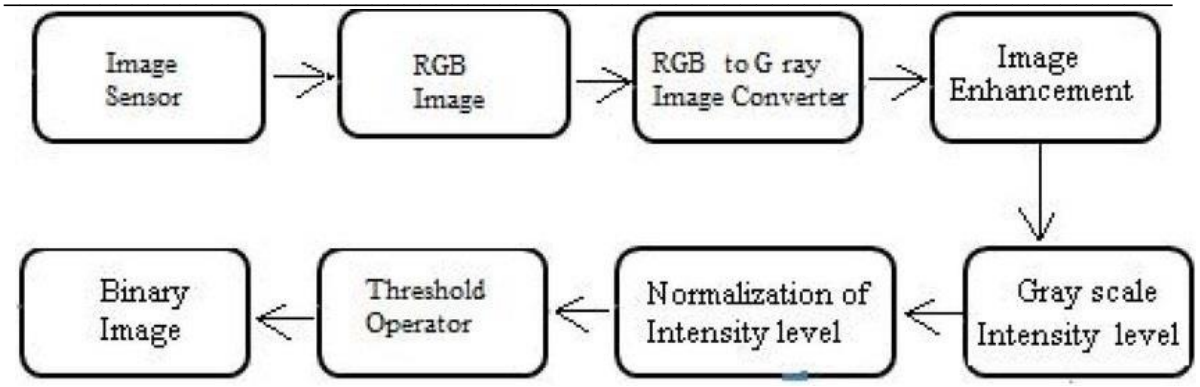

Figure 1: Illustrates the image wireless communication model

In order to secure the picture data during the transmission over the communication channel, there are some parameters that ensure the vulnerability of the different color image formats against the strikers' various attacks [2]. The Pixel Change Rate Number (NPCR) and Unified Average Shifting of Power (UACI). The formulas for calculating NPCR and UACI for an image are given below.

$$NPCR = \frac{1}{M \times N}\sum_{i=1}^{M}\sum_{j=1}^{N} D(i,j) \times 100\ \%$$

$$UACI = \left[\sum_{i=1}^{M}\sum_{j=1}^{N}\frac{|C1(i,j) - C2(i,j)|}{255}\right] \times \frac{100\%}{M \times N}$$

Using the following formulas, the similarity analysis of color images is carried out. Correlation plays a crucial role in assessing the resemblance between the two neighboring pixels of the plain image as well as the cypher image. By using the following formulas, the image correlation coefficient can be determined.In nature, wireless channel is random and has several retlectors in the area, resulting in fading[2]. Multiple reflections create multiple paths called multipath propagation for a signal to transfer a signal from transmitter to receiver. Multipath propagation results in high signal phase and amplitude variations. There is an absence of line-of-sight propagated signal in the Rayleigh fading channel model specializing in stochastic fading.The compression method has a transmitter encoder to compress the image data and, conversely, a decoder to de-compress the receiver data. Mapper transformed f(x, y) into a spatial and temporal redundancy reduced format. The whole process is known as picture formatting. The Quantizer decreases the large input value set to a smaller set size. In order to obtain pre-established fidelity requirements, the Quantizer process requires rounding and truncation of mapper output[3].

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

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

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

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

$$\sqrt{D(x)} \neq 0, \sqrt{D(y)} \neq 0$$

LITERATURE REVIEW

Alfalou et al. conducted a research on optical image compression and encryption methods. Extensive experiments have been carried out over the years to apply coherent optical methods to real-time communication and transmission of images. This is particularly true because, for example, in high-resolution photography, a large volume of information needs to be processed. Recent advances in data-processing networks and communication systems have greatly improved information sharing ability. Non-authorized individuals may, however, intercept the transmitted data. This explains why tremendous effort is being put into data encryption and secure transmission at the current time. Furthermore, with many purposes, only a small part of the total knowledge is very useful[4].

Sobha et al. conducted another research on secure transmission of data using audio watermarking with protection on synchronization attack. The process used to cover copyright (watermark) information from the digital audio signal is referred to as audio watermarking. Audio watermarking is an excellent approach to minimizing issues resulting from the simple handling and dissemination of audio files that are downloaded or uploaded through the web. Audio watermarking is an excellent solution[5]. The previously proposed audio watermarking algorithms were implemented as a watermark via the image or binary logo or a specific pattern. Unethical attempts to intentionally modify copyrighted audio data and illegal dissemination and tampering of audio files are proposed here to resolve the difficulty of online musical piracy. An appropriate audio watermarking technique is suggested[6].

DISCUSSION AND CONCLUSION

The size of an input image is one of the factors responsible for successful image transmission through a wireless channel. Under the image formatting module, the rem oval of redundant data that is the primary compression criterion is performed. Different compression techniques have been studied, such as Run Length Encoding (RLE), Precision Run Length Encoding (KRLE), Discrete Cosine Transform (DCT) and Wavelet Transform, where K-RLE is found

to minimize the size of the data more effectively than RLE. DCT and Wavelet Transform have both data compression and noise rem oval utilities. Noise rem oval is more effective than average filters with a median filer. Noises in digital images are an undesired signal. Unwanted effects created by noise are produced by artefacts, unrealistic edges, invisible lines, corners, distorted objects and disrupted background scenes. During image acquisition, coding, and transmission, noises are added. Prior learning of noise models is important for further processing in order to reduce these undesirable effects caused by noise.

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