

Flight Video Transmission for Surveillance

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Abstract: This paper reveals an idea of video transmission for surveillance for a wide range of applications such as Air craft System, Road traffic signal offenders etc. The operation is carried out in three stages such as introduction, processing and transmitting the image frames. At the early stage for doing this video transmission MATLAB simulation tools is used. Later updated with hardware results.

Keywords: Video image, MATLAB Tools, wireless n/w.

1. Introduction

In 1956, the Defense Science and Technology Organizations', Aeronautical Research Laboratories in Australia Dr. David Warren designed the first proto type coupled FDR / CVR for explicit post- crash examination purposes in airplane accidents. . A Recorder is fully automatic for fit-and-forget operation with a memory mechanism that would store hours of pilot voice and instrument readings up to the moment of any accident, but would automatically erase older records for the memory to be re-used. Generally Manufacturers might want to use the data to understand how their vehicles are performing and also this device is used to Insurance companies try out auto recorders, pay-as-you-drive car insurance, and a recorder for human health. The unit is attached to the ship's main engine and works similarly to "black box" data recorders fitted to aircraft and other high-tech vehicles. Researchers in the UK believe the technology also has vast environmental and ecological benefits in reducing the risk of oil spills at sea if a ship is at risk of breaking down. In United States, today maximum no of vehicles contain some type of data recording device.

The main advantage of this paper is replacing existing audio and data is black box along with that include video concept.

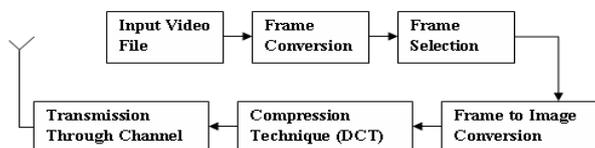
2. Processing & Transmitting Section

Ming Yang' [1] presented for audio and video synchronization, DCT based high bit rate hiding information algorithm is proposed. At the receiver, the embedded audio data is extracted and played with the host video frames to achieve the synchronization. Some significant advantages in this approach is (a) the communication channel for audio data transmission is avoided; (b) The synchronization between audio and video data is robust to packet loss (c) Complex task of multiplexing, de-multiplexing and synchronization in MPEG system have been avoided.

In another study by Qiang Wu Kebin Jia Xuwen Li [2] a new type vehicle video blackbox with acceleration sensitive function was designed. Different with common blackbox on car, the system can record and store the analog video to H.264 bi stream files when acceleration exceeds the limitation value. The acceleration sensitive algorithm has been derived.

A novel approach [3], for analyzing when the car acceleration exceeds the threshold value and the system can record and store the analog video H.264 stream files .This paper gives a trans coding scheme from H.264 to AVS (Audio video standard) .

3. Proposed System



In this paper, the above proposed block diagram explains that based on the surveillance system this recorder continuously stores the video streams. The stored video streams are converted into frames. From that sampled frames are converted into images by DCT compression technique .Then transmission takes place through the channel.

4. Methodology

The proposed work involves the simulation of the images to frame conversion. From that sampled frames are took and analyzed signal to noise ratio (SNR) Vs bit error rate (BER) of first three frames as well as Bits/Sec Vs PSNR for Frames .

5. Simulation Results

The following figures shows that comparison of signal to noise ratio Vs bit error rate and bits/sec Vs peak signal noise ratio(PSNR).

Bit-Error-Rate :

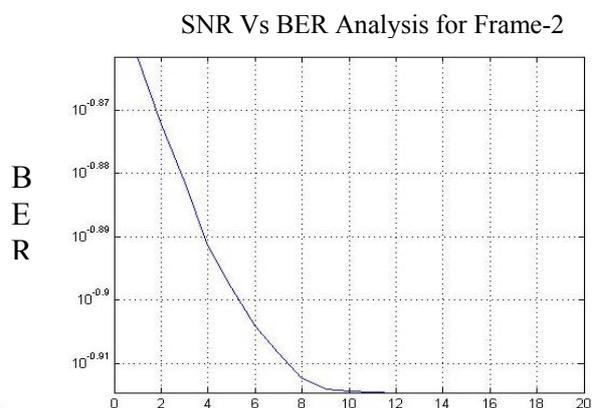
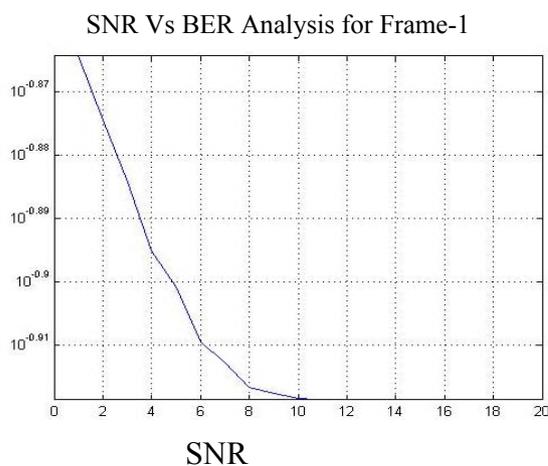
Each time run a bit-error-rate simulation, then transmit and receive a fixed number of bits. We determine how many of the received bits are in error, then compute the bit-error-rate as the number of bit errors divided by the total number of bits in

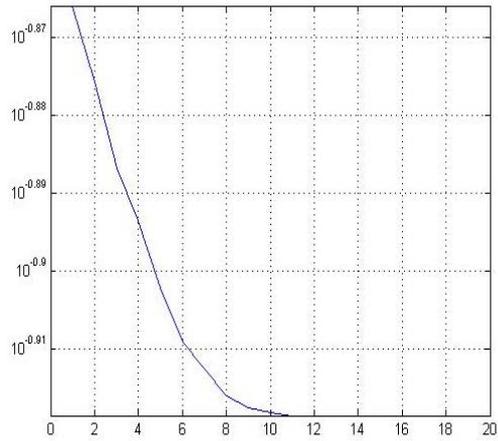
the transmitted signal.

Using Matlab, we compute the bit-error-rate, ‘ber’, as:

$$ber = te / \text{length}(tx),$$

where ‘te’ is the total number of bit errors, and ‘tx’ is the transmitted bit vector.





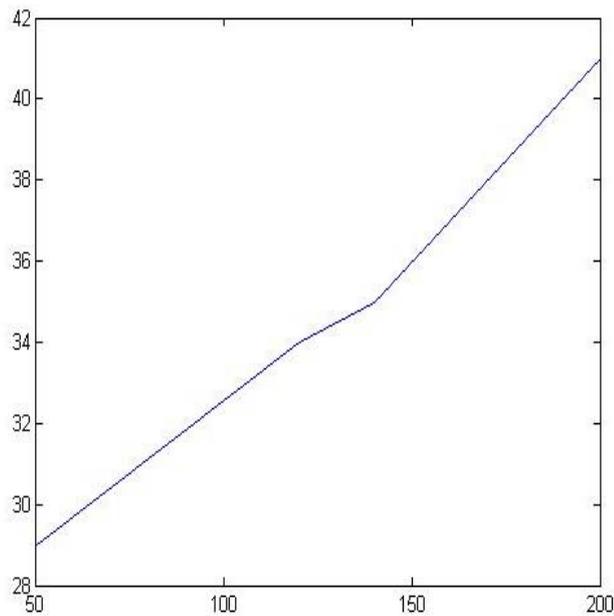
SNR Vs BER Analysis for Frame-3

Function of PSNR: To find PSNR between two images.

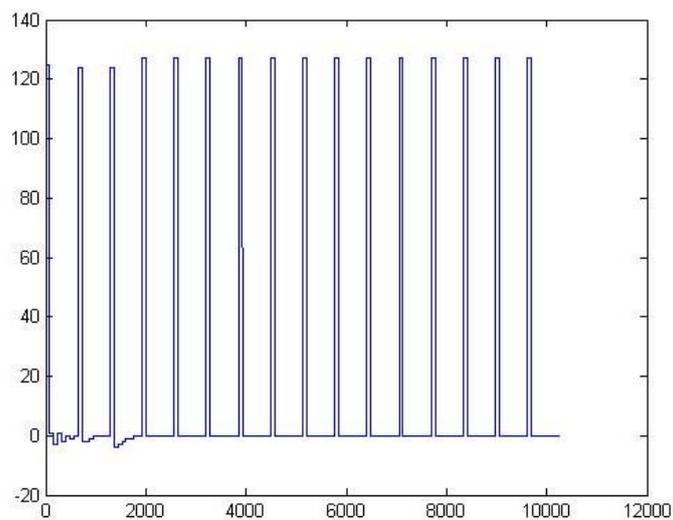
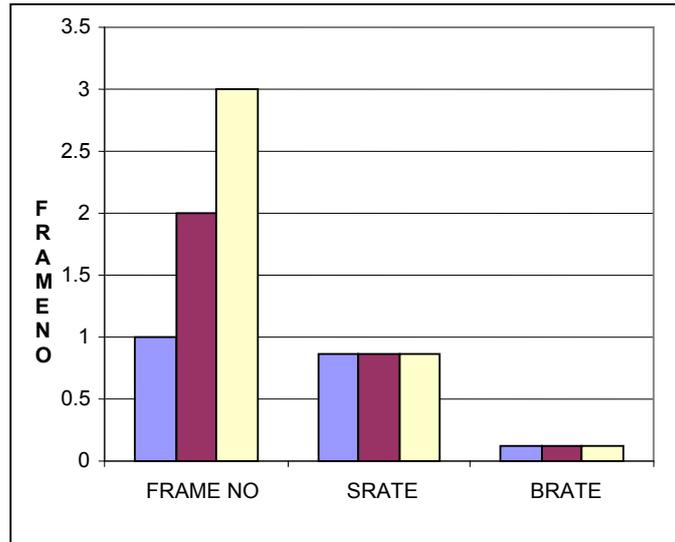
$$\text{PSNR} = 20 * \log_{10} (b/\text{rms})$$

Where b is the largest possible value of the signal (typically 255 or 1), and rms is the root mean square difference between two images. The PSNR is given in decibel units (dB), which measure the ratio of the peak signal and the difference between two images

Bits/Sec Vs PSNR for Frames



S.NO	FRAME NO	SNUM	SRATE	BNUM	BRATE
1	1	8816	0.8596	8659	0.1206
2	2	8816	0.8596	8739	0.1217
3	3	8816	0.8596	8746	0.1218



6. Conclusion

This paper summarizes how image file is converted into frames and what is the bit error and signal error rate is analyzed. Finally a prototype has been designed and developed which enables continuous video transmission process from source to target.

7. References

- [1] Ming Yang', Nikolaos Bourbakis², Zizhong Chen', and Monica Trifas', "An Efficient Audio-Video Synchronization Methodology", proceeding in IEEE internal conference
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- [3] Baoguo Wang , Yunhui Shi , Baocai Yin , "Transcoding of H.264 bitstream to AVS bitstream", sponsored by National Natural Science Foundation of China and proceeding in IEEE 2009.