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EVOLUTION OF QUALITY OF EXPERIENCE FOR ULTRA HD VIDEO STREAMING IN NETWORK MANAGEMENT

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Abstract: In this paper we introduce the video streaming with enhanced security and speed of the video processing. The system mainly concentrate on building a Quality of Experience (QoE)-aware video adaption system that uses the scalable H.265 encoded UHD video stream. The proposed model is the client server based model. The main objective of the proposed model is to ensure high accuracy, speed of the video streaming and enhanced security.

Keywords: UHD, QoE, Enhanced Security, video streaming, scalable encoded.

I.INTRODUCTION

Video applications at present record for 73% of all IP based Internet traffic and are anticipated to expend 82% by 2021. Over a similar period traffic from cell phones is set to ascend from 7% of all traffic to 17%, expanding at double the rate of fixed IP traffic. Additionally as Fifth Generation (5G) versatile systems enter administration, anticipated higher transmission capacities, lower start to finish delays and improved unwavering quality, are probably going to expand interest for portable video utilization. Some compact gadgets as of now have screen goals of 4K with 8K conceivable by the mid 2020's.

II. LITERATURE SURVEY

This can tell about the method which is existing. The QoE assessment and modelling for video streaming is H.264/HEVC (High Efficiency Video Coding). The HEVC standard was introduced in 2013.The high efficiency video coding is a video compression standard, one of the potential successors to the widely used AVC (H.264). H.265 has the spatial resolution of up to 8K and frame rates of up to 300 frames per second.

III. PROPOSED SYSTEM

The system will concentrate on building a QoE-aware video adaption system that uses the scalable H.265 encoded UHD video stream. The server is the entity where the videos are saved. The client is the entity where the videos can be accessed through the mediator. The H.265 Encoded UHD acts as the transmission medium which enables the video streaming.

A. Advantage

1) The video can be streamed at high quality, accuracy and enhanced security.
2) The speed factor can be improved by using the scalable H.265 encoded UHD system.
3)

IV. IMPLEMENTATION

The proposed model is implemented by the following diagram. The Scalable H.265 Encoded UHD video stream is the new video compression standard for the video streaming and also for live streaming.

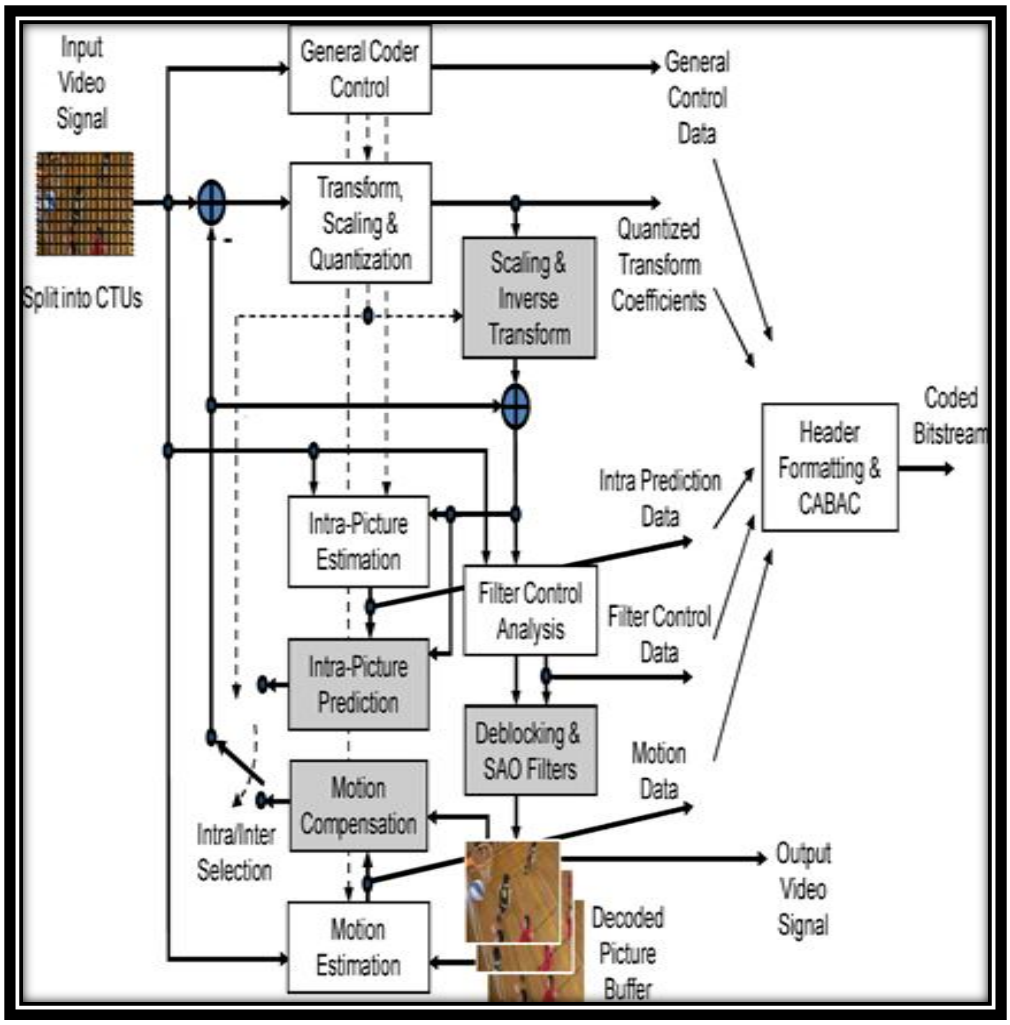

Fig. 1 Proposed Model

a. List of components

1. CTU
2. General Coder Control
3. Transformation, Scaling and Quantization
4. Motion Estimation
5. Intra Picture Prediction
6. Motion Compensation
7. De-blocking filter
8. SAO filter
9. CABAC
10. Filter Control Analysis
11. Decoded Picture Buffer
12. Intra Picture Estimation

b. Components description

1. CTU:

The CTU (Coding Tree Unit) is the basic version processing unit in the video compression coding standard. It deals with the structure of macro block units that were used in several previous video standards. CTU is also called or referred to as largest coding unit (LCU).

2. GENERAL CODER CONTROL:

The general coder control system is the version of control system in which the basic or original version of the video signal is retrieved. This is the specified work of the general coder control.

3. TRANSFORM; SCALING AND QUANTIZATION:
In the H.265 scalable codec, macro block data are transformed and quantized before to coding and rescaled and inverse transformed before to reconstruction and display. Several transforms are available in the H.265 standard: 4x4 "core" transforms, 4x4 and 2x2 Hadamard transforms and an 8x8 transforms (High profiles only).

4. MOTION ESTIMATION:
Motion estimation is the process of estimating the motion vectors that describe the transformation or converting the one two dimensional image to another two dimensional image; usually next frames in a video sequence. It is a major problem as the motion is in three dimensions but the images are a projection onto a 2D plane.

5. INTRA PICTURE PREDICTION:
The intra picture prediction framework consists of three basic steps:
- Reference sample array construction
- Sample prediction
- Post-processing

All the three steps have been constructed to achieve the high efficiency coding in the video standard while reducing the computational specification in both the encoder and decoder.

6. MOTION COMPENSATION:
Motion compensation is an algorithmic technique used to determine the frame in the uploaded video, given the predecessor and/or successor frames by accounting for moving objects of the camera and/or objects in the video. It is most commonly employed in the encoding of video data for video compression, for example in the generation of MPEG-2 files.

7. DEBLOCKING FILTER:
A de-blocking filter is a video filter applied to the input video to make the clear visual quality in the video. The sharp edges are smoothed in order to predict the entire frame performance of the input video samples.

8. SAO FILTER:
Sample Adaptive Offset Filter is applied to get the final picture which can be used as a reference picture for inter prediction. The basic idea of the SAO filter is to reduce the distortion in the video signal. The offset is applied to each category and at the last the offset is added to the entire video samples to make the video better and good looking.

9. CABAC:
Context Adaptive Binary Arithmetic Coding (CABAC) is mainly used in the H.265/MPEG-4 and High Efficiency Video Coding (HEVC) standards as the form encoding entropy in the video compression standards. It is a loss free video compression technique. CABAC is capable for achieving better compression than the most other entropy encoding algorithms.

10. FILTER CONTROL ANALYSIS:
The filter control aims to reduce the noise and distortion in the video standard. It enhances the video quality in the codec processing.

11. DECODED PICTURE BUFFER:
The decoded picture buffer will provide the synchronization between the encoder and decoder. It ensures the security enhancement in the video coding.

12. INTRA PICTURE ESTIMATION:
The intra picture estimation aims to determine the frames and estimate the quality of the pictures involved in the videos.

V.WORKING

The Scalable H.265 Encoded UHD video stream works by client server model. The input video which is saved in the system drive is loaded in the outlook of the output image. The output dialog box consists of the dark channel, bright channel, combination of both the channels, PSNR value (Peak to Signal Noise ratio). The Scalable H.265 Encoded UHD video streaming is done to enhance the video quality and security in the video codec processing.

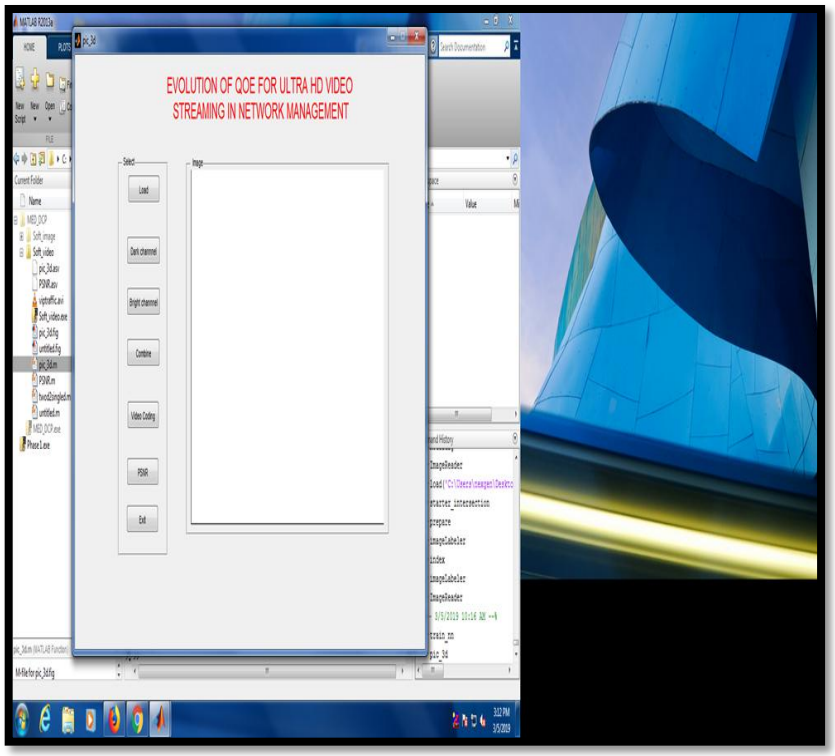

Fig. 2 The outlook of the video processing

DARK CHANNEL: The dark channel in the codec processing is meant for encryption in which the video is encrypted and safely transmitted to the recipient. The security in the codec processing can be of security key exchange, authentication, and authorization. The Dark Channel and the bright channel are combined to show the binarized difference image to enhance the security of the video processing.

BRIGHT CHANNEL:

The bright channel is meant for the decryption in which the video is decrypted and the originally transmitted video is streamed by the end user.

VI. RESULT

The result of the codec processing analysis the each and every frame in the videos. The frame is analyzed to determine the mean gray level graph. The input video is loaded in the output screen. The input video must be the HD video.

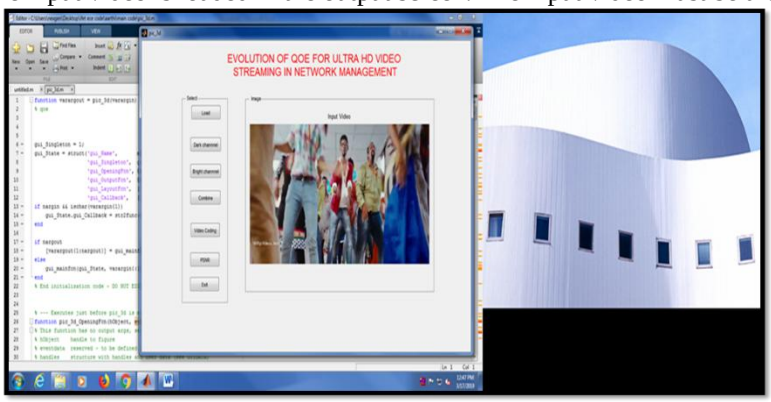

Fig.3 Loading of the input HD video

The video is loaded by using “LOAD” option in the output screen. The Ultra-HD video is loaded by the load option in the codec processing. The input video must be fully loaded to determine the quality metrics of the input video in the video codec processing.

MEAN GRAY LEVEL: The gray level is defined as the resolution of the predictable or deterministic change in the shades or levels of gray in an image. In short the gray level resolution is equal to the number of bits per pixel.

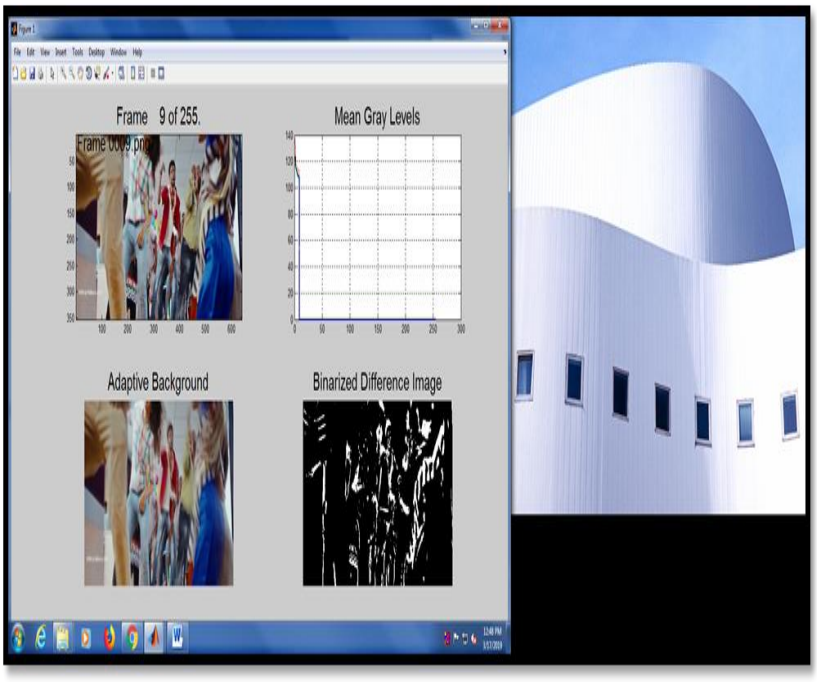

Fig. 4 Input Video Frame at frame no.9

The input HD- Video is streamed to the receiver and the video is viewed at different frames and the video at each frame is analyzed to determine the mean gray level graph.

BINARIZATION:

The binarization is the process of converting or changing a pixel image to a binary image. In the olden days the binarization is used in sending faxes. These days it is still used for things like digitalizing text or segmentation.

- At first the input image or video is converted into gray level
- Then a threshold is applied

The threshold can be either be set fixed or adaptive using a clustering algorithm. This algorithm is called as ISO Data Algorithm. It first counts the appearance of each tone in the image and tries to find a good center.

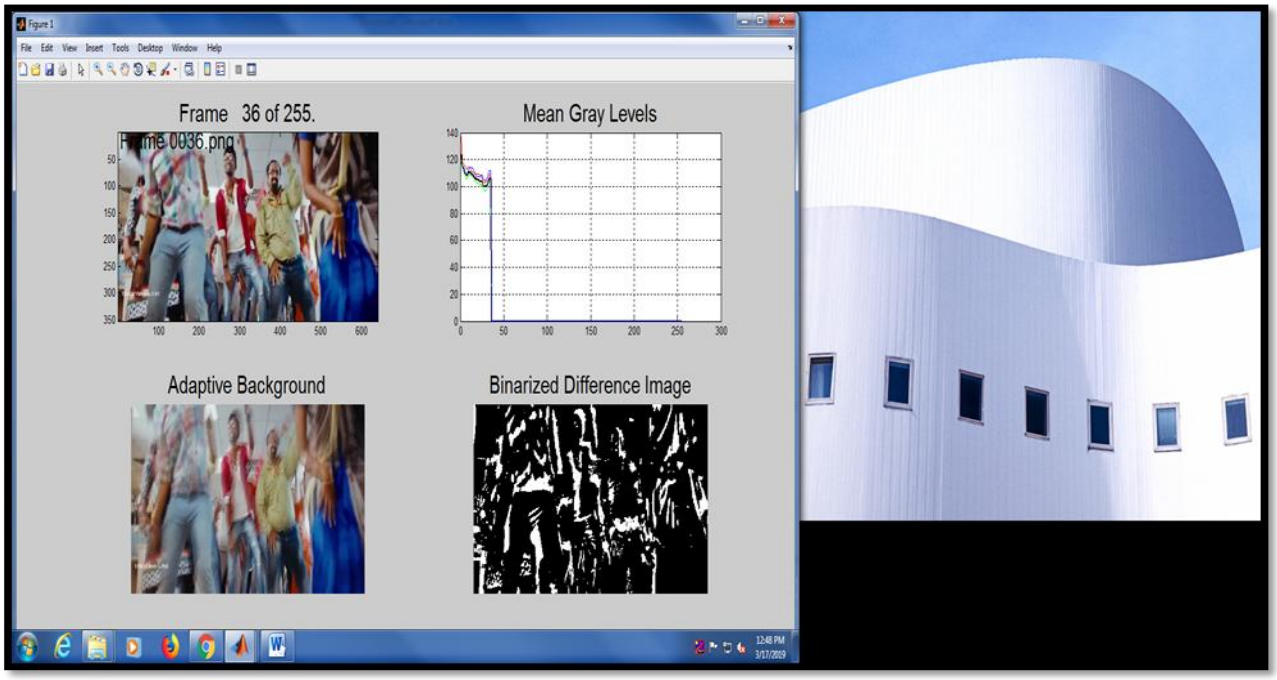

Fig.5 Input Video Frame at 36

The videos are analyzed at each frame. The total frames for the uploaded input video is 255.The mean gray level graph is represented at each frames per video.

VII. CONCLUSION

The Scalable H.265 Encoded UHD system ensures high security and to create the end-to-end video production ecosystem. The proposed system can be used in DEFENSE as the information can be send with end-to-end security and 3rd person is unable to interrupt the transmitted information. Especially, it centers on forecasting the video in high quality. This technique is mainly used in remote surgery and cricket live.

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