

A Novel to achieve ULTRA HD video compression by using VHT algorithm based on embedded Technology

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Abstract- Different level of compression on real-time video streaming has successfully reduced the storage space complexities and bandwidth constraints in the recent times. To design and develop a novel concept towards the enhancement of perceptual quality of a real-time video ultra HD frames. The proposed model has been considering multilevel compression operation on video frames and pixel level analysis using VHT algorithm. AVI moving frames and pixel standards play a crucial role. The study also applies a novel concept of High-efficiency video coding (HEVC) for adaptive live video streaming over a mobile network. The proposed study aims to formulate to enhance the performance of both encoding and decoding mechmulti-level optimization for noise filter algorithm using Embedded systems ensure higher compression ratio ion video frames and pixel. The proposed outcomes also will show that protocol achieves better performance ratio and overall improved efficiency.

Keywords – RS232, VHT Algorithm, ATMEGA328, UHD Video

I. INTRODUCTION

Videos entertainment (DVD, LCD, LED, etc) and video communication (CCTV's, Virtual presentations, etc) are excessively used. But storage space required to the video is large amount of memory [1]. Video transmission has to send frames of information with the large requirement of transmission bandwidth. Therefore, Video compression is essential method for making video to transmittable size.

Users today have gotten used to taking and posting photos proximately with mobile phones, digital cameras, and other portable devices (CCTV's) to record daily life, share experiences, and promote businesses [2].

Recent day's analysis, Instagram users have been posting an average of 55 million photos every day. Face book users are uploading 350 million photos each day. How to store, backup, and maintain these enormous amount of

photos in an efficient way has become an urgent problem [3].

Hexagonal Based Search Pattern: Hexagonal Based Search Pattern for Motion Estimation is a frequency domain image transform method that is used to reduce the storage space where we want to store the image. In DCT, the whole image is divided into $n*n$ blocks then Hexagonal Based Search Pattern (HBSP) is applied on these blocks [2].

High efficiency Video Coding (HEVC): It is an image compression standard, In comparison to, HEVC offers about the data compression ratio at the same level of image quality, or substantially improved image quality at the same quality [2].

II. PROPOSED ATMEGA 328 PROCESSOR ARCHITECTURE

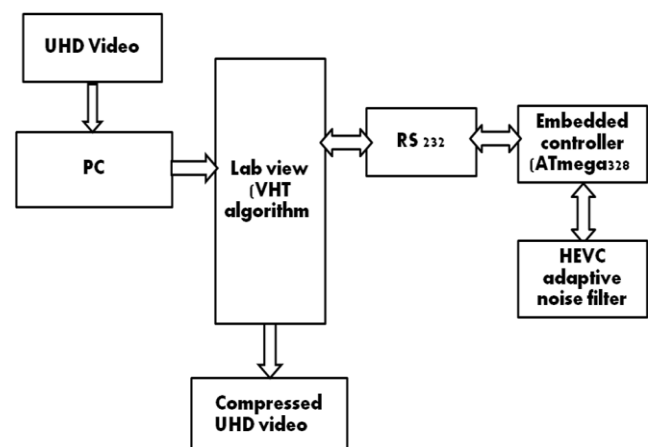


Figure.1. Proposed System Block Diagram

Internet of Things (IOT) big data requires new machine learning methods able to scale to large size of data arriving at high speed. Decision trees are popular machine learning models since they are very effective, yet easy to interpret and visualize. In the literature, we can find distributed algorithms for learning decision trees, and also

streaming algorithms, but not algorithms that combine both features storage and efficiency. In this novel approach we present the Vertical Hoeffding Tree (VHT), the first distributed streaming algorithm for learning decision trees. It features a novel way of distributing decision trees via vertical parallelism to improve the feature of storage and efficiency of video framing. The algorithm is implemented on top of Apache Scalable Advanced Machine Online Analysis (SAMOA), in the era of mining distributed data streams; they can able to run on real-world clusters. We have to study the accuracy and throughput performance of our new VHT algorithm and its ability to scale while keeping its superior performance with respect to non-distributed decision trees.

Microsoft deprecated support for the RS-232 compatible serial port of the original International Business machine (IBM) PC design. Today, RS-232 has mostly replaced in personal computers by Universal Serial Bus (USB) for local communications in fig 2. Compared with RS-232, USB is faster, uses lower voltages, and also it has connectors that are simpler to connect and use, USB are limited by standard to no more than 5 meters of cable, thus favoring RS-232 when longer distances are needed. Both standards have software support in popular operating systems like as WINDOWS, ANDROID.

A. RS232:

USB is designed to make communication easier for transmitting the data with hardware. USB is more complex than the RS-232 standard because it includes complicated protocol architecture for transferring data from source device to destination to devices; here used protocol requires more software to support. There is no direct analog to the terminal emulator programs in that cases users communicate directly with serial ports.

Serial ports of personal computers are also often used to directly control various hardware devices, such as relays or lamps. Personal computers are used as a serial port interface to devices uninterruptible power supplies. In some cases, serial data is not exchanged, but the control lines are used to signal conditions they are loss of power and low battery alarms. An application program can detect or change the state of RS-232 control lines in the registers of the serial hardware using only a few input/output instructions; contrast, a USB cable interface requires software to decode the serial data.

Devices that convert between USB and RS-232 do not work with all software or on all personal computers.

In fields such as laboratory automation or surveying, RS-232 devices may continue to be used. Programmable Logic Controller (PLCs,) Variable Frequency Drives (VFDs), servo drives, and Computer Numerical Control (CNC) equipment are programmable via RS-232. (Some manufacturer is responded to this demand: Toshiba re-introduced the DE-9M connector on the Tecra laptop).

RS-232 ports are also commonly used to communicate to headless systems such as servers, where no monitor or keyboard is installed, during boot when operating system is not performed yet, therefore no network connection is possible. A computer with an RS-232 serial port can communicate with the serial port of an embedded system (such as a router) as an alternative to monitoring over Ethernet cable.

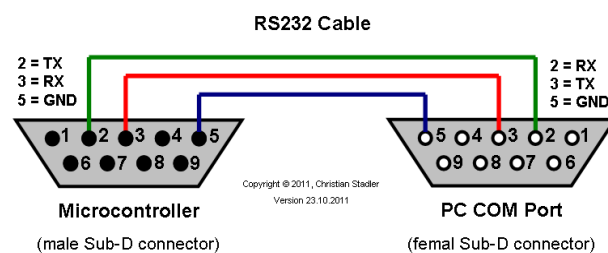


Fig.2. RS232 CABLE

B. AT MEGA328:

The Atmega328 is a one of the mostly used microcontroller. In chip produced process by Atmel. This contains many special features that are 8 or 16-bit microcontroller, 32K of flash memory, 1K of Electrical Erasable PROM, and 2K of internal Static RAM.

The Atmega328 is one of the microcontroller chips that are used with the popular Arduino Duemilanove boards. The Arduino Duemilanove board designed with microcontroller chips, Atmega168 or the Atmega328 of these two, the Atmega328 is the upgraded, more advanced chip. Unlike the Atmega168 which has 16K of flash program memory and 512 bytes of internal Static RAM, the Atmega328 has 32K of flash program memory and 2K of Internal Static RAM.

The Atmega328 has 28 pins. It has 14 digital I/O pins, of which 6 can be used as PWM outputs and 6 analog input pins. These I/O pins account for 20 of the pins. The pin out for the Atmega328 is shown Fig 3.

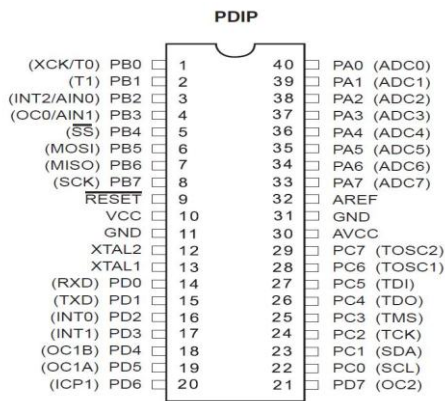


Figure.3. ATMEGA328 Pin details.

III. PROPOSED WORK

The powerful video compression processing system is the human brain together with the eye. The system receives, enhances and stores images at enormous rates of speed. The VHT algorithm realizes the properties of VHT transform and establishes better compression with better quality than the VHT individuals by use of Atmega328 processor to achieve high compression ratio. The input frame is transformed individually. The frame coefficients are subjected to one-level VHT in Fig 4.

Detail coefficients are containing more important information. Approximate coefficients are less important and can be discarded. Then second level VHT is computed on the LL coefficients only. After that VHT transformation is applied on this information and then it is subjected to approximation of coefficients to prefixed quantized values.

The input video is first converted into frames and each frame is processed. The frame is VHT computed one by one after the conversion of the frame here we proposed to analysis the micro level analysis of each pixel in each frame.

In matrix every bit of informative frames are quantized. Quantization is approximation or rounding off information bits to nearest pre-defined levels. The arithmetic coding technique is used here which has better compression ability.

In arithmetic coding the number of bits used to encode each symbol varies according to probability assigned to that individual symbol. Low probability symbols use many bits, high probability use fewer bits. This is variable length coding or Huffman coding.

Arithmetic coding achieved more compression ratio of video frames. After that the output bit stream is stored to the storage space of processor Atmega328. This is compression version of HD video. For Video decompression is reverse procedure of compression.

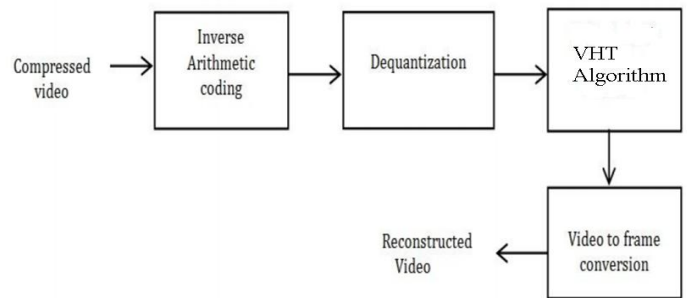


Figure.4. Proposed block diagram

IV. CONCLUSION

Video compression techniques have important role in entertainment (UHDTV, LCD-TV) and the communication applications like CCTV's but it is limited by storage space and bandwidth of video transmission.

Hybrid method of video compression using VHT algorithm solves this problem to great extent. It reduces the size of the storage space and transmission bandwidth without affecting the quality of the video by using the VHT algorithm with the help of hardware Atmega328 processor.

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VI. REFERENCES

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