Universidade de Aveiro Departamento de Electrónica, Telecomunicações e Informática,
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Miguel Oliveira Inocêncio

Co-processador da Transformada e Quantização para AV1

AV1 Transform and Quantization Co-Processor

DOCUMENTO PROVISÓRIO

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AV1 Transform and Quantization Co-Processor

Dissertação de Mestrado apresentada à Universidade de Aveiro, para obtenção do grau de Mestre em Engenharia Eletrónica e de Telecomunicações, sob orientação do Professor Doutor António Navarro ...

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agradecimentos / acknowledgements

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Palavras-Chave HEVC, ...

Resumo

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Keywords HEVC, ...

Abstract

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Acronyms

CMOS Complementary metal–oxide–semiconductor.

Codec Encoder-Decoder.

fps frames per second.

HEVC High Efficiency Video Coding.

TV Television.

UHD Ultra-High-Definition.

Glossary

Codec Encoder-Decoder. Also referred to the method of compressing and decompressing a video sequence..

RGB Color space based on the addition of Red, Green and Blue components for complex color representation.

CHAPTER 1

Introduction

1.1 Background and Motivation

* Desenvolvimento da qualidade de vídeo ao consumidor final

* Depêndencia das baterias para aplicações móveis

* Hardware dedicado melhora performance e consumo energético

Since the spark of television research in 1887, a tremendous investment has been put into increasing the quality of images, cameras and screens that display them [1].

In the early years of mechanical television, this desire was pursued by making changes to the *Nipkow* disks, up to the decline of the mechanical TV, around the 1930's. The consequential rise of all-electronic TVs started with the capture of images with the same cathode tubes put into the televisions, with broadcasts of the live analog recordings, since there were no available methods of storing images, up to 1955, with the development of the open-reel magnetic tape [2].

The evolution of Complementary metal–oxide–semiconductor (CMOS) technologies however, led to the downfall of camera tubes, and to the rise of image capture to a digital sensor, that allowed better image captures and lower demands in terms of storage space. However, with the desire for higher fidelity video, the quantity of information captured also increased. Whether by increasing the sensor resolution, color bit depth or frame rate, the captured video sequences have increased its size throughout the years. For instance, for a video of 640×360 (considered as a low resolution), at 30 frames per second (fps), considering each captured color (RGB) is represented with 8 bits, there is approximately 166 Million bits per second (Mbps) of captured information. This means that a short 5 minute video would occupy more than 6 Giga Bytes (GB) of memory. This aspect gets more severe once higher resolutions are considered. For newer standards such as 4K Ultra-High-Definition (UHD) (3840×2160) or 8K UHD (7680×4320), under the same conditions, a 10 minute video would occupy 448 GB and 1792 GB of raw data, respectively.

Falar dos color spaces mais à frente?

Insert here CISCO forecast

This problem has led to the introduction of a new concept: *Video Compression* [1], which is the process of reducing the size of a video sequence, while still maintaining its playback capabilities. The Codec takes advantage of redundant information present on the raw data to reduce the size of the video, without heavily modifying the original picture or its quality .

Referência para secção mais à frente?

References

[1] Mark Schubin. "What Sparked Video Research in 1877? The Overlooked Role of the Siemens Artificial Eye [Scanning Our Past]". In: *Proceedings of the IEEE* 105.3 (Mar. 2017), pp. 568–576. ISSN: 0018-9219, 1558-2256. DOI: 10.1109/JPROC.2017.2652998.

[2] Marco Jacobs and Jonah Probell. "A Brief History of Video Coding". en. In: (), p. 6.

[1] Also called *Video Coding*.

CHAPTER 2

Estado de Arte

[1]

References

[1] *Television in the US: History and Production.* http://www3.northern.edu/wild/th100/tv.htm.