

Resilience Evaluations for Approximation Storage at VVC Encoders

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INTRODUCTION

The video streaming on the internet will surpass 90% by 2023 [1].

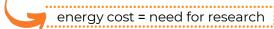


Versatile Video Coding



VVC is expected to be by developers by 2022 [2].

savings on video Significantly higher compression compared to computational cost. HEVC [3].



Approximate Storage



Reduction of energy consumption



Loss of coding efficiency

OBJECTIVE

Assess memory resilience levels in video encoding with VVC exploring the use of approximate storage techniques in specific encoding modules.

[1] CISCO. Cisco Annual Internet Report (2018-2023) White Paper.

[2] FRANCIS, A. Top Video Technology Trends 2022: The Future of Streaming is About

METHODOLOGY

Coding modules

Intra-Frame Prediction

Transforms

Fractional Motion Estimation (FME)

Integer Motion Estimation (IME)

Parameters for the experiment

QPs: 22, 27, 32, 37 (416x240 pixels)

Repetitions: 5 Video: RaceHorses Error rates: 10⁻⁷, 10⁻⁶, 10⁻⁵, 10⁻⁴,10

Software Tools

Versatile Video Encoder (VVenC)



RESULTS AND CONCLUSIONS

Higher error rates = lower coding efficiency

- Transform module has the lowest error resilience (89%).
- In the other modules, losses reach 0.48% (FME), 0.31% (IME) and 0.45% (Intra Prediction). Transforms
- The use of errors 10 and 10 can be tolerated.
- Future work: Profiling more detailed resiliency and analyzing the impact of reducina power **VVC** consumption codecs.

