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Chroma Resampling for 4K Video Production.

ABSTRACT - Masterthesis

Human vision is more sensitive to changes in brightness than color information. Hence video systems use YCbCr (Y indicates luma information and CbCr indicates blue-difference and red-difference Chroma or color information) color space for representing video, so that color information can be compressed and bandwidth is saved; but with drawback of lesser video quality.

The YCbCr in a 4:4:4 format represents complete video signal without any Chroma sub-sampling, whereas YCbCr in a 4:2:2 down sampled format represents Chroma information with ½ resolution in horizontal direction and full resolution in vertical direction. In order to display 4:2:2 YCbCr compressed video on a monitor; the video has to be converted back (up sampled) to full resolution RGB or YCbCr 4:4:4.

There are several YCbCr Chroma up sampling (4:2:2 to 4:4:4) and down sampling (4:4:4 to 4:2:2) schemes, each scheme has its own advantages and disadvantages.

Aim of the thesis is:

- To find suitable, visually lossless Chroma resampling scheme for a 4K video production system.

- To perform color space conversion before and after Chroma resampling.

- To find drawbacks involved when Chroma resampling is done using different types of filter.

- To design hardware that utilizes FPGA resources efficiently.