Weekly Meetings Report

03 March 2015

Discussed Topics

1. ***DCT Implementation***
   Efficient 2D DCT implementation was discussed, and two options for the position of the DCT in the algorithm were weighted: pre computation of the DCT of all blocks for each neighborhood, as in the MATLAB implementation, versus computation of the DCT after each group is formed. Both options are going to be fully analyzed when designing the system architecture.
2. ***FPGA Platform***
   The FPGA board to be used during the work is the Xilinx Zynq-7000 ZC706 evaluation board, which will be shared with Professor Xin Li's students working on image and video processing.
3. ***System Architecture***
   Some preliminary ideas regarding the system architecture were discussed, and Professor Xin Li proposed the replacement of the ℓ_2 norm with the ℓ_1 norm, in order to decrease the computationally requirements (eliminating all multiplications) of measuring the distance between blocks. After the meeting, this idea was tested in MATLAB, with results of the algorithm decreasing in terms of PSNR, but not significantly. Nevertheless, this trade-off between high PSNR and dramatically lower hardware resource usage must be fully analyzed when planing the system architecture.

Next tasks

1. ***Develop the system level architecture for the BM3D algorithm***
   The architecture should achieve the best possible trade-off between resource availability in the FPGA and runtime of the algorithm.
2. ***Literature review on hardware design for image processing***