Image processing on FPGA

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What and Why?

- FPGAs are ideal for control applications because they can run extremely fast, highly deterministic loop rates
- Basic image processing functions like filtering, edge detection etc.are very much used for other purposes like objet detecton etc. in real life
- Through this project we try make a co-processing module to perform such image preprocessing efficiently exploiting FPGA architecture

Project

Building a image processing module on FPGA

- Include function like Greyscale, Inversion , Edge detection*

  Further algo suited for FPGA architecture would also be implemented , if time permits

  Our main motive would to exploit the high parallelism and modularity offered by FPGA.

Steps

- Reading an image , in hex format, and transmitting each pixel information using arduino
- Performing modular operation on FPGA and sending data accordingly back in hex format
- Reconstructing the image from the hex format.

Module include:

1. Grey scale - Outputs the grayscale image
2. Threshold - Outputs the image with desired value for brightness

*3. Edge detection

*4. Image compression using DCT

* - requires memory mapping and reading , still to do