Real Time face detection

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Project Abstract:

The primary goal of this project is face detection. We want to accomplish being able to detect and track a face in a camera feed. Our primary goal is for the FPGA to take any image in real time, localize the face in the image, and track it with an overlay box around it.

Our plan is to take a 320 x 240 frame of video and then use two 128kB input buffers; one to process the frame and the other one to buffer the image. Then want to downsample the image into 20 x 20 pixel search windows and classify each window with a score based mainly on an edge detection pass (using the Sobel edge detector) and a naive Bayes classifier. The score for each window is saved in internal memory. The score will be used to determine whether the search window is part of a face or not. Time permitting, we would like to be able to zoom into the face and track it with a camera mounted on a servo.

The project can be divided into modules, which makes it easy to work on. Some of the modules that we have in mind already are the acquisition of the video feed and population of the input buffers; the necessary image processing on the image; and then the tracking of the image on the screen.

The motivation behind our project is that the FPGA is ideal for the kind of image processing face detection requires. Also, face detection is something that has not been done before in a 6.111 project, and it is something the three of us desire to learn more about and accomplish.