ABSTRACT

This research focused on the Integration Design of a Hybrid ARM and FPGA based Face Detection System powered by the OpenCV computer vision library and the SoCKit Altera Cyclone V System-on-Chip FPGA Development Board. A hardware and software integration system was designed for compatibility with the Cyclone V SoC SoCKit Development Board using Altera QSys and Altera Quartus. A custom version of the Linux Operating System Kernel from Github was then developed to support the Development Board's specification and the System Requirements such as USB Video Class Kernel Modules for USB Web Cam Support of the Integrated Face Detection System which was compiled using the Linaro tool-chain. OpenCV was then compiled within the Linux System and a face detection program using OpenCV face detection functions was developed that would be compatible to the integrated system. The Integrated Face Detection System was compared to a CISC based setup with Intel(R) Core(TM) i7-2670QM CPU @ 2.20GHz. The results showed that the SoC is slower by 43% compared to the Intel Core i7 setup in detecting a face from the standard Lena.jpg input file.