

BIOMETRICS SIGNAL PROCESSING USING FPGA

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Biometrics, encompassing the engineering, statistical, mathematical and computing methods, is an emerging field of technology which uses unique and measurable physical, biological or behavioral human characteristics to identify a person. Essential for successful identification is the signal processing techniques to extract features from the previously captured data and to compare the stored features with features extracted from the real time data. Several algorithms have been developed and proven on a digital computer running a software model. This paper presents an alternative execution platform to run the proven algorithms, using the contemporary Field Programmable Gate Arrays (FPGA). Modern biometrics based authentication systems demand small size, low power consumption and high speed operation. FPGA based signal processing models developed at the Knowledge Engineering Design Research Institute (KEDRI) have shown the FPGA based execution platform to be an order of magnitude faster than the Pentium based platforms for the same signal processing task. The paper describes one such FPGA engine and the tools needed for its development and testing. Unlike a software based engine, which executes one instruction at a time, the FPGA executes multiple tasks concurrently giving it considerable speed advantage. The paper concludes with listing the execution speeds offered by FPGA based engine for several signal processing “building blocks” such as FFTs, cosine transforms etc.