

Overview

Biometric matching applications (finger print, palm print, retina, and facial) are ideal candidates for DRC's FPGA-based Accelium™ accelerators. Using the massive parallelism of the accelerators results in orders of magnitude¹ wall-clock application speed-up vs. the same algorithms executed in software on conventional processors.

Background

Biometric identification is a rapidly growing segment and one that places extraordinary resource demands on the host system. Fingerprint, palm print, retina, facial, and voice recognition algorithms are concurrently computationally and data intensive applications.



Accelium Engine

Frequently the resource demand by these systems quickly outstrips even the capacity of the largest monolithic systems forcing use of clusters having increased programming and support complexity combined with significantly greater infrastructure needs.

Solution

Most biometric identity applications follow the 80/20 rule for wall-clock performance; 80% of the total *time-to-solution* is consumed by 20%, or less, of the run-time code. By moving the processing of the critical 20% to the DRC Accelium engine not only is orders of magnitude speed-up of the critical algorithms achieved but main thread speed-up is also realized.

DRC is partnered with AFIX Technologies, Inc, an international leader in biometric identification systems. The combined approach has resulted in 20X acceleration of subject to database matching with 40X acceleration on the horizon.

Single Engine or Appliance

The DRC Biometrics system is configured into an Accelium accelerator (a PCIe plug-in board) for integration into your application server or storage system. Also available as an in-line appliance; a plurality of accelerators (four or more, depending on the specified chassis) may be installed making the system easily scalable to match your requirements for both economy and throughput.

Storage Integrated

Installing the DRC Biometrics engine in the system that stores your reference data ensures that analysis is performed as closely as possible to the data source for maximum performance and minimized communications latency.

The Hardware is the Algorithm

The image matching algorithms are instanced as FPGA logic blocks—it is hardware, not software. Unlike conventional computer programs, the FPGA allows creation of a “custom” processor that is optimized for a single algorithm. Sequential operations are instanced in a “pipeline” such that new data is accepted and results are generated on every clock cycle once the pipeline is full. Additional performance comes from putting pipelines in parallel. While a microprocessor does one operation every clock (at best) the FPGA does thousands.

This massively parallel approach to application-specific computing is what gives the DRC Accelium its very attractive SWaP (Size, Weight, and Power) profile compared to conventional systems.

The DRC Biometrics system is easily integrated into your application using a simple, robust, and flexible API callable from any language supporting the use of Linux shared object libraries.

Scalability and Workflow

The system is scalable from one to any number of Accelium accelerators depending on your performance needs. The API is thread and MPI friendly simplifying reliable integration into both Linux and Windows HPC environments—this makes the system compatible with most the workflow/process management and submission engines commonly used in contemporary data centers.

The DRC Difference

Over 200 man-years of experience developing low latency, high capacity solutions gives DRC unique talent in big data applications.

DRC's novel architecture optimizes the data management/analysis balance. The key to ultra-high performance is distributing processing capacity making it available where it's needed rather than centralizing it. DRC moves the processing to the data versus the data to the processor.

Made in America

DRC is a US based company with all staff US citizens, with all engineering and manufacturing conducted in the USA.

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¹ Acceleration of 10X to 100X is representative depending upon the system configuration.