**An Efficient Parallel Approach for Sclera Vein Recognition**

**ABSTRACT:**

Sclera vein recognition is shown to be a promising method for human identification. However, its matching speed is slow, which could impact its application for real-time applications. To improve the matching efficiency, we proposed a new parallel sclera vein recognition method using a two-stage parallel approach for registration and matching. First, we designed a rotation- and scale-invariant Y shape descriptor based feature extraction method to efficiently eliminate most unlikely matches. Second, we developed a weighted polar line sclera descriptor structure to incorporate mask information to reduce GPU memory cost. Third, we designed a coarse-to-fine two-stage matching method. Finally, we developed a mapping scheme to map the subtasks to GPU processing units. The experimental results show that our proposed method can achieve dramatic processing speed improvement without compromising the recognition accuracy.

**EXISTING SYSTEM:**

In, Crihalmeanu and Ross proposed three approaches: Speed Up Robust Features (SURF)-based method, minutiae detection, and direct correlation matching for feature registration and matching. Within these three methods, the SURF method achieves the best accuracy. It takes an average of 1.5 seconds1 using the SURF method to perform a one-to-one matching. In, Zhou et. al. Proposed line descriptor-based method for sclera vein recognition. The matching step (including registration) is the most time-consuming step in this sclera vein recognition system, which costs about 1.2 seconds to perform a one-to-one matching. Both speed was calculated using a PC with Intel® CoreTM 2 Duo 2.4GHz processors and 4 GB DRAM. Currently, Sclera vein recognition algorithms are designed using central processing unit (CPU)-based systems.

**DISADVANTAGES OF EXISTING SYSTEM:**

* Mask files are used to calculate valid overlapping areas of two sclera templates and to align the templates to the same coordinate system. But the mask files are large in size and will preoccupy the GPU memory and slow down the data transfer. Also, some of processing on the mask files will involve convolution which is difficult to improve its performance on the scalar process unit on CUDA
* The procedure of sclera feature matching consists of a pipeline of several computational stages with different memory and processing requirements. There is no uniform mapping scheme applicable for all these stages.
* When the scale of sclera database is far larger than the number of the processing units on the GPU, parallel matching on the GPU is still unable to satisfy the requirement of real-time performance.

**PROPOSED SYSTEM:**

It is relatively straightforward to implement our C program for CUDA on AMD-based GPU using OpenCL. Our CUDA kernels can be directly converted to OpenCL kernels by concerning different syntax for various keywords and built-in functions. The mapping strategy is also effective in OpenCL if we regard thread and block in CUDA as workitem and work-group in OpenCL. Most of our optimization techniques such as coalesced memory access and prefix sum can work in OpenCL too. Moreover, since CUDA is a data parallel architecture, the implementation of our approach by OpenCL should be programmed in data-parallel model. In this research, we first discuss why the naïve parallel approach would not work. We then propose the new sclera descriptor – the Y shape sclera feature-based efficient registration method to speed up the mapping scheme ; introduce the “weighted polar line (WPL) descriptor”, that would be better suited for parallel computing to mitigate the mask size issue ; and develop our coarse to fine two-stage matching process to dramatically improve the matching speed. These new approaches make the parallel processing possible and efficient.

**ADVANTAGES OF PROPOSED SYSTEM:**

* To improve the efficiency, in this research, we propose a new descriptor — the Y shape descriptor, which can greatly help improve the efficiency of the coarse registration of two images and can be used to filter out some non-matching pairs before refined matching.
* We propose the coarse-to-fine two-stage matching process. In the first stage, we matched two images coarsely using the Y-shape descriptors, which is very fast to match because no registration was needed. The matching result in this stage can help filter out image pairs with low similarities.

**SYSTEM ARCHITECTURE:**

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**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

* System : Pentium IV 2.4 GHz.
* Hard Disk : 40 GB.
* Floppy Drive : 1.44 Mb.
* Monitor : 15 VGA Colour.
* Mouse : Logitech.
* Ram : 512 Mb.

**SOFTWARE REQUIREMENTS:**

* Operating system : Windows XP/7.
* Coding Language : MATLAB
* Tool : MATLAB R 2007B

**REFERENCE:**

QYong Lin, Eliza Yingzi Du, Senior Member, IEEE, Zhi Zhou, Student Member, IEEE, and N. Luke Thomas ,“**An Efficient Parallel Approach for Sclera Vein Recognition**”, IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY, VOL. 9, NO. 2, FEBRUARY 2014.