Abstract

Image processing and pattern recognition algorithms take more time for execution on a single core processor. Graphics Processing Unit (GPU) is more popular now-a-days due to their speed, programmability, low cost and more inbuilt execution cores in it. Most of the researchers started work to use GPUs as a processing unit with a single core computer system to speedup
execution of algorithms. The main goal of this research work is to make binarization faster for recognition of a large number of degraded document images on GPU. In this paper, parallel implementation is focused on the well known Niblack’s binarization approach for Optical Character Recognition (OCR) systems, since it is one of the most fundamental and important problems in the field of computer vision and pattern recognition. Our work employs extensive usage of highly multithreaded architecture of multi-cored GPU. An efficient use of shared memory is required to optimize parallel reduction in Compute Unified Device Architecture (CUDA). Experimental results show that parallel implementation achieved an average speedup of 20.84x over the serial implementation when running on a GPU named GeForce 9500 GT having 32 cores. Niblack’s method of binarization is also evaluated using PSNR, F-measure, NRM, and IND evaluation measures.

Reference

International Conference of Pattern Recognition, 1251-1255.

Index Terms

Computer Science  
Pattern Recognition

Key words

Binarization  
CUDA  
GPU  
OCR  
Parallelization