IMAGE SEGMENTATION WITH CYCLIC LOAD BALANCED PARALLEL FUZZY C – MEANS CLUSTER ANALYSIS

Mogana Vadiveloo\textsuperscript{1}, Rosni Abdullah\textsuperscript{2}, Mandava Rajeswari\textsuperscript{3}, Ahmad Adel Abu-Shareha\textsuperscript{4}

School of Computer Sciences
Universiti Sains Malaysia
11800 USM, Penang, Malaysia

E-mail: 1mv90991@student.usm.my, 2rosni@cs.usm.my, 3mandava@cs.usm.my, 4adel@cs.usm.my

Abstract

This paper proposes a cyclic load balancing strategy to parallel Fuzzy C – Means cluster analysis algorithm. The problem is to minimize the total time cost and maximize the parallel processing efficiency when a subset of clusters is distributed over a set of processors cores on shared memory architecture. The parallel Fuzzy C – Means (FCM) cluster analysis algorithm is composed by two distinct parts. The two distinct parts are; first: the cluster analysis whereby using the FCM algorithm to calculate the cluster centers and second: the evaluation of the subset of clusters whereby using the cluster validity functions to produce the result of the optimal cluster. The experimental result shows that the cyclic load balanced parallel FCM cluster analysis algorithm presents good speed up especially when the size of clusters is large as compared to the parallel FCM cluster analysis algorithm.

Keywords: Clustering, Parallel Fuzzy C – Means cluster analysis, Shared memory architecture, Load balancing