

Abstract

Many of the problems in this world that is modeled by mathematics in the process of completion, one model in matrix form, some other cases modeled in the form of a matrix coordinates in the conversion of the original image of it, the coordinate matrix aims to minimize the data to be used, so it took mapping back in the form of a regular matrix, and formed a sparse matrix, sparse matrix is a matrix of large size with many zero elements that surround the element is not zero, if the sparse matrix mapped back will take a long time to map one by one those coordinates. Many studies using sparse matrix that is calculated to be Sparse Matrix-Vector Multipliation (SpMV) in benchmarking their hardware, with the aim of getting the optimum time in executing the matrix, so the faster execution time, the better the performance of their hardware.

To simplify the mapping matrix required storage format that good anyway, storage format is fully functional when the matrix mapping and facilitate the reading of a matrix that has been converted from the coordinate matrix, this study will use two storage format that CSR and BCSR, the performance of both of these formats in evaluation and run on personal computers with two mechanisms: serial and parallel, the mechanism will be run parallel with MPI communications protocols. MPI will divide the matrix into small parts to simplify and speed up the execution time of the matrix.

The test results using multiple matrix data type is different and the size of the column line is diverse, each matrix in execution with five iterations in order to obtain optimal results, each storage format produced mixed results, due to the size of the matrix and distribution of data in the coordinate matrix, the format CSR speed increase of as much as 229 times contained in the thread 3 to the thread 4, in and on the format BCSR, the speed increase of 300 times faster on a thread 4, but the decrease in speed on the thread 3 for each matrix, in which case this can be concluded each method has its own advantages and disadvantages in executing SpMV. Namely the influence on the size and distribution of the data matrix in the matrix.

Keyword: SpMV, CSR, BCSR, MPI, thread