An Enhanced Simulated Annealing Algorithm for Solving the Cell Assignment Problem of the Two-Level Wireless ATM Network

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Abstract

In this paper, we investigate the problem of optimum assignment of cells in PCS (Personal Communication Service) to switches in an ATM (Asynchronous Transfer Mode) network. Given cells and switches in an ATM network (whose locations are fixed and known), the problem is grouping cells into clusters and assigning these clusters in an optimum manner. This problem is termed as cell assignment problem and modeled as a complex integer programming problem, and finding an optimal solution to this problem is NP-complete. Owing to the inability of simulated annealing (SA) to generate solutions that always satisfy all the constraints, the performance of a traditional-SA approach is not so promising. The SA technique is, however, easy to implement, requires little expert knowledge and is not memory intensive. Hence, in this paper, we attempt to develop an enhanced-SA approach for solving the cell assignment problem. The enhanced-SA constructs constraint-satisfying configurations and perturbation mechanism to ensure that the candidate configurations produced are feasible and satisfy all the constraints. The performance of the enhanced-SA algorithm is demonstrated through simulation. The result of the study is also compared with previous reported solution methods.

Key words：Cell assignment;Design of algorithms;Graph partitioning;Simulated annealing;Wireless ATM