

## ANT COLONY OPTIMIZATION FOR REPORTING CELL PLANNING IN MOBILE COMPUTING USING SELECTIVE PAGING STRATEGY

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**ABSTRACT.** Location management problem that arise in mobile computing networks is addressed. One method used in location management is to designate some of the cells in the network as “reporting cells”. The other cells in the network are “non-reporting cells”. Finding an optimal set of reporting cells (or reporting cell configuration) for a given network is a difficult combinatorial optimization problem. In fact this is shown to be an NP-complete problem in an earlier study. In this paper, we use the selective paging strategy and use an ant colony optimization method to obtain the best/optimal set of reporting cells for a given a network.

**Keywords:** Mobile computing, Location management, Reporting cells, Vicinity value, Ant colony optimization.

**1. Introduction.** Mobile communication systems pose hard challenges to planners. One of the problems faced by planners is that of providing a cost-effective method of offering a Quality of Service (QoS) levels that are comparable with other fixed systems. An important aspect of QoS is fast service access to customers. Fast service access involves keeping track of the location of users, while they are moving around the network without being involved in calls. In a mobile network location databases are used to keep track of Mobile Terminals (MT). Also, in order to route the incoming calls to appropriate mobile terminals the network must keep track of the location of each mobile terminal. The complete mobile network is divided into location areas (LA). Each location area consists of a group of cells. For the MTs in a location area or in its neighbors a location database is used. In order to keep track of the user locations, the mobile terminals use the location area and a location update procedure. One method used in location management is to designate some of the cells in the network as *reporting cells*. The other cells in the network are *non-reporting cells*. When a mobile terminal enters any one of these reporting cells a location update is performed. When a call arrives, search is done only to the reporting cell ( the user last reported) and its neighboring non-reporting cells. The two important cost components in mobility management or location management are cost of location update (registration) and cost of paging (search cost). These two cost components are of conflicting in nature; i.e., minimizing the location cost might increase the paging cost and paging delay. Hence, it is important to find a compromise between the location update (registration) and paging (search) operations such that the cost of mobile terminal location