

Abstract

This work focuses on the use of an Ant colony optimization (ACO) based approach to the problem of 3D object segmentation. The ACO metaheuristic uses a set of agents (artificial ants) to explore a search space. This kind of metaheuristic can be classified as a Natural computing non-deterministic technique, which is frequently used when the size of the search space makes the use of analytic mathematical tools unaffordable. The exploration is influenced by heuristic information, determined by each particular problem. Agents communicate with each other through the pheromone trails, which act as the common memory for the colony. In the approach presented, the agents start their exploration at the outer contour of an object. The final result is given after a certain number of generations, when the particular solutions of the agents converge to create the global paths followed by the colony. These paths coherently connect the object's high curvature areas, facilitating the segmentation process. The advantage of this convergence mechanism is that it avoids the problem of over-segmentation by detecting regions based on the global structure of the object and not just on local information.