

Survey of Various Route Optimization Techniques for Solid Waste

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Abstract:

The routing is the main components of solid waste management. The paper aims-to find the best routing for collecting solid waste. Multi-Objective Ant Colony Optimization is a new meta- heuristic technique inspired by the nature of the real ants and its help to finding the best solution of the problem.. This technique can generated stable and feasible optimal robotic substance handling sequence and then path sequence can satisfying the materials handling limitation with minimum proceed time. The main objective of this survey paper is to study the various alternative of ACO i.e. Basic rank based system, min-max system best worst system, elitist ant system, ant system and ant colony system. Some of the main elements studied in each of the case are average number of iterations, average best inspection, and average best time.

Keywords: Solid waste management, Meta-heuristic Technique, Ant Colony Optimization (ACO), Routing, Best Route, Waste collection, Variants of ACO, Ant Colony System.

Introduction

It is very difficult operational problem to collection the solid waste of any town by the local authorizations. At present due to, environmental concern, health ,no. of cost, many municipalities, particularly in industrialized nation , have been forced to quality of their solid waste management and examine its environmental impacts and in terms of designing collection cost-effectiveness routes. During the last 15 years, there have been numerous technological advances, new mergers and developments acquisitions in the waste industry. The result is that both municipal and private haulers are giving serious deliberation to new technologies such as computerized vehicle solutions. It has been extent of the spent money of total amount for the transportation, collection, and disposal of solid waste, approximately 80% is spent on the collection phase .Therefore, even a small improvement in the collection operation can result to a significant saving in the all cost. The present study is mainly focused on the transport and collection of solid waste from any loading in the area under study. The routing optimization problem in waste management has been already explored with a number of algorithms. Routing algorithm use a standard of measurement called a metric to determine the optimal path or route to a specified destination. Optimal routes are determined by comparing metrics, and these metrics can be depend on the different design of the routing algorithm used.The complexity of the problem is high due to many alternatives that have to be considered. Propitiously many algorithms have been developed and discussed in order to find an optimized solution, to lead the various different results. The reason for this diversity is that the majority of routing algorithms include the use of heuristic programs. Heuristic programs are ad hoc, trial-and-error methods which do not guarantee to find the excellent solution but are designed to find absolute solutions in a fraction of the time required by optimal methods.[1]

The scope of the thesis is to unearth out a better heuristic algorithm to solve the routing problem in solid waste management system. Because most of the resources and time is wasted in routing from different places, so there must be an

efficient way of collecting and transportation of waste material. By finding an optimal technique for such problem will save lot of fuel, time and other wherewithal. Ant colony optimization is a latest technique for solving the meta-heuristic problems. Thus the main objective of the dissertation is to apply ant colony optimization algorithm using obstacle to the problem of solid waste management and then compare the result with previous results.

Solid Waste Management will provide an complete forum to share the ideas & experiences of specialized expertise of the respective field. This will facilitate consensus/conflict resolution among actors. i.e. Environmentalists , Medical Professionals, Municipal Corporation, , , Public & Corporate Sectors. Solid waste management is characterized by insufficient coverage and inefficient collection methods of the collection system and improper disposal. It will also focus on new technologies & concept for Sustainable Solid Waste Management.

The major objectives of the solid waste routing are:

- (1) To reproduce the working of solid waste routing optimization problem.
- (2) The extracting the useful Results from the simulation models.
- (3) Examining the obtained results[7].

Planning of a path is an important issue for the navigation and moving control of independent robot manipulators. In computational complexity the theory of path planning is categorize an np (nondeterministic polynomial) time complete problem. That is,the computational time that is required to solve such problem increases dramatically when the size or dimension of the problem increases.