

基于时间窗约束的青羊区桶装水配送路径优化——以四川嘉庆水务有限公司为例

摘 要

近年来，我国经济发展迅速，人们生活环境的不断改善，饮用水备受人们的关注，人们对健康也更加的在意，桶装水出现之后，自来水逐渐被取代，因此桶装水的配送管理问题也逐渐被人们关注。桶装水配送管理成本作为桶装水公司运营成本的一大部分，并且桶装水的配送也是公司作为经营者服务于客户的一种重方式，公司为了能更加有竞争力，形成高效及时的桶装水配送管理系统十分重要。

四川嘉庆水务有限公司配送部拥有自己独立的桶装水配送管理系统，承担着自己的桶装水配送的任务。多年以来，该桶装水公司的配送都是依靠公司员工常年的配送经验积累来安排自己配送的路径，这已完全不能适应于现代桶装水配送的发展趋势，所以对于如何采用系统科学的桶装水配送管理方式解决问题具有重要的指导意义。本文在研究解决关于四川嘉庆水务有限公司桶装水配送的问题时，采用了先进的数学模型、遗传算法和先进的 Matlab 仿真算法相结合的科学计算方式，对该公司实际产品在配送中出现问题的可能性进行了分析和研究。具体配送问题研究的内容如下：

本文简要地介绍了配送方面的一些知识和理论，阐述了配送的概念、特点及其分类，以及解决车辆配送路径问题的各种约束限制条件、带时间窗的车辆路径管理问题的分类和车辆配送相关的求解问题模型等。

并对四川嘉庆水务有限公司车辆配送的现状和问题进行了深入的分析，找出其中存在的缺陷和问题，建立以公司总投入花费最少、运输成本最低为主要目标，以能够满足广大客户的要求为基本约束的数学模型。最后，利用先进的 Matlab 仿真分析软件对基于遗传算法的四川嘉庆水务有限公司的车辆配送路径的现状和问题进行了仿真分析求解，达到了满足广大客户的需求，提高了客户的满意度，降低了运输成本，缩短了运输车行驶距离，提高四川嘉庆水务有限公司经济效益的目标。

关键词：桶装水配送；车辆路径优化；Matlab 仿真

Abstract

In recent years, with the rapid development of China's economy and the continuous improvement of people's living environment, drinking water has attracted people's attention, and people are more concerned about health. After the emergence of bottled water, tap water is gradually replaced, so the distribution management of bottled water is also gradually concerned by people. The management cost of bottled water distribution is a major part of the operation cost of the bottled water company, and the distribution of bottled water is also an important way for the company as a business operator to serve customers. In order to be more competitive, it is very important for the company to form an efficient and timely management system of bottled water distribution.

The Distribution Department of Sichuan Jiaqing water Co., Ltd. has its own independent bottled water distribution management system, which undertakes its own task of bottled water distribution. For many years, the distribution of the bottled water company relies on the annual distribution experience of the company's employees to arrange their own distribution path, which has been completely unable to adapt to the development trend of modern bottled water distribution, so it has an important guiding significance for how to use the scientific management method of bottled water distribution to solve the problem. In order to solve the problem of bottled water distribution in Sichuan Jiaqing Water Service Co., Ltd., this paper uses the scientific calculation method of advanced mathematical model, genetic algorithm and advanced matlab simulation algorithm to analyze and study the possibility of problems in the distribution of the company's actual products. The specific research contents of distribution are as follows:

This paper briefly introduces some knowledge and theory of distribution, expounds the concept, characteristics and classification of distribution, as well as various constraints and restrictions to solve the vehicle distribution path problem, the classification of vehicle path management problem with time window and the solution model related to vehicle distribution.

It also analyzes the current situation and problems of vehicle distribution in Sichuan Jiaqing Water Service Co., Ltd., finds out the defects and problems, and establishes a mathematical model with the minimum total investment and transportation cost as the main goal, and the basic constraint of meeting the requirements of customers. Finally, using the advanced matlab simulation analysis software, the status and problems of the vehicle distribution path of Sichuan Jiaqing water Co., Ltd. based on genetic algorithm are simulated, analyzed and solved, which meets the needs of customers, improves customer satisfaction, reduces transportation cost,

shortens the distance of transportation vehicles, and improves the economic benefits of Sichuan

Jiaqing water Co., Ltd Objectives.

Keywords: Bottled water distribution; Vehicle route optimization; Matlab simulation

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