Vehicle Routing Problem

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Abstract:

Summarize the objectives of the paper

Summarize the results and conclusion

State the basic principles underlying any new theoretical or experimental methods that are developed in the paper

# Introduction

State the precise subject of the paper immediately

As people and enterprises come under more pressure in a fast moving and highly connected world, smart logistics play an increasingly important role in improving operational efficiency and enhancing the consumer experience. Reducing costs and increasing logistics efficiency is critical. With the improvement of computational performance, this kind of NP-Hard problem can be better solved by technology developed with optimization algorithms. Our goal is to provide consumers with simpler and faster logistics.

Tell the reader how the paper is organized

# Literature Review

AnyLogic simulation environment can be used in different application problems, e.g., epidemic spread modelling, industrial development, complex system design evaluation, computer performance evaluation, military systems, transportation systems, supply chain management and business process evaluation. (Merkuryeva & Bolshakovs, 2010)

The rest of this article is organized as follows. Section 3 defined the problem to be solved and put up a mathematic model with regard to it. In section 4, we describe how we the Anylogic model and display the results. Finally, we draw a conclusion and give out some future research we may do in section 5.

# Problem Define

A distribution center is associated to a city. It provides distribution services to over a thousand customers of this city needing bulk commodities daily. It is assumed that there is no constraint on how many trucks can be used every day. It is also assumed that JD’s comprehensive costs cannot be reduced. That is, variable costs such as transportation, waiting and charging costs, along with the fixed cost of using a truck are at their minimum value.

City A is associated with urban distribution center B which provides daily distribution services for more than 1,000 customers in this city. The target customers are B2B or clients who require bulk commodities. The number of transportation resources, such as the number of trucks, can be assumed to be infinite. It is expected that the comprehensive costs are set to the lowest value. This includes transportation cost, waiting cost, charging cost and fixed use cost.

## Input Data

Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Longitude** | **Latitude** | **Pack\_ Weight** | **Pack\_ Volume** | **Earliest\_ Time** | **Latest\_ Time** |
| 1 | 116.242043 | 40.072630 | 0.2076 | 0.3666 | 09:00 | 12:00 |
| 2 | 116.403595 | 39.872945 | 0.05863 | 0.1687 | 13:30 | 14:00 |
| 3 | 116.186289 | 40.016361 | 0.03645 | 0.0745 | 13:00 | 15:00 |
| 4 | 116.508011 | 39.826296 | 0.02595 | 0.0542 | 09:00 | 10:00 |
| 5 | 116.130997 | 39.825921 | 0.0198 | 0.1117 | 11:00 | 13:30 |

## Constrains

1. Capacity: the whole weight and volume should not exceed the capacity of trucks.
2. Time window: package should be delivered within the specified time window.

## Assumptions

# Model

# Results

5.1 model validation

# Conclusion