

# Smart container loading

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**Abstract.** The need to move various items from one location to another has become a primary need of most companies. Items are usually boxed and arranged inside containers to be transported from one location to the other. Most companies pay shipments by the number of containers being transported; therefore, it is in the interest of the company to minimize that number. Furthermore, some items might have properties, which force special constraints on how and where they are stored inside the container. In this work, we propose an agent based solution for maximizing the use of a single container; thus, reducing the transportation cost for the companies having their items transported, as well as increasing transportation performance for transportation companies. Separate agents are used for packing, tracking, loading and unloading items. Also, artificial intelligence is provided through the use of the PROLOG programming language to specify rules and constraints on items loaded as well as on the container itself.

Keywords: Artificial intelligence, container loading

## 1. Introduction

Movement of items of any type, shape, size and weight has become increasingly common among most companies; industrial and commercial, as well as among regular individuals for both business and personal reasons [2]. Items being transported can range from small items of irregular shapes having negligible weight, to large heavy items with specific shapes. Companies transport items for business reason. It is common among construction companies to transport equipment used in one site, to be able to use them on another site, instead of buying new material for each site. It is even more common among production companies to ship their products from their factories to various locations where their consumers reside. Regular individuals, as well as companies, may need to transport their possessions from location to another, most notably when moving from a residence location to another. Their possessions will include furniture, electronics and many other personal belongings. Depending on the type of the item being transported, specific properties might be associated with the items. Some items can be marked as fragile, these items will need special care when being placed, and cannot be placed anywhere when being transported. Some items might be of more value than others, and will need to be handed priority when being transported. Each item however belongs to a specific customer. These items must reach the destination specified by the customer. When having his items transported, the customer will expect his/her items to arrive at a specified date, to the specified destination. Therefore, items of the same customer are usually transported together.

Shipping companies have to deal with the many types, shapes, sizes and weights of these items. These companies are responsible for shipping the items from one location to another. They might ship items by land through vehicles, such as pickup trucks, or by sea through ships. In either case items that are

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