Analyzing Co-Purchase Network of DVDs in Japanese Online Store

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1. Introduction

We have found power law distribution emerges between sales volume and sales rank of DVDs in the market. It means "Free Choices make Emergent Order" . In this research, we visualize and analyze the co-purchase networks of DVDs in order to understand the hidden relationship of each DVD in the Japanese online market.

In the networks, a node represents a DVD or a DVD-box, which means a set of DVDs, and the nodes are connected only if they are purchased by same customer. The source data of the network is collected by the store "Rakuten Books" (http://books.rakuten.co.jp/), which is one of the biggest online stores in Japan. The data we used are an extraction of 30,000 customers of the store at random. The target term is from April 2006 to March 2007. Note that this research was done as an analysis by Rakuten Institute of Technology, and the data do not include any personal information.



3. Visualization and Analysis





2. Method

Full-connection

The co-purchase network is compiled by the following way. We describe a node A if the product A is purchased by customers. Then we describe an edge to connect node A and node B if the product A and the product B are purchased by a customer. Describing the edge, we try two types of connection method: "full connection" and "sequential connection". In the former method, all the nodes which same customer bought are connected each other. In the latter method, nodes are connected as the sequential order of customer. It means that an undirected graph is generated by the former method and a directed graph is generated by the latter.

Sequential-connection

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