**Question 19.1**

Describe analytics models and data that could be used to make good recommendations to the retailer. How much shelf space should the company have, to maximize their sales or their profit?

Of course, there are some restrictions – for each product type, the retailer imposed a minimum amount of shelf space required, and a maximum amount that can be devoted; and of course, the physical size of each store means there’s a total amount of shelf space that has to be used. But the key is the division of that shelf space among the product types.

For the purposes of this case, I want you to ignore other factors – for example, don’t worry about promotions for certain products, and don’t consider the fact that some companies pay stores to get more shelf space. Just think about the basic question asked by the retailer, and how you could use analytics to address it.

As part of your answer, I’d like you to think about how to *measure* the effects. How will you estimate the extra sales the company might get with different amounts of shelf space – and, for that matter, how will you determine whether the effect really exists at all? Maybe the retailer’s hypotheses are not all true – can you use analytics to check?

Think about the problem and your approach. Then talk about it with other learners, and share and combine your ideas. And then, put your approaches up on the discussion forum, and give feedback and suggestions to each other.

# You can use the {given, use, to} format to guide the discussions: Given {data}, use {model} to {result}.

One of the key issues in this case will be data – in this case, thinking about the data might be harder than thinking about the models.

# Solution:

There are different ways to approach this problem from hypothesis testing to Louvain approach.

# However, below is my approach where I assume that client knows what they want, and I am assisting them in their problem approach.

# This approach first finds the products at are best-selling and in what location of the store, and then finds the most efficient way of grouping them and placing on the shelf

# Given- Product data, sales data, store planogram

# Use- K-means and confusion matrix

# Result- to identify products that make up the sales bucket based on individual sales

# From the result of the above,

# Use- create a regression model to find items and product combinations that sell the most

# Result- to tell the retailer that among their inventory, these are the products that sell the most and the customers are interested in these regardless of costs, promotions, seasonality, etc.; along with the store areas where they sell the most

# After we have identified the products, next is the optimal strategy to select the products

# Given- Product sales, product placement, product mix, store sales, constraints (min and max # of products, etc.)

**Use**- logistic regression

# Result- to optimize the products placed on shelf for maximizing profit

# Alternative approach – This approach is using simulation to find the area of store with most traffic and items that sell the most (by backtracking items sold; where in the shelf were they placed). With the insights from that, the model finds the most efficient placing on the shelf along with the no pf products to be placed.

# Given- the product and sales data, and store layout

**Use**- create an experiment design to identify where in the shelf and store the maximum sales happen for the selected products

Furthermore, we can use concave optimization technique

**Result**- to maximize the product sales

At the end, each approach, will utilize optimization to identify the optimum shelf space for the items to maximize the profit