g-COM Revenue

g a l o r – Cluster Optimization Model Revenue:
The solution for improved pricing

Challenge

The key element of every pricing or revenue management strategy is price differentiation which is basically established on the basis of customer segmentation. For this optimal fencing criteria have to be determined that allow the company for separating these segments and to offer prices or products that are optimal for the respective group of customers.

Benefits

The main benefit is improved analysis of the customer data leading to optimal fencing criteria that can be oriented to willingness to pay, choice probabilities, etc.

The quality and accuracy of the analysis can be employed to yield improved revenues and better marketing position.

Data mining and analytics techniques have become main stream not only in the field of revenue management The predominant task in the analysis of massive data is the identification of (statistically) relevant structures and a subsequent valid prediction of future developments.
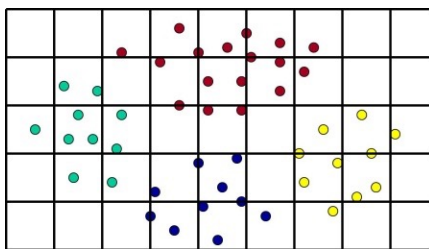
Extracting knowledge from customer data

Analyzing customer data with the highest level of accuracy is important for an optimal segmentation of customers into homogeneous groups. With g-COM-Revenue, the customization of g-COM for price differentitation within the field of Revenue Management, the so-called fencing criteria between different groups of similar customers are determined. In contrast to existing approaches, the characteristics of these groups will not have to be predefined but are determined by a machine learning algorithm.

Revenue Manager can now analyze the groups and their characteristics and use their gained expertise on the fencing criteria to choose segment individual prices or products that are optimized with respect to the overall expected revenue.

As an example, in a recent study optimal fencing criteria for a medium-sized German company had to be determined on the basis of about 300.000 data sets. Using g-COM Revenue relevant features of the customer data could be identified. As it turned out, willingness to pay was highly dependent on the multidimensional characteristics of the combination of product and costumer features. See Figure 1 for the demand functions that resulted from applying multivariate fencing criteria on the customers.

Disadvantages of standard methods

Standard approaches typically employ pre-segmentation techniques that are based on the independent analysis of the influence of all relevant parameters. Geometrically, this leads to a dissection of the parameter space into boxes
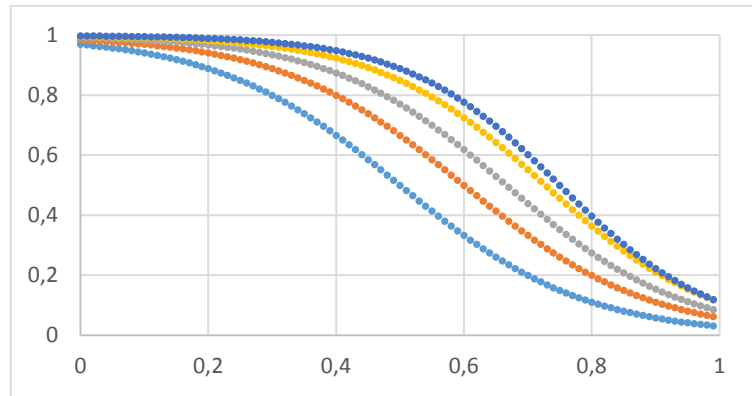
Figure 1: Segment related demand functions

*Sparsely populated or empty cells*

which contain more homogeneous substructures that are then subject to statistical analysis. In the presence of a reasonably large number of parameter characteristics and specifications the generated cells are typically sparsely populated. Hence, quite often, an application of the law of large numbers is prohibited and different, more complicated and less reliable, statistical techniques have to be evoked.

g-COM: A change in paradigm

g-COM uses a reverse, data driven paradigm. Rather than imposing a simple dissection on the parameter space followed by complicated statistics **g-COM** computes an optimal clustering of this space and subsequently applies simple, meaningful and reliable statistics. Until recently such an effective and efficient application of this natural principle was out of reach due to the lack of an adequate mathematical model and fast algorithms for clustering of high dimensional weighted data, including nominal data, under all relevant problem specific constraints. While standard clustering methods are capable of determining rather homogenous structures efficiently, such additional constraints could not been incorporated appropriately. Further, standard methods are typically restricted to computing solutions that are merely locally optimal, while the new technique is capable of creating globally optimal solutions. **g-COM** therefore allows to gain new insight in the dependencies and interactions of all parameters for the respective application by allowing for a significant analysis of the clusters at optimality.

g-COM in a nutshell

g-COM, the galor Cluster Optimization Model, first solves an application and data specific complex clustering
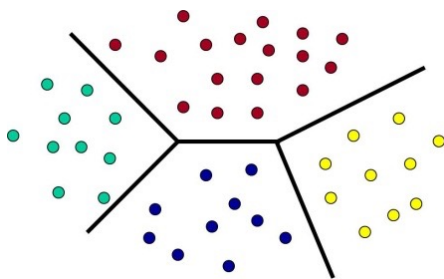
Significant substructures

problem with the aid of state-of-the-art and newly developed mathematics and software technology. **g-COM** thereby identifies homogenous substructures within the total body of data and performs a robust and statistically significant analysis of the multvariat interactions of all parameters. This is the bases of the **g-COM** prediction method which can then be used for the classification of new data.

Knowledge discovery with g-COM Revenue

With **g-COM Revenue** the typically inhomogenous population of customers is segmented into a small number of groups that can totally be described by fencing criteria. In contrast to classical sub-group analysis this multivariate approach guarantees the detection of large enough but still quite homogeneous customer segments so as to warrant significant results that can be assessed by the revenue manager's favorite tool. **g-COM Revenue** is able to determine representatives of the relevant groups and provides in depth analysis. Combined with the knowledge and experience of revenue managers this yields a new and precise way of interpreting customer segments. **g-COM Revenue** can either be combined with standard tools for revenue management or function as a stand allone tool with various taylor-made front end tools. The potential of **g-COM Revenue** was shown in the recent case study - price differentiation on the basis of the detected fencing criteria with respect to willingness to pay would have increased the revenue by about **3%** while simultaneously the sales decreased by about **3%**.

g-COM Revenue within the realm of business analytics

g-COM Revenue can be described within the realm of the phase model of business analytics:

What happened? This task is performed by identifying and analyzing homogeneous substructures of customers and their prototypes. **g-COM Revenue** reveals these structures in a form that is directly accessible by revenue managers.

Why did it happen? On the basis of the structural information revenue management experts gain new insight in the correlation between multiple attributes and the resulting potential for price differentiation.

What will happen? Based on the identified structures within the high-dimensional space of attributes **g-COM Revenue** provides significant predictions for the behaviour of any individual customer. In fact, his attribute combination places a new customer into a reference group and, say, in an online selling channel, optimal customer centric price or offer can be calculated in real-time.
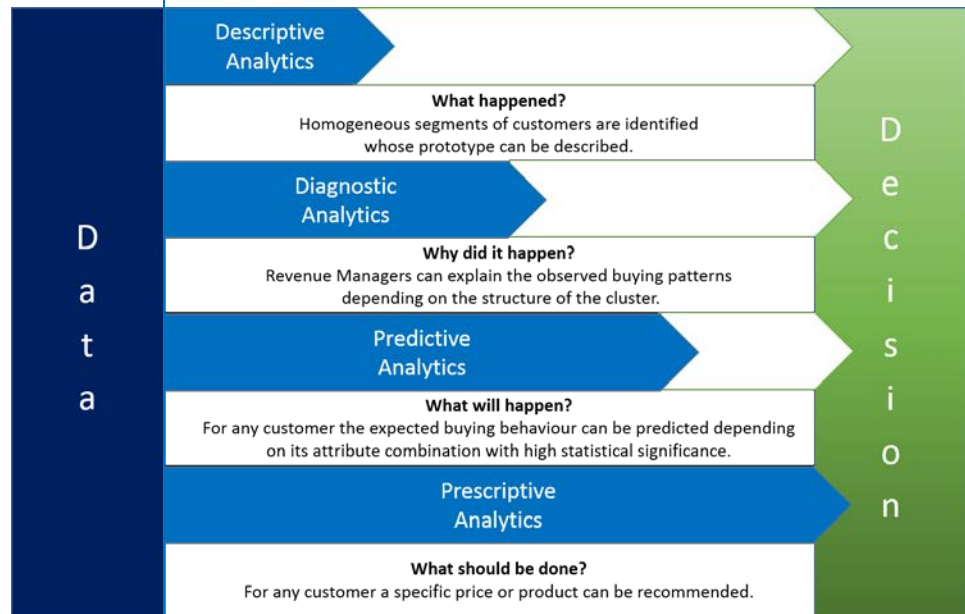
General applicability

g-COM can be applied to a great variety of data analysis tasks in various business sectors. It has already been proven highly successful in the prediction of credit and insurance loss, air cargo demands, and medical treatment efficacy.

What should be done? **g-COM Revenue** can be used to derive a new price differentiation system.

Unlike other methods, **g-COM Revenue** does not function as a black box but allows for reasoning.

Are you ready to start a project?

To assess the potential of **g-COM** in a new field of application the following is needed:

- A short description of the application including the desired analytic goals;
- A list of the relevant parameters and their specifications;
- A representative set of test data.

Contact us!

Gesellschaft für Angewandte Logik und Operations Research
Spitzelbergstraße 10a, D-81476 Munich, Germany
Managing Directors: Dr. Peter Gritzmann, Dr. Andreas Brieden
Phone ++49 / 89 / 74 54 53 70 • Fax ++49 / 89 / 74 54 53 80 • www.galor.de • g-com@galor.de