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Chapter IV

Essential Mining Approaches to Problem Solving

Forecasting and "what if" mining generally incorporates the application of regression and neural network methodologies. In certain cases, for more simple applications, univariate forecasting methods can be used. Forecasting procedures are more affiliated with time series data or historic data that extend back in time (e.g., monthly periods over several years). Other mining applications involve examining a section of data over a specified time period, (e.g., looking at a number of customers, employees or processes over a given time period, let's say a six-month period). This approach is referred to as a cross-sectional analysis mentioned briefly in the last chapter.

The following section will describe these mining approaches in a bit more detail to give you an idea of not only how to effectively implement them, but also when and in what situation you may need to apply them.

FORECASTING TOOLS

Forecasting: Univariate and Multivariate

In data mining, the term forecasting means the prediction of future values on the basis of past values by means of a forecasting algorithm. In budgeting and planning, the same term has quite a different meaning and the two should not be confused.

There are two basic ways in which future values can be predicted from past values:

- *Univariate forecasting*, where a quantity such as sales is predicted purely on the basis of previous values of sales.

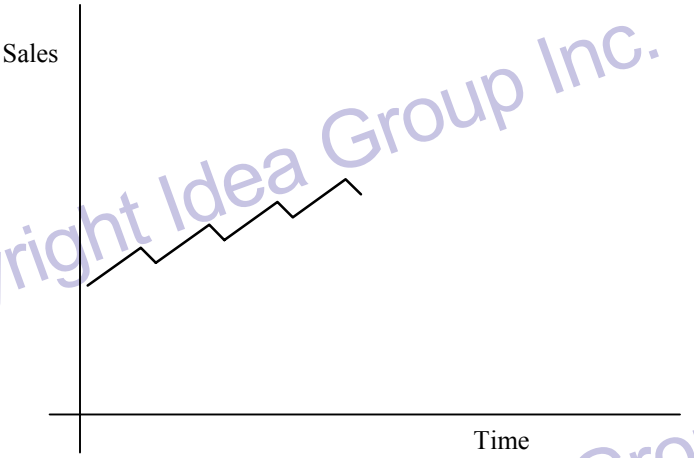
- *Multivariate forecasting*, where a quantity such as sales is predicted not only on the basis of previous values of itself, but also on other external factors.

Univariate Forecasting

Univariate forecasting is appropriate for forecasting a lot of quantities, where speed and automation are more important than forecasting accuracy. An example of this is to forecast demand for individual line items in a retail outlet or products for a manufacturer.

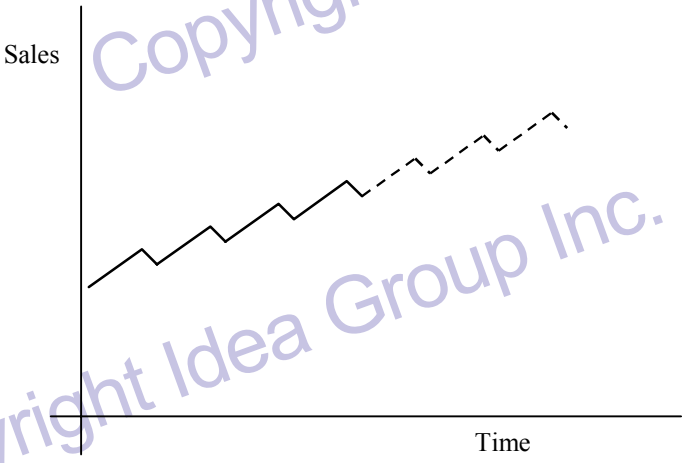
The basic principle is easy to illustrate graphically depicted in Figures 4.1 and 4. 2. Given a time-series of data:

Figure 4.1.



Look for patterns in the past to try to predict the future:

Figure 4.2.



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