Chapter VII

Using an Extended Self-Organizing Map Network to Forecast Market Segment Membership

Melody Y. Kiang, California State University, Long Beach, USA

Dorothy M. Fisher, California State University, Dominguez Hills, USA

Michael Y. Hu, Kent State University, USA

Robert T. Chi, California State University, Long Beach, USA

ABSTRACT

This chapter presents an extended Self-Organizing Map (SOM) network and demonstrates how it can be used to forecast market segment membership. The Kohonen’s SOM network is an unsupervised learning neural network that maps n-dimensional input data to a lower dimensional (usually one- or two-dimensional) output map while maintaining the original topological relations. We apply an extended version of SOM
networks that further groups the nodes on the output map into a user-specified number of clusters to a residential market data set from AT&T. Specifically, the extended SOM is used to group survey respondents using their attitudes towards modes of communication. We then compare the extended SOM network solutions with a two-step procedure that uses the factor scores from factor analysis as inputs to K-means cluster analysis. Results using AT&T data indicate that the extended SOM network performs better than the two-step procedure.

INTRODUCTION

Market segmentation refers to the formation of distinct subsets of customers where any subset may conceivably be selected as a market target to be reached with a distinct marketing mix (Kotler, 1980). Consumers are put into relatively homogeneous groups so that the marketing manager can select and effectively execute segment-specific marketing mixes. The identification of consumer segments is of critical importance for key strategic issues in marketing involving the assessment of a firm’s opportunities and threats. The value of performing marketing segmentation analysis includes better understanding of the market to properly position a product in the marketplace, identifying the appropriate segment/s for target marketing, finding opportunities in existing markets, and gaining competitive advantage through product differentiation (Kotler, 1980). The bottom line is to increase profitability by enabling firms to more effectively target consumers. Although it was introduced into the academic marketing literature in the fifties, market segmentation continues to be an important focal point of ongoing research and marketing practices (e.g., Chaturvedi et al., 1997). Most of the academic research in market segmentation has been in the development of new techniques and methodologies for segmenting markets. The common thread running through these diverse streams of research is the attempt to segment consumers, deterministically or probabilistically, into a finite number of segments such that consumers within a segment are relatively homogeneous with respect to the variables used in the segmentation.

It should be noted that the usefulness of market segmentation hinges upon accurate forecasts of segment memberships. Relatively low accuracy in forecasting segment memberships indicates a high portion of unintended members in each segment. Misplacements will result in less efficient implementation of the marketing program designed to stimulate sales and potential negative impact on revenue generation from the unintended segment members.
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