Module 11:Application of stochastic processes in areas marketing

Lecture 38:Examples of Application of renewal theorey in Marketing

The probabilities $p_{x,x}$, $p_{y,x}$, $p_{x|x}$ and $p_{y|x}$ can be modeled is a form such that one can easily use the concept of Markov matrix to answer many of the queries which are very much relevant for the marketing firm or the company. One can possible use the Erlang or the Poisson processes to denote the purchase time process of the customer.

One should remember that what is of interest is the fact that the marketing firm or the company wants to characterize the distribution of λ over time, where this λ is given by $E(T_i) = \frac{1}{\lambda}, i = 2,3,4, \ldots$.and T_2, T_3,.. are the Erlang processes with parameters λ and r (which is a positive integer). Consequently one can then assume that the distribution of λ is Gamma with certain parameters which can be calculated using λ and r(which have been mentioned above).

Finally if the marketing firm denotes $N_\tau(N_\tau = 0,1,2, \ldots)$ as the variable which signifies the number of time the product is purchased in the time interval,τ ,$[0,\tau]$ then one can easily solve to calculate the expected fraction of the total market which purchases the product class N_τ. Using Dirichlet and Multinomial models one can furthermore study the choice process. Similarly using multiple hyper geometric models one can throw light on the concepts of integrated brand choice and purchase time model which may be of interest to the marketing firm as well as to the company at large.

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Example 11.3

To conclude this module on the uses of stochastic processes in the area of marketing let us analyze the problem related to multibrand stochastic model where the aim is to describe the occurrence over time of purchases of the product class and a multibrand stochastic choice model which specifies how a brand may be chosen on a given purchase occasion.

Before describing the model let us go through the variable/statistics which are important for a better understanding of the model, and they are:

1. Market share: Proportion of the sales of the product class that corresponds to a specific brand x during the t^{th} period of the analysis, and it is denoted by $m_x(t)$.

2. Market penetration: Proportion of the population who buy brand x at least once during a given interval of time, and it may be denoted by $pen_x(\tau)$, where τ is the time period.

3. Duplication: Proportion of the population who buy both brands x and y at least once during the interval considered, and it is denoted by $D_{xy}(\tau)$.

4. Brand switching: Denotes the proportion of purchase occasion such that a different brand is bought during the next purchase occasion. Thus it refers to the concept of switching from brand x to brand y, and is denoted by $\sum_x \sum_{y \neq x} p_{xy}$.

5. Conditional switching: It denotes the proportion of purchase occasion such that a different brand is bought on the next purchase occasion. Here one important fact to be remembered is that the second purchase is definitely dependent on the first. As in the previous case this also refers to the concept of switching from brand x to brand y, but is now denoted by $\sum_x \sum_{y \neq x} p_{y|x}$.

6. Repeat buying: Denotes the time that any brand is bought on two consecutive occasions. Repeat buying can also be applied to one specific brand and is given by the formulae $\sum_x p_{x,x}$ or $\sum_x p_{x|x}$ depending on the background of how the repeat purchases or buying are being done. One should remember that RB=1-TS, where RB means repeat buying while TS is total switching.

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