

# REMARKETING MEDIA ALTERNATIVES BASED ON CUSTOMER PREFERENCES

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## ABSTRACT

*Remarketing is a powerful tool for marketers to offer products over and over to existing customers or potential customers. By using remarketing, the marketers target to further down their sales funnel. As in traditional marketing, most online marketers find it challenging to deliver the best way of advertising their products according to what customers need or like. This research aims to achieve the right promotional media alternatives based on customer preferences. A clustering method was used to perform behavior segmentation on sales data. Then, customer reviews on the purchased products collected from online platforms were analyzed to obtain customer preferences. Finally, customer preference was mapped to some suitable promotion media. The experiment result showed that pipelining sales data and product reviews could obtain definite and distinct promotional media based on customer preference. Overall, this research may help online marketers bundle specific remarketing content into promotional media that matches to customer favorites.*

**Keywords:** *Advertisement, classifier, neuro-linguistic programming, remarketing, text mining.*

# ALTERNATIF MEDIA REMARKETING BERDASARKAN PREFERENSI PELANGGAN

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## ABSTRAK

*Remarketing adalah cara yang ampuh bagi penjual untuk menawarkan produk secara terus-menerus kepada pelanggan lama atau pelanggan yang potensial. Dengan menggunakan teknik ini, penjual menargetkan untuk memperpanjang corong penjualan (sales funnel). Seperti pada pemasaran tradisional, salah satu masalah yang dihadapi kebanyakan penjual dalam pembuatan remarketing adalah bagaimana menyajikan informasi yang cocok bagi orang tertentu dengan menggunakan media promosi yang sesuai kebutuhan atau yang disukai oleh pelanggan. Tujuan dari penelitian ini adalah untuk mendapatkan alternatif media promosi yang tepat berdasarkan preferensi pelanggan. Metode klusterisasi digunakan untuk mengelompokkan perilaku (behavior) pelanggan. Selanjutnya, ulasan produk yang diberikan pelanggan pada platform daring dianalisis untuk memunculkan preferensi pelanggan. Berikutnya, preferensi pelanggan dipetakan pada media promosi yang tepat. Hasil eksperimen menunjukkan bahwa media promosi yang tepat dan spesifik berdasarkan preferensi pelanggan berhasil direkomendasikan dengan menggabungkan pengolahan data penjualan dan ulasan produk. Hal ini tentu saja dapat membantu penjual online mengirimkan iklan remarketing yang tepat kepada jenis pelanggan yang memiliki preferensi berbeda-beda.*

**Kata kunci:** *Advertisement, classifier, neuro-linguistic programming, remarketing, text mining.*

## I. INTRODUCTION

**A**DVERTISING is critical to introduce company brands, products, or services to increase loyal customers, leading further down their sales funnel in commercial business. To keep its customers updated, the company applies remarketing techniques which come in many strategies, i.e., offline, phone, email, social

media, and retargeting. Specifically, there are various promotional media alternatives to be used, but choosing one that suitable for customer preference is quite a challenge.

As the digital world grows, most users access the internet as sources of information and perform transactions such as shopping, booking tickets of travel, movies, and hotels [1]. Before buying a certain product of service, currently people rely on online platform to gather as much information as they need [2]. Specifically, user read about product reviews written by other customer who bought the product previously. In business, it is conceded that customer satisfaction is critical in building the relationship between a company and its customers. To grasp customer experience on the bought products, online marketers encourage their customers to fulfill the product review. The review is ranging from giving star reviews or writing their comments directly. Then, those reviews are learned to understand customer behavior in buying company's products. However, reading those reviews burdens the Customer Relationship Management manager, especially when the reviews reach thousands [3]. In [4], they proposed a product review summary solution based on product features. In this research, we present promotional media alternatives to deliver accurate remarketing information to different customers based on their preferences.

## II. RELATED WORKS

A market segment is formed by a group of people, groups, or organizations that share the same interests, habits, and characteristics [5]. Companies should understand what market segments they target because each segment has different needs. Once they identified market segment needs, a custom product, and offerings that meet markets expectation can be delivered.

The identification of market segments, along with the process of grouping broad customers into subgroups, such as existing and prospective customers, is called market segmentation. Typically, the grouping process is conducted by scrutinizing common characteristics, including demographic profiles besides needs and interests. By using this information, different marketing strategies such as giving promotions, vouchers, special offers, free samples, credits, price reductions, and free shipping fees can be applied to attract definite customers.

The traditional variables such as demographic, geographic, psychographic, behavioral, and product-related factors are applicable for market segmentation. Specifically, this paper focused on using the behavioral category to elaborate its marketing strategy based on individual purchase behaviors [5]. Behavioral segmentation is noticeable by the benefits explored from the product, identifying specific buying behaviors, shopping frequency and volumes of purchase, and so on.

On the other hand, customer reviews on the bought product are essential for the marketer to understand their product acceptance. The marketer can study customer profiles through their writing [6-10]. In this research, the Neuro-Linguistic Programming (NLP) approach [11] is applied to study customer profiles through customer reviews. NLP describes the underlying dynamics between mind (neuro) and language (linguistic) and how their reciprocation affects the human body and behavior (programming) using NLP Predicates. NLP is composed of a set of techniques to identify how they think, communicate with each other using certain words and language. Besides, it studies human behavior patterns. Incorporating NLP for remarketing is a right decision because NLP contains psychological techniques that effectively communicate with the customer through the subconscious or unconscious mind. NLP has six representational systems: visual, auditory, kinesthetic, olfactory, gustatory, and auditory digital. The latter is a non-sensory system that relies on self-talk, discrete words, facts, and figures to represent how people sort experience.

## III. PROPOSED METHOD

We proposed to combine e-commerce sales data clustering and customer reviews as a way to find customer preferences of a specific category group. By classifying the sales data into the loyal-to-prospect type of customers, we can study their preferences by narrowing down to their review after they bought a specific product. After customer preferences are known, promotional media is created. Overall process is illustrated in Fig. 1.

### A. E-commerce Sales Data Customer Segmentation

This research used annual income, age, and spending scores as attributes to segment the customer. K-Means clustering is used to segment the customers and use the result to decide which type of promotion best for each cluster. A Python program has been developed, and the program is trained by applying standard scaler onto a dataset having two features of 200 training samples on e-commerce visit and order data. Both the features are the average number of visits to the website and the average number of orders made. Fig. 2 indicates how sales data are processed to create customer clusters.

At this implementation, the dataset has been taken from an e-commerce website consisting of two features, the

average number of visits to the site and the average amount of orders done from the web shown in Table 1. The data has been scaled using Standard Scaler from Scikit-learn [12] by applying standard scaler the data gets centered around zero with a standard deviation of one. The scaled data is defined using (1) where  $x$  represents an entry in a feature set  $x_i \in X$ ,  $mean(X)$ , and  $stdev(X)$  represent mean of feature set  $X$  and standard deviation of  $X$ , respectively.

$$\frac{x - mean(X)}{stdev(X)} \tag{1}$$

Before performing the clustering, the choosing of the optimal number of clusters is essential. In this research, the Elbow Method is applied. To start the Elbow Method, a random number ranging from one to ten is chosen. Then, the sum of squared error (SSE) within the cluster is calculated. The optimal number of cluster is one that lies at the bent position in the plot.

Having known the optimum number of clusters, we perform K-Means Clustering. It is a straightforward algorithm of clustering based on the partitioning principle. First, sales data points are assigned to the closest cluster centroids. After the cluster was formed, it is evaluated. When the result is suboptimal, barycenters are recalculated. When the optimal solution is found, the iteration process is stopped. Three attributes in the sales data, including annual income, age, and spending scores are applied to group the customers.

*B. Customer Preference Analysis*

Customer preference analysis focused on analyzing customer reviews for a specific customer segment using process displayed in Fig. 3. Natural language processing was applied to preprocess customer review. Then, simple text mining is employed to find the words that labelled as Neuro-Linguistic Programming Predicates. It includes converting each words in the review text into lower case, remove special characters, and punctual marks. The extracted words from the review are used to indicate customer preferences, specifically based on the frequency of words that appear in the customer review. Table 2 shows sample words representing the NLP Predicate used in our research [13].

Online advertisers should regularly play the job of thought pioneers who model accepted procedures and show their crowds their ability. Moreover, they should connect with their crowds to keep their drawn out intrigue. All things considered, an idea chief's essential job is to serve, not only to pitch to change over. Each idea head must guarantee all substance is painstakingly introduced to take into account high assimilation and held enthusiasm among audience individuals.

Notwithstanding, most of customers has one learning style they expend information most successfully. Each learning style requires its one of a kind learning instruments to help in learning. Fortunately, content advertisers have more instruments available to them than at some other time ever.

TABLE I  
CUSTOMER DATA SAMPLES.

Customer ID	Gender	Age	Annual Income (\$)	Spending Score
1	Female	19	39	15
2	Male	21	81	15
3	Male	20	6	16
4	Female	23	77	17
5	Female	31	40	18
6	Male	22	76	19
7	Female	35	94	13

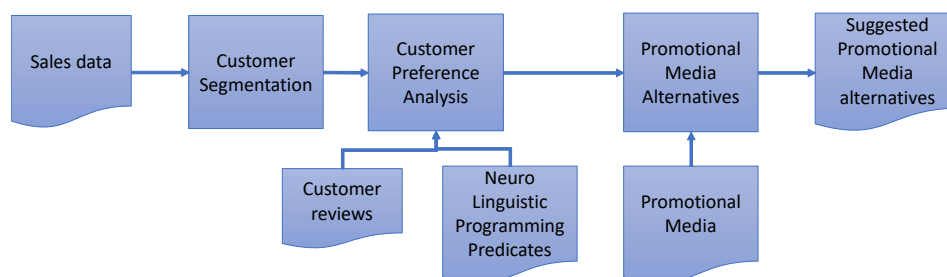


Fig. 1. Pipelining sales data and customer review.

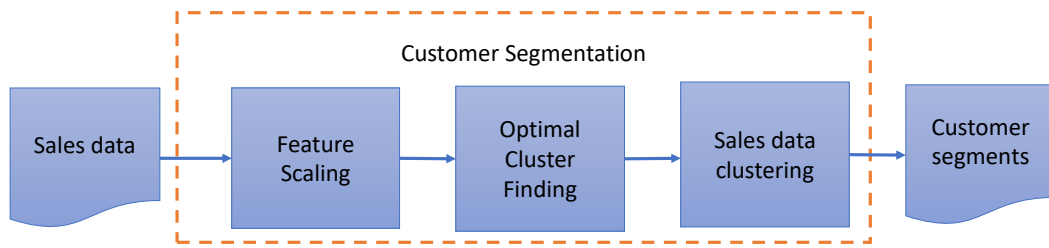


Fig. 2. Customer segmentation process.

TABLE II  
NLP PREDICATES SAMPLES.

NLP Predicate	Word
Visual	see, look, view, appear, show, dawn, reveal, imagine, focus
Auditory	hear, listen, sound, harmonize, tune, resonate
Kinesthetic	feel, touch, grasp, concrete, solid
Auditory Digital	sense, experience, understand, think, learn, process, decide, consider, change, perceive, insensitive, conceive, distinct, know, motivate

TABLE III  
PROMOTIONAL MEDIA BASED ON LEARNING TYPE.

Customer Learning Type	Promotion Media
Visual	videos, infographics, animations, photographs, slide share presentations
Auditory	podcasts, auditory e-books
Kinesthetic	videos, animations, quizzes, surveys, games, calls-to-action, slide share
Auditory Digital	quizzes, surveys, games (strategy, logic, science simulator), e-books, podcasts

Kinesthetic customers learn through touch. They like to physically control things, tap things, write things, and in any case connect with visuals. These kinds of customers are frequently found performing various tasks while devouring data. They may watch a video or read a content, for instance, while working out.

Visual customers learn through sight. They regularly tune out immediately when tuning in to sound data and experience difficulty recollecting data they have just been given verbally. Be that as it may, they do recall outlines, composed data, workmanship, and shaded or featured focuses.

Auditory customers are the individuals who hold data best when they hear it. One locates that numerous audi-conservative customers learn best by first tuning in and afterward summing up it to solidify the data to memory. They are frequently pulled in to music and may think better with some delicate ambient sounds playing. In addition, they like to take part in bunch conversations and record any material they are learning for later tuning in.

Auditory Digital customers regularly display qualities of the other three correspondence inclinations. They will be most intrigued that a message bodes well. They additionally retain by steps, methods, and groupings [14].

### C. Promotional Media Alternatives

As shown in the right part of the process illustrated in Fig. 3, promotional media alternatives for a specific customer are found by mapping the frequency of the NLP predicates, i.e., auditory, kinesthetic, visual, and auditory digital into related promotional media.

Table 3 displays some suggestions for advertising content based on customer learning type. If the result shows "visual" as the highest number of words, then the suggestions of promotion content to the customer are video, infographic, animation, photo, or slide share presentation. This rule applies to other types.

## IV. RESULTS AND DISCUSSIONS

### A. Customer Behavioral Segmentation

From the experiment, we obtain clustering sales data using three metrics, precisely annual income, age, and spending scores. The consistency within data clusters was validated using the Silhouette Score, with an average score of 0.56. As shown in Fig. 4, there are five clusters shown in different colors (blue, orange, red, purple, and yellow). The blue cluster represents customers with a low spending score and annual income. While the orange

cluster indicates customers with a low spending score but high annual income. Next, the red cluster shows the customers with average spending score and medium annual income. Meanwhile, the purple cluster indicates type of customers with high spending score and annual income. Last, the yellow cluster consist of a customer group with has a high spending score but low annual income. More detail analysis on each clusters are discussed as follows.

From Table 4, data shows that each person on this cluster has a low spending score and annual income. So, this cluster should be treated with a product discount or low-price product to increase their spending score but not step over the annual income. Using a coupon could be working with this type of cluster, for they can saving their income into a different type. Table 5 shows that each person on this cluster has a low spending score and high annual income. This cluster should be treated by promoting the item that they need. In this case, the behavior of a buying item needs to be recorded, and the recorded data is used to predict their need and then promote the item. Meanwhile, Table 6 shows that each person on this cluster has an average spending score and medium annual income. This cluster should be treated as a blue cluster because their spending score relatively proportional to their annual income.

Next, Table 7 shows that each person on this cluster has a high spending score and high annual income. This cluster should be treated like the blue cluster and red cluster because their spending score relatively proportional to their annual income. Last, Table 8 shows that each person on this cluster have a high spending score but low annual income. One promotion to attract this type of customer is 0% Interest Credit Card Installment promotion could be used because the possible transaction could happen if they use a credit card as their payment method. So, it pushes the customer to spend more.

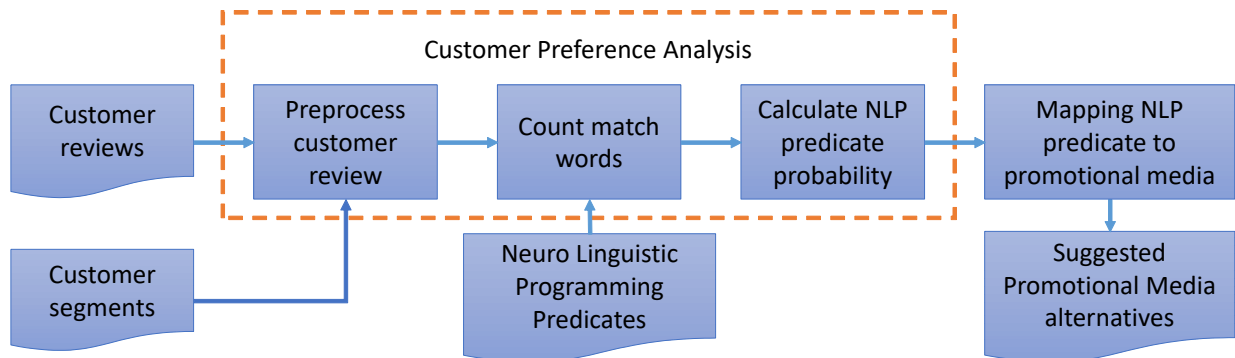


Fig. 3. Customer preference analysis process.

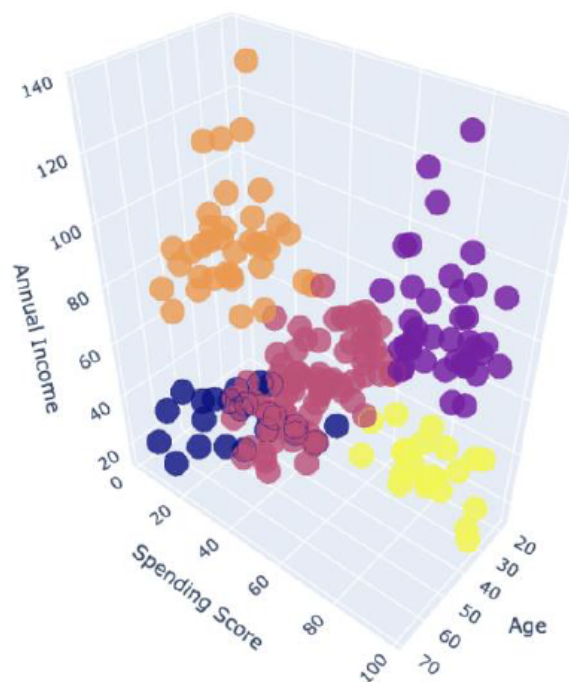


Fig. 4. Sales data clustering results.

TABLE IV  
RANKED DATA OF CLUSTER BLUE (TOP 10).

Customer ID	Annual income (\$)	Spending Score	Rank
3	60	20	1
2	58	18	2
15	57	18	3
21	55	16	4
30	40	15	5
45	39	14	6
60	35	13	7
85	25	12	8
100	22	12	9
120	20	10	10

TABLE V  
RANKED DATA OF CLUSTER ORANGE (TOP 10).

Customer ID	Annual income (\$)	Spending Score	Rank
25	140	20	1
71	135	18	2
56	135	18	3
135	120	16	4
150	119	15	5
209	106	14	6
210	99	13	7
8	95	12	8
98	86	12	9
100	82	10	10

TABLE VI  
RANKED DATA OF CLUSTER RED (TOP 10).

Customer ID	Annual income (\$)	Spending Score	Rank
45	80	60	1
56	78	58	2
32	75	57	3
267	64	56	4
368	63	48	5
890	60	45	6
567	58	35	7
435	52	31	8
123	48	26	9
20	41	22	10

TABLE VII  
RANKED DATA OF CLUSTER PURPLE (TOP 10).

Customer ID	Annual income (\$)	Spending Score	Rank
90	140	100	1
456	138	98	2
314	135	96	3
327	131	94	4
250	128	92	5
138	125	90	6
256	110	87	7
187	96	85	8
65	95	82	9
40	80	80	10

TABLE VIII  
RANKED DATA OF CLUSTER YELLOW (TOP 10).

Customer ID	Annual income (\$)	Spending Score	Rank
35	40	100	1
58	38	98	2
278	36	96	3
259	33	93	4
476	32	91	5
489	28	85	6
768	26	83	7
243	25	80	8
278	22	79	9
135	20	75	10

B. Suitable Promotional Media Alternatives

For experiment purpose, we collected a hundred customer reviews on a beauty product. Each row contains many attributes but only reviewer name and review text attributes are used. Fig. 5 displays the example of a row on the dataset.

Table 9 shows the result of the suggested promotional media alternatives based on customer reviews. Visual, Auditory, Kinesthetic, and Auditory Digital learning style probabilities are indicated using letter V, A, K, and AD, respectively. Each review was handled and each keyword has been contrasted with the current dataset of NLP predicates and occurrence probability of the keyword help the proposed system to suggest promotional media alternatives that match customer preferences. With the help of customer profiling, marketers easily decide the most suitable promotion content for each of the customers.

```
{
  "reviewer": "A1YJFY40YUW4SE",
  "asin": "7806397051",
  "reviewerName": "Andrea",
  "helpful": [3, 4],
  "reviewText": "Very oily and creamy. Not at all what I expected... ordered this to try to highlight and contour and it just looked awful!!! Plus, took FOREVER to arrive.",
  "overall": 1.0,
  "summary": "Don't waste your money",
  "unixReviewTime": 1391040000,
  "reviewTime": "01 30, 2014"
}
```

Fig. 5. Customer review structure.

TABLE IX  
SUGGESTED PROMOTIONAL MEDIA ALTERNATIVES.

Re-viewer	Review Text	Preprocessed Text	NLP Predicate Matches	V	A	K	AD	Promotional Media Alternatives
Karen	The texture of this concealer pallet is fantastic, it has great coverage and a wide variety of uses, I guess ..., and two more occasionally, ..., it's not cakey, gives me a natural for and concealed my imperfections, therefore I highly recommend it :)	['texture', 'concealer', 'pallet', 'fantastic', 'ha', 'great', 'coverage', 'wide', 'variety', 'us', 'guess', 'meant', 'professional', 'makeup', 'artist', 'lot', 'colour', 'use', 'use', 'least', 'two', 'regular', 'basis', 'two', 'occasionally', 'reason', 'giving', 'star', 'feel', 'like', 'range', 'color', 'kind', 'waste', 'product', 'wonderful', 'cakey', 'give', 'natural', 'concealed', 'imperfection', 'therefore', 'highly', 'recommend'] = 44 Words	Visual : 0 Auditory : 0 Kinesthetic : 1 ['feel'] Auditory Digital : 0	0	0	22	0	Videos, Animations, Quizzes, Surveys, Games, Calls-to-action, Slide share

TABLE IX  
SUGGESTED PROMOTIONAL MEDIA ALTERNATIVES (CONT'D).

Reviewer	Review Text	Preprocessed Text	NLP Predictate Matches	V	A	K	AD	Promotional Media Alternatives	
Andrea	Very oily and creamy. Not at all what I expected... ordered this to try to highlight and contour and it just looked awful!!! Plus, took FOREVER to arrive.	['oily', 'creamy', 'expected', 'ordered', 'try', 'highlight', 'contour', 'looked', 'awful', 'plus', 'took', 'forever', 'arrive'] = 13 Words	Visual : 1 [‘look’] Auditory : 0 Kinesthetic : 0 Auditory Digital: 0	6.5	0	0	0	Videos, Infographics, Animations, Photographs, Slide share presentations	
Manana-gir16	Got this product and I never heard of this so I took a chance and when I got it I fell head over heels for this new smell I won't let anybody use this perfume but me sounds selfish now so thanks for selling a wonderful perfume I will be stocking up on this product	['got', 'product', 'never', 'heard', 'took', 'chance', 'got', 'fell', 'head', 'heel', 'new', 'smell', 'wo', 'nt', 'let', 'anybody', 'use', 'perfume', {'reviewer': "A1YJEY40YUW4SE", "asin": "7806397051", "reviewerName": "Andrea", "helpful": [3, 4], "reviewText": "Very oily and creamy. Not at all what I expected... ordered this to try to highlight and contour and it just looked awful!!! Plus, took FOREVER to arrive.", "overall": 1.0, "summary": "Don't waste your money", "unixReviewTime": 1391040000, "reviewTime": "01 30, 2014"} 'sound', 'selfish', 'favorite', 'thanks', 'selling', 'wonderful', 'perfume', 'stocking', 'product'] = 27 words	Visual : 0 Auditory : 0 Kinesthetic : 2 [‘hear’, ‘sound’] Auditory Digital : 0	0	0	13.5	0	0	Podcasts, Auditory e-books
Nova Amor	It was a little smaller than I expected, but that was okay because it lasted me for a long time. I think it does great coverage for the price I paid. It is heavy, and wears off within 30-1hr. It kinda dries your skin. I'd recommend it to people who are just looking for a cheap coverage, or beginners who are	['wa', 'little', 'smaller', 'expected', 'wa', 'okay', 'lasted', 'long', 'time', 'think', 'doe', 'great', 'coverage', 'price', 'paid', 'heavy', 'wear', 'within', 'hr', 'kinda', 'dry', 'skin', 'recommend', 'people', 'looking', 'cheap', 'coverage', 'beginner', 'learning', 'conceal'] = 10 Words	Visual : 1 [‘look’] Auditory : 0 Kinesthetic : 0 Auditory Digital : 2 [‘think’, ‘learn’]	5	0	0	10	Quizzes, Surveys, Games (Strategy, Logic, Science Simulator), E-books, Podcasts.	



TABLE IX  
SUGGESTED PROMOTIONAL MEDIA ALTERNATIVES (CONT'D).

Re- viewe r	Review Text	Preprocessed Text	NLP Predi- cate Matches	V	A	K	AD	Promo- tional Me- dia Alter- natives
	just learning to conceal.							

## V. CONCLUSION

Pipelining sales data and customer reviews can help to narrow down customer profiling and customer preferences. The behavior segmentation on sales data helps the online marketer to decide specific treatment in general. Customer reviews obtained after-sales help the online marketer obtain customer preferences and decide precise promotional media to deliver remarketing messages.

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