Accurate Marketing Strategies Based On Data Analytics

Xinyi Wang*
Nanchang Institute of Science and Technology, Jiangxi, China

*Corresponding author e-mail: wangxinyi@ncpu.edu.cn

Abstract. In the current background of the times, China's economic development is very rapid, all walks of life are changing with each passing day, so for marketing strategy, the current situation is also a challenge, but also an opportunity. Therefore, according to the current situation, this paper puts forward some methods of using data analysis to implement precision marketing. In this paper, on the premise of protecting user data security and not violating the data mining rules, in order to improve the accuracy of marketing, through comparing the current marketing model with the previous marketing model, and using literature research, questionnaire method, comparative analysis, mathematical statistics, a number of algorithms and other methods to get the experimental results. The experimental results show that the appropriate algorithm can make the marketing strategy get more accurate results.

Keywords: Data Analysis, Data Mining, Precision Marketing, Euclidean Distance Analysis Algorithm.

1. Introduction
Big data has changed the society, changed the times, and is destined to change the existing lifestyle [1]. Especially for the relevant marketing mode, the change of marketing mode directly affects the development of subsequent enterprises. In order to further meet the comprehensive needs of the development of the times and social progress, we realize the role and value of big data in this process [2]. And then actively apply relevant measures to reform the marketing mode, and comprehensively strengthen and improve the overall, so as to optimize the final marketing effect. [3].

Based on the distance calculation method in mathematics, the Euclidean distance correlation analysis algorithm, correlation coefficient correlation analysis algorithm and cosine correlation analysis algorithm are implemented. The correlation degree between data is calculated, and the specific correlation degree is obtained through quantitative analysis, which provides a guiding scheme for the prediction results of marketing scheme [4]. Using data mining technology, according to some selected data dimensions that may affect the marketing results, a random forest model for predicting marketing results is constructed through the software package based on Python integrated environment. The original data is divided into training set and test set, and finally the prediction results are obtained [5]. Through the analysis of random forest algorithm, this experiment obtains some characteristics of random algorithm, because data-driven prediction modeling first needs to filter out the main attributes that may affect the marketing effect in the attribute set of the original data, and then selects the
attribute as the independent variable and the marketing effect as the dependent variable to establish the mathematical model [6-7].

The meaning of data mining refers to the process of discovering a large amount of data from various information bases, and extracting the information hidden in it [8]. The data objects it deals with are generally incomplete, noisy and random daily business data. Filter the effective data, transform the format and content of the required data, data mining, pattern evaluation and knowledge representation, which are part of the knowledge discovery process [9]. One of the basic steps in knowledge discovery is data mining. Data mining is actually to obtain valuable data from a pile of seemingly meaningless and unrelated data. This study attempts to use data-driven modeling method to mine the factors affecting online learners' academic performance from data, and automatically learn classification prediction model from data through machine learning [10].

2. Method

2.1 Euclid Distance Analysis Algorithm

Euclidean distance is used to measure the distance between two variables in many algorithms. For data association, each data can be considered as coordinate points. If the correlation between two data is greater, the closer their distance is; on the contrary, the smaller the correlation between two data, the farther their distance is.

Based on the Euclidean distance algorithm, the correlation formula algorithm of two data I, j is as follows:

\[
\gamma(C_i, C_j) = \frac{1}{1 + \frac{1}{\sqrt{(x_i^1 - x_j^1)^2 + (x_i^2 - x_j^2)^2 + (x_i^k - x_j^k)^2}}}
\] (1)

By analyzing the relevant associated data, we can get the relevant data algorithm as follows:

\[
\rho_{X,Y} = \frac{\text{cov}(X,Y)}{\sigma_X \sigma_Y} = \frac{E[(X - \mu_X)(Y - \mu_Y)]}{\sigma_X \sigma_Y}
\] (2)

Using correlation coefficients to indicate how correlated each data is, the formula can be rewritten as follows:

\[
\gamma(C_i, C_j) = \frac{\text{cov}(C_i, C_j)}{\sigma_{C_i} \sigma_{C_j}} = \frac{E[(C_i - \mu_{C_i})(C_j - \mu_{C_j})]}{\sigma_{C_i} \sigma_{C_j}}
\] (3)

2.2 Use Big Data as a Foundation to Accelerate Predictive Analysis of Marketing Strategies

By using Internet technologies such as big data and cloud computing, we can constantly enrich the diversity of marketing schemes, thus increasing their selectivity. At the same time, we should use computers and network multimedia to create an analysis mechanism, and use the platform feedback function to analyze the changes of all data in real time, so as to accelerate the transformation of traditional marketing strategies. Further use the multimedia network to speed up the construction of resources, enrich the analysis method of marketing strategy, and communicate with many studios to share high-quality resources and experience.

2.3 Change the Traditional Teaching Mode and Use the New Era Network Teaching Methods

In view of the rapid development of big data technology, as well as the needs of marketing strategy in today's era, we should fully change the current marketing analysis method, use rich network and a large amount of data to analyze and deal with examples. All in all, changing ideas is the most important step. At the same time, the existing marketing strategy examples should be transferred to the network platform and integrated and classified, and targeted induction and processing methods should be designed for the platform to promote the platform's autonomous learning and classification, so as to change the marketing mode.
3. **Experiment**

3.1 **Two Group-Controlled Trials Were Established**

We can select an advertising agency, accept several projects at the same time, and then set up two groups. Two groups use new and traditional technologies based on data analysis to analyze the cost, audience and final revenue of each advertisement, so as to distinguish the methods we should use. Of course, due to the difference between individual ability and team cooperation, the result may have a little error, so we need to analyze more cases and exchange the two groups of personnel to get the general situation by excluding other factors. Then, we can use the various algorithms mentioned above to analyze and analyze the same case one by one to determine the cost of the advertisement and how to maximize the marketing effect.

3.2 **Get the Audience's Attitude to Reflect the Problem**

Marketing is the key link of corporate profitability. The foundation of sustainable development. Enterprises need to establish a good corporate image. Public relations activities and exhibition activities to promote help to establish a good corporate image, in the promotion, the main products can be promoted to achieve the purpose of product sales. This has become the focus of the industry. In order for people to buy the company's products, they must respond to the audience and come up with a marketing plan to promote to the masses, which is the focus of the plan. Audiences can be divided into consumer audiences, professional audiences and general audiences. If marketing is done well, the audience will also produce great economic benefits, so the publicity work should continue to produce good results. Therefore, we should finally apply data analysis technology to control marketing strategy. And we ended up using questionnaires to get our customers' attitudes.

4. **Results**

4.1 **On Whether to Apply Data Analysis Technology to the Results Accurate of Precision Marketing**

![Figure 1](image1.png)

Figure 1. Compares the marketing effectiveness of data analysis to whether data analysis is applied.

It can be seen from Figure 1 that in terms of marketing, the marketing scheme is designed according to the requirements of the product or customer, and then updated and changed in real time. At this time,
the fund can be fully used, and the best result is generally obtained. Because the traditional design generally spends a lot of time to predict various possible situations, to explore the future planning of the overall goal, starting from the overall situation, not the success or failure of small sections, just like playing chess, we can make mistakes or let go of details, but in general, we should be in an advantage, so there may be short-term disadvantages at this time, but these are controllable. In the state, it is acceptable, but it is not worth the loss to pursue the actual optimal solution for the advertising project with more conditions but less quantity provided by customers. Therefore, data analysis technology should be used to obtain the theoretical optimal solution from the overall control and implementation of regulation.

![Figure 2. An inflection point chart that predicts marketing strategies based on euclidean distance analysis algorithms](image)

According to figure 2 data of the inflection point graph of the accuracy of the prediction marketing scheme of the Euclidean distance analysis algorithm, the algorithm is not stable in the prediction of teaching quality evaluation effect in the early stage of the current algorithm construction, but according to the above seven experiments, we compare the prediction results of each experiment with the actual results, in order to be able to improve the prediction efficiency of the prediction model to the current evaluation system, improve the accuracy of the prediction data, make it more accurate. So we added additional algorithms later to address the flaws faced by euclidean distance analysis algorithms, and later found that the following results would appear. So after weighing, we chose the Euclidean Distance Analysis Algorithm and the Cosine Association Analysis Algorithm to evaluate to complete the final step of our evaluation teaching.

**Table 1. The different uses of algorithms for marketing strategy control and its final impact**

|                         | Expected planning funds. | Adjust the number of modifications. | The use of funds. | Marketing distance is expected to work. | The final result is the situation. |
|-------------------------|--------------------------|-------------------------------------|-------------------|----------------------------------------|---------------------------------|
| Euclidean distance analysis algorithm. | 100%                     | 12                                  | 93%               | 92%                                    | 200%                            |
| Cosine association analysis algorithm. | 100%                     | 15                                  | 94%               | 91%                                    | 190%                            |
| Comprehensive analysis. | 100%                     | 6                                   | 82%               | 103%                                   | 230%                            |

It can be seen from table 1 that the implementation of Euclidean distance analysis algorithm and cosine association analysis algorithm together will lead to the minimization of cost and the maximization of profits, because Euclidean distance analysis algorithm can obtain the information of the marketing people, know their preferences, and then analyze the advertising content, while the
cosine correlation analysis algorithm can be used for various information such as marketing strategy applicable groups. Finally, the optimal solution is obtained. Therefore, we should try to use a variety of methods to analyze the optimal solution.

**Table 2.** The precision analysis table of the Euclid distance analysis algorithm

|                          | Data digs. | Cosine classification. | Euclid. |
|--------------------------|------------|------------------------|--------|
| The accuracy of the training dataset. | 68.17%     | 83.39%                 | 96.17  |
| Check accuracy.           | 83%        | 99.87%                 | 100%   |

According to the data in Table 1 and table 2, the prediction and analysis results of the marketing scheme show that Euclid's algorithm has the highest accuracy according to the above data and after different data preprocessing operations. When applying libsvm, the data is processed by smote and the optimal parameters are calculated, and the results are satisfactory but not stable, and the linear regression combined with the prediction in the marketing program has better prediction accuracy and more stability.

### 4.2 The Purpose of Precision Marketing

Precision marketing is based on precise positioning, relying on modern information technology means to establish a personalized customer communication service system, to achieve the enterprise can measure the low-cost expansion of the road, is an attitude of the network marketing concept of one of the core points of view. "The firm needs more accurate, measurable and high return on investment marketing communications, a more results- and action-oriented marketing communications programme, and an increasing focus on direct sales communication." Precision marketing is also the key to enterprise marketing in this era, how to be accurate, this is a systematic process, some enterprises will do a good job through marketing corresponding enterprise marketing analysis, marketing situation analysis, crowd positioning analysis, the most important thing is the need to fully tap the enterprise products have the demand point, to achieve the true sense of precision marketing.

The best embodiment of the Internet changing people's way of life is the web application of e-commerce. So let's talk about precision marketing of e-commerce sites. With the rapid development of e-commerce, on the one hand, people are satisfied with a large number of online shopping centers; although almost every online marketer has a live search, people are still dissatisfied, so there is an online marketer personalized recommendation system. The principle of precision marketing of the online market mall personalized recommendation system through the recommendation engine of the personalized recommendation system, the online market mall digs deep into the user's preferences, creates a personalized recommendation bar, and displays the goods intelligently according to their own interests and preferences, as well as the user's purchase intention, to help users find the desired goods faster and easier, so that users have a more smooth and comfortable shopping experience. On the other hand, personalized referral bars can help users make decisions and make online purchases more efficient. Here is a principle: for each user's interests, he is most likely to recommend the user's intelligent recommendation of the product is not only personalized marketing, but also the best performance and practice of e-commerce precision marketing.

### 4.3 The Purpose and Significance of Data Analysis

The purpose of data analysis is to collect and extract information hidden in a large amount of seemingly confusing data, so as to find out the inherent laws of the subjects studied. In practice, data analysis can help people make judgments and take appropriate action. Data analysis is the process of collecting data, analyzing it, and translating it into information. This process is a necessary support process for quality management systems. The data analysis process should be used appropriately throughout the life cycle of the product, from market research to after-sales service to final disposal, to improve its effectiveness. Therefore, data analysis plays an extremely important role in marketing design.

Data analysis is the use of appropriate statistical and analytical methods to analyze a large amount of collected data to summarize, understand and digest it, so as to maximize the function of data and the
role of data. Data analysis is the process of studying and summarizing data in detail to extract useful information and draw conclusions. Data, also known as observations, are the result of experiments, measurements, observations, surveys, etc. The data processed in data analysis is divided into qualitative data and quantitative data. Data that can only be classified as a specific category and cannot be measured numerically is called qualitative data. In qualitative data, category data that is not sequential is classified data, such as gender, brand, etc., and in qualitative data, category but sequential differentiation data is sequential data, such as educational background, product quality grade, etc.

5. Conclusion
Although a good marketing plan is creative and innovative, it still needs a lot of calculation to think about and predict the specific development of the follow-up. Because a large number of data flow into the market, we need to carry out detailed market planning to avoid mistakes. Well, in order to better accurately predict, we need to carry out accurate control of marketing plan through a large number of data mining and data analysis, so we use data analysis technology and a variety of algorithms for layout. Therefore, we believe that in the future, we will use better methods to concentrate resources for more accurate control and improvement.

References
[1] Mishra B K, Barik R K, Priyadarshini R, et al. An Investigation Into the Efficacy of Deep Learning Tools for Big Data Analysis in Health Care. International Journal of Grid and High Performance Computing, 2018, 10 (3): 1-13.
[2] Pedoia V, Haefeli J, Morioka K, et al. MRI and biomechanics multidimensional data analysis reveals R2- R1ρ as an early predictor of cartilage lesion progression in knee osteoarthritis. Journal of Magnetic Resonance Imaging, 2018, 47 (1): 78-90.
[3] Ahmad F, Draz M U, Yang S C. Causality nexus of exports, FDI and economic growth of the ASEAN5 economies: evidence from panel data analysis. Journal of International Trade and Economic Development, 2018, 27 (5-6): 1-16.
[4] Hasan, Umair, Whyte, et al. Life-Cycle Asset Management in Residential Developments Building on Transport System Critical Attributes via a Data-Mining Algorithm. Buildings, 2019, 9 (1): 1-1.
[5] Yangwei, Xiang, Yifeng, etc. Development and validation of a predictive model for the diagnosis of the solid solitary pulmonary nodules using data mining methods. Journal of thoracic disease, 2019, 11 (3): 950-958.
[6] Rahman A, Oldford R W. Euclidean distance matrix matrix and point configurations from the minimal spanning tree. Siam Journal on Optimization, 2018, 28 (1): 528-550.
[7] Lensen A, Xue B, Zhang M. Genetic Programming for Evolving Similarity Functions for Clustering: Representations and Analysiis. Evolutionary Computation, 2019 (3): 1-29.
[8] Lee J H, Song J Y, Kim D W, et al. Particle Swarm Optimization Algorithm With Intelligent Particle Number Control for Optimal Design of Electric Machines. Industrial Electronics, IEEE Transactions on, 2018, 65 (2): 1791-1798.
[9] Morgan N A, Whitler K A, Feng H, et al. Research in marketing strategy. Journal of The Academy of Marketing Science, 2018, 47 (1): 4-29.
[10] Song R, Moon S, Chen H A, et al. When marketing strategy meets culture: the role of culture in product evaluations. Journal of The Academy of Marketing Science, 2018, 46 (3): 384-402.