# System Design Analysis of Economics Teaching in Western Colleges and Universities Under the Background of Big Data

Ping Wang(✉)

School of Yunnan Technology and Business University, Yunnan 651701, China

**Abstract.** In order to improve the teaching quality of western economics, teachers should carefully compile and select teaching materials, and teachers should play a positive guiding role in enhancing students' subjective learning, so as to realize the significance of teaching reform.

**Keywords:** Western economics teaching · Innovation · Personnel training

## 1 Introduction

As the main core course of talent training program in Colleges and universities, western economics is highly valued in most colleges and universities. It is not only a professional compulsory course, but also has a lot of class hours. In addition, there are practical teaching and tutorial teaching. However, in the process of teaching, there are some common problems, such as outdated teaching methods of economics and students low interest in learning. At present, the teaching method and talent training mode of western economics in Colleges and universities need to be adjusted and reformed in combination with the national talent training strategic planning and students learning needs, so as to meet the needs of the development of the times [1].

## 2 An Analysis of the Problems in the Teaching of Western Economics in Chinese Universities

According to the survey of the actual situation of Western Economics Teaching in most colleges and universities in China, there are several problems in the teaching of western economics in Colleges and universities.

(1) As a discipline, microeconomics and macroeconomics have a history of more than 200 years, while I have only 20 years of education and teaching history. It is difficult to guarantee that western economics education has enough time accumulation. There is not only a lack of excellent teachers in the teaching front line, but also a lack of experience summary in the teaching reform of western economics, and a lack


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of excellent students engaged in Research-based Learning of economics. According to the survey, students who are engaged in economics, after simple self-study, stand on the platform of western economics according to their own understanding of economics. From a nationwide perspective, although all colleges and universities have basically set up economics courses, the teaching of western economics is still in its infancy, and a complete, scientific and suitable teaching system of western economics needs to be improved.

(2) The teaching mode is old, and the teaching mode is still teacher centered. It adopts indoctrination teaching methods such as classroom teaching theory, homework arrangement after class and final closed book examination. The teaching methods of teachers are old, and the classroom teaching process is chalk writing and oral teaching. Moreover, economics has been set as an elective course in many colleges and universities, the teaching content is scripted, emphasizing theory over practice, basic knowledge is not popularized in all majors, students lack the basic understanding of economic theory, which not only does not reflect the requirements of multimedia teaching mode in the new era, but also is difficult to mobilize students enthusiasm in learning economics [2].

(3) The main problems in the teaching materials of western economics are as follows: (1) at present, the teaching materials of western economics are still traditional ones, whose contents are mainly the mainstream micro and macro-economic theories. Its emergence is based on the western industrial production, and its formation is based on the fully competitive market economic system. Many theories are inconsistent with or even contrary to the reality of China economic development. In the process of teaching, both teachers and learners are puzzled by the theory. (2) Most of the teaching materials are specialized for economics and management majors, which are more theoretical, which is helpful for the students to form a perfect knowledge system, but it is not suitable for non economics and management students to learn the knowledge. The lack of the necessary mathematical model and the introduction of the history of economic theory, the history of economic thought and other professional basic knowledge in the teaching materials leads to the students mental confusion and burnout in their study, and the teachers teaching is also difficult. (3) The textbook lacks the introduction of practical life knowledge such as financial management, investment and entrepreneurship education. More and more college students hope to grasp the guidance of economic activities in social life, such as rational consumption, reasonable investment and innovation and entrepreneurship. If the existing western economics textbooks are not compiled under the guidance of practical application and entrepreneurship and employment education concept, they will not be welcomed and valued in the teaching of economics in Colleges and universities, and the teaching goal of western economics to adapt to the development of the times and promote the cultivation of talents in Colleges and Universities will be even more difficult to achieve.

## 3 Classification Algorithm and Feature Selection

### 3.1 The Concept of Machine Learning

Machine learning is simply to let the machine learn human intelligence and become more intelligent, which is also the core of artificial intelligence. We study machine learning in the hope that machines can acquire knowledge from reality and use this knowledge to acquire new knowledge and skills. At the same time, it constructs relevant theories and applies them to various fields. Now all walks of life are entering the era of big data, from search engines to recommendation systems, and so on, covering many aspects. Just because big data has the characteristics of complexity and high dimension, we urgently need the theory of machine learning to help us to mine interesting knowledge from the irregular original big data information. Studies have shown that the effect of machine learning model is directly proportional to the size of data, so the academia generally believes that big data is the driving force of machine learning. In the field of data mining, because of its powerful ability to process all kinds of data and huge commercial application potential, it can better capture the correlation of continuously accumulated data, greatly saving the time and energy of artificial modeling: it meets the needs of the era of big data, and is suitable for the data situation caused by the unstable economic cycle and complex financial environment, So machine learning has been paid more and more attention by academia and industry scholars.

### 3.2 Common Models of Machine Learning

Support vector machine (SVM) is an algorithm with simple theoretical background and easy to understand. It can be used in machine learning technology related to pattern recognition (classification), and has been widely used in machine tilt and data mining tasks. In order to achieve the effect of classification, SVM develops a hyperplane, namely decision boundary, which separates two classes in data classification and divides them into data points. We know that the data points near the boundary of support vector machine are more important and more difficult to divide. However, in order to construct the decision boundary, SVM realizes the separation boundary between the two data in the data space to the maximum extent and minimizes the classification error. In addition, many experiments show that SVM has better performance and higher generalization ability than other machine learning methods [3].

In binary classification, if there is a sample set X:

$$X = \{(x_i, y_i), i = 1, 2, \ldots, n\} \tag{1}$$

Similarly, we can construct the objective function in the training set

$$min\frac{1}{2}\|w\|^2 + C\sum\nolimits_{i=1}^{n} x_i \tag{2}$$

Where C is the penalty constant.

Use iris data and R language program example analysis. First, install the function package (el071) loaded with SVM, and then you can analyze and model the data directly. The results are shown in Fig. 1.

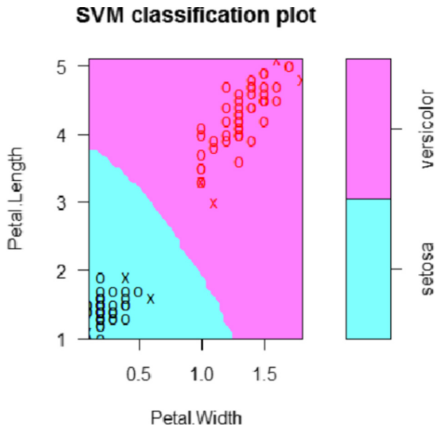


**Fig. 1.** Classification results of support vector machine

## 4 Economic Theory and Model

### 4.1 CRM Analysis Mode

Customer Relationship Management (CRM) is an information intensive process, including all the activities within the company. It is mainly to establish a customer-oriented corporate culture and establish a strategy for acquiring, improving profitability and retaining customers. CRM process is divided into three stages, namely delivery process (sales related activities), support process (what type of customers are the activities oriented to the market) and analysis process (value analysis based on the information collected by the activities). These processes may affect the quality and duration of customer relationship. Especially in the banking sector, making good use of the data related to customer behavior and demand can realize the identification of important customers and develop the relationship with potential customers, which can not only assess the income that these customers may bring to the bank in advance, but also predict the probability that they may participate in bank investment in the future. In customer relationship management, every enterprise must think about three problems: how to find target customers, how to maintain customer loyalty after finding customers, and whether the value created by customers can be maximized on these basis. In many customer relationship management systems, the analysis of relevant indicators can have a preliminary understanding of customers, also can understand the value of customers to the enterprise, and then take different marketing means for different customers [4].

### 4.2 RFM Model

RFM analysis is a very famous and powerful tool in marketing. It is widely used because it can measure the value of consumers according to their purchasing history. It is an important means and method to know whether customers can bring profits to the company and how much. In CRM analysis mode, this model is also mentioned very much. The main idea of RFM model is to know the customer's value by collecting three kinds of

indicators of "customer purchase" behavior: "recency", "frequency" and "monetary". "Recent purchase behavior" refers to the time since the customer last consumed, such as when he last came to the supermarket for shopping. Generally speaking, the shorter the time from the last consumption to the present, the better the customer is, and the greater the response to the instant goods or services provided by the enterprise. "Overall purchasing frequency" refers to the frequency of customers' consumption in the enterprise, such as how many times a customer purchases in the supermarket in a year. Usually, the more times, that is, the higher the frequency, the higher the customer's loyalty and the greater the value to the enterprise. "Purchase amount" refers to the total amount of money that customers spend in the company in a certain period of time. For example, how much money consumers spend in the supermarket in a year, and the higher the amount of consumption, the higher the customer value. By default, accounting calculates the customer's RFM score. The higher the score, the higher the customer's loyalty and satisfaction, and the greater the customer's value. Then build a consumption pyramid according to the customer score, the closer to the top, the greater the customer value, and then formulate different marketing strategies and carry out corresponding marketing activities for customers of different value levels. At the same time, find the lost customers and explore the reasons, and make effective countermeasures to regain these customers.

Based on the idea of RFM model, the factors selected by RFM model are applied to the analysis of bank loan customers, that is, according to the characteristics of bank data, RFM is given new meanings respectively. They are: R refers to the amount of the latest repayment, the more the repayment, the higher the credit rating of the customer; F refers to the frequency of default within a period of time, using the repayment behavior of the customer in a certain period of time to make a general detection of its credit; m refers to the account situation of the customer in a certain period of time, the more the balance of the account, the higher the ability and possibility of the customer's repayment. Through this redefinition, the selected features are applied to the analysis of bank loan customers again.

## 5 Conclusion

This paper first analyzes the current situation of the credit risk in the banking industry, the means adopted by banks to reduce this risk, and the research and achievements of scholars at home and abroad with various methods on this issue. Then it introduces various classification algorithms in Statistics (including support vector machine, neural network, Bayesian and decision tree), principal component analysis in feature selection and some concepts of theoretical models in economics. Secondly, an example is analyzed. The main work is to apply some algorithms of data mining to economic problems and integrate them with economic theories. It includes applying random forest and principal component analysis in statistics to a group of bank data. Through comparison, it is found that the performance of random forest is better than other algorithms in dealing with this problem; and using principal component analysis to find out the most relevant factor of loan default, and STP analysis on this factor, so as to achieve the purpose of reducing default events.

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