

ARTICLE

Text mining algorithm of value orientation of civil and commercial law, regulations, and reimbursement based on emotional dictionary

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ABSTRACT

Aiming at the low accuracy of the traditional value oriented text mining algorithm of civil and commercial law, a value oriented text mining algorithm of civil and commercial law based on emotional dictionary is designed. Through the civil and commercial law value orientation text word segmentation, eliminate the redundant values in the text. Select the text features of the value orientation of civil and commercial law, and use the one hot method to represent the text vector. Calculate pad and emotional intensity, construct civil and commercial law value orientation text, and mine emotional dictionary. The confusion matrix is established to realize the text mining of the value orientation of civil and commercial law. The experimental results show that the accuracy of the designed algorithm for value oriented text mining of civil and commercial law is significantly higher than that of the traditional algorithm, which can solve the problem of low accuracy of the traditional value oriented text mining algorithm of civil and commercial law.

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Keywords: emotional dictionary; civil and commercial law; value orientation; text mining algorithm;

INTRODUCTION

Civil and commercial law refers to civil law and commercial law. As for the relationship between civil law and commercial law, there are two international styles: one is the integration of civil and commercial law, and the other is the separation of civil and commercial law. The so-called integration of civil and commercial law means that civil law includes commercial law. Civil law is the parent law of commercial law, guiding and commanding commercial law. Commercial law is a sub law or special law of civil law, such as Switzerland, Italy and other countries. The so-called separation of civil and commercial law means that civil law and commercial law belong to two coexisting independent departmental laws. Usually, commercial codes have been formulated in addition to civil codes, such as France, Germany and other countries. China has not

made clear what kind of style it belongs to, but according to China's current requirements and the development trend of modern civil law, China adopts the style of integration of civil and commercial affairs. Civil law and commercial law jointly adjust the relationship of commodity economy, both belong to private law, and they are closely related. All the principles used in commercial law are constantly absorbed by civil law. As we all know, civil law develops with the development of commodity economies. The property relationship adjusted by it mainly refers to the property ownership and circulation relationship. Personal relationship refers to personal non property relationship. The interests protected by civil law are personal interests, while commercial law is mainly the commodity trading rules formed with commercial trading habits, and the interests it protects are also personal interests. Civil law is the product of commodity economy. In ancient Rome, commodity exchange was very frequent.

People engaged in trading gradually need a common trading rule to maintain the trading order and ensure the circulation of goods. Thus, the habit of commodity exchange came into being. Then, custom develops into law. This is the origin of civil law. Since civil law takes the protection of transaction interests as the main content, it must meet the requirements of commodity exchange. That is, the independence of personality, the ability to engage in transactions at their own will, the certainty of ownership and the freedom to establish contracts. Civil and commercial law is directly related to people's daily production and living standards. Once people form a certain conflict with each other and vicious competition between industries and shops, they can be properly dredged with the help of civil and commercial law. However, through the actual investigation, it is found that there are obvious signs of changes in the value orientation of China's civil and commercial law in the recent stage. In order to ensure that the supporting service effect of this part of law can be better played in the actual work in the future, guide the public to pay deep attention to and make rational use of civil and commercial law, and choose to clarify the control mode of the value orientation of civil and commercial law in a timely manner under the modern social market economy. It can be seen that the text mining for the value orientation of civil and commercial law is of practical significance. Therefore, the value orientation text mining algorithm of civil and commercial law should be born. In the research of traditional civil and commercial law value orientation text mining algorithm, due to the low information understanding ability of civil and commercial law value orientation, the accuracy of text mining is low.

An emotion dictionary is one of the important methods of emotion mining in language text. This method refers to the process of constructing emotion dictionary according to prior knowledge, extracting emotion words and calculating text emotion tendency based on the constructed dictionary. Based on this, this study excavates the corpus of civil and commercial law value orientation texts (> 700000) based on the emotional dictionary. The purpose is to evaluate the feasibility of emotional dictionary in text mining according to the value orientation of civil and commercial law. Secondly, it is expected to explore the differences of emotional expression of different types of civil and commercial law value orientation through various detailed emotional indicators and combined with the characteristics of multiple dimensions of writing individuals (such as psychological, emotional and other processes), in order to provide clues and theoretical support for seeking a breakthrough in the

analysis of civil and commercial law value orientation.

Affective dictionary

Each item in the emotion dictionary is a < word, weight > duality, in which the weight represents the emotional tendency of the word, which is called "emotional weight". The value range of emotion weight is [-1,+1]. A negative value indicates that the word has been cancelled. On the contrary, the word has a positive preference. A value close to zero indicates that the word is neutral emotional orientation [1]. The closer the weight of emotion is to -1, the stronger the negative emotion is. Similarly, the closer the weight is to +1, the more significant their positive emotional tendency is. The final classification effect of emotion mining based on emotion dictionary depends on the perfection of emotion dictionary and the quality of emotion dictionary. At the same time, we also need to select and construct an appropriate emotion dictionary according to the type of target text. The advantages of the emotional dictionary are very obvious; The processing efficiency of text is high, and there is no need for manual intervention in the early stage and processing process. At present, the commonly used emotion dictionaries in the field of emotion mining mainly include AFINN, NRC and Bing. The three emotion dictionaries are based on a single word, and the dictionary itself will assign emotion values or count positive / negative emotions and emotional entries such as happiness, anger and discomfort. The current version of AFINN (AFINN-en-165. txt) contains more than 3300 emotional terms. Each entry is marked with an emotion score between -5 and 5. A negative value indicates negative emotion and a positive value indicates positive emotion. The current version of NRC dictionary is 0.92, which contains more than 14000 emotional terms. Words are divided into 10 categories: positive, negative, angel, anti patient, distinct, fear, joy, safety, risk and trust in binary (yes or no) [2]. Bing Dictionary (about 6800 emotional entries) divides words into positive and negative emotional scores in binary mode. At present, most of the general emotional dictionaries are constructed manually. The manual construction method is mainly to manually summarize the words with emotional tendency by reading a large number of relevant corpus or with the help of existing dictionaries, and mark their emotional polarity or intensity to form a dictionary. However, this method costs a lot. Table 1 summarizes the common general affective dictionaries in Chinese and English.

Table 1. Introduction to common general affective dictionaries

Language	Dictionary name	Explain
English	SentiWordNet	The most famous emotion dictionary in English, which is based on WordNet and gives positive, negative and objective emotion scores for each synonym set in WordNet
Chinese	General Inquirer	General inquirer is considered to be the earliest emotion thesaurus and computer emotion analysis program. Its emotion words come from Harvard Dictionary (4th Edition) and Raswell dictionary, which classify the words according to the positive and negative of emotion
	Opinion Lexicon	An English emotional dictionary released by Bing Liu contains not only emotional words, but also spelling errors, grammatical deformation, slang and social media markers
	HowNet emotional dictionary	Dong Zhendong and Dong Qiang established a common sense knowledge base, which takes the concepts represented by Chinese and English words as the description object and reveals the relationship between concepts and the attributes of concepts as the basic content, including the word set for emotion analysis
	DUTIR emotional vocabulary ontology	A Chinese ontology resource sorted and labeled by the information retrieval research office of Dalian University of Technology. The resource describes a Chinese word or phrase from different angles, including word part of speech type, emotion category, emotion intensity and polarity
	NTUSD	Chinese affective polarity dictionary from the natural language processing laboratory of Taiwan University

As shown in Table 1, the manual construction of emotional dictionary started earlier in foreign countries. One of the more famous is SentiWordNet¹. According to WordNet², it combines words with the same interpretation and gives the corresponding positive score and negative score. Users can not only accurately locate the emotional score, but also use the positive and negative average score of a word to represent the emotional score of the word. General Inquirer (GI)³ is considered to be the earliest emotional thesaurus. The early stage contains 1915 commendatory words and 2291 derogatory words. It also puts different labels on each word according to the attributes of emotional polarity, intensity and part of speech, which is convenient for flexible application in emotional analysis. An emotional dictionary provided by Hu et al. Opinion Lexicon⁴ is also widely used in the industry. The dictionary contains many words, including 2006 commendatory words and 4783 derogatory words.

Text mining algorithm of value orientation of civil and commercial

law based on emotional dictionary

In the design of civil and commercial law value orientation text mining algorithm based on emotional dictionary, text content interpretation is an indispensable part of civil and commercial law value orientation text mining. The emotion in the text has subjective consciousness and different levels of classification. The first is the emotional analysis at the lexical level and at the sentence level. Finally, the emotional analysis at the text level can build a scientific emotional dictionary^[3-4]. The working principle of the civil and commercial law value orientation text mining algorithm based on emotional dictionary is shown in Figure 1.

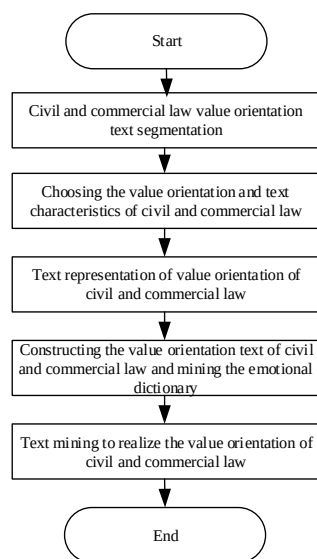


Figure 1 Process of civil and commercial law value orientation text mining algorithm based on emotional dictionary

As shown in Figure 1, the key steps in the process are described in detail below.

2.1 Civil and commercial law value orientation text segmentation

On the premise of clarifying the basic content of the value orientation text of civil and commercial law, it is necessary to adopt the preprocessing method of the value orientation text of civil and commercial law, so as to lay a foundation for extracting the key information in the value orientation text of civil and commercial law. The purpose of text preprocessing is to delete html links, css tags, useless punctuation marks, stop words and other noisy information that is useless for text mining, so as to leave text content that is helpful for text mining. Word segmentation is an important step in text mining. Its purpose is to segment a complete text into meaningful words [5-6]. In this process, because the text of civil and commercial law is Chinese, only words, sentences and paragraphs can be distinguished by punctuation. However, there is no obvious identifier between words, so word segmentation needs to be carried out through dictionary, statistics, labeling, artificial intelligence and other methods. SnowNLP word segmentation has the greatest advantage of simple operation, but many functions are not perfect, and the preprocessing effect is general [7-8]. Stop words refer to heartless words that have no actual meaning. These words do not play a great role in text mining. Part of speech tagging

refers to judging the most appropriate part of speech of each word in a sentence and the network relationship between words. There may be countless connections between any two words [9-10]. If the expression for calculating candidate words in this process is $SO(w)$, there is formula (1):

$$SO(w) = \frac{d(t, w^-) - d(t, w^+)}{d(w^+, w^-)} \quad (1)$$

In formula (1), $d(t, w)$ refers to the minimum number of times required for the word t of unknown polarity to iterate to the word w of known polarity

through synonyms; w^+, w^- respectively represent commendatory and derogatory words in the value orientation text of civil and commercial law. The idea of calculating the number of iterations is similar to the point mutual information introduced below, which can measure the similarity between two words. The difference is that point by point mutual information is based on corpus statistics to calculate the co-occurrence information between two words as a similarity measure. So as to realize the value orientation of civil and commercial law and text word segmentation.

2.2 Choosing the value orientation and text characteristics of civil and commercial law

The words processed by word segmentation together form the original feature set of the value oriented text of civil and commercial law. In text mining, it is necessary to remove irrelevant features. Then form a new low dimensional space, which can well represent the emotional tendency of the civil and commercial law value orientation text. If more features are selected, the dimension of the generated feature space vector will become very high, resulting in sparse text representation vector of civil and commercial law value orientation and sharp increase in calculation scale, which will affect the accuracy of mining [11-12]. One of the current improvement methods is to reduce the feature dimension. The method to reduce the feature dimension is mainly feature selection. Its purpose is to retain the features that can well express the text information in the high-latitude feature vector and delete the redundant features that are not strong for the text content [13]. On this basis, assuming that there is a certain interval between different redundant features, the feature weight iteration can

take the current situation of civil and commercial law value orientation text classification as the goal, and take the specific surface with invalid information as the maximum distance of civil and commercial law value orientation text recognition. Determine the text interval of civil and commercial law value orientation with redundant characteristics, and the expression is shown in formula (2).

$$\theta = \frac{1}{2} (\|x - L\| - \|x - w\|) \quad (2)$$

In formula (2): x represents the nearest similar redundant feature point of civil and commercial law value orientation text data; L represents the same kind of redundant feature points that are not of the same type as x . According to formula (2), specific redundant points are obtained for the civil and commercial law value orientation text data. This process is expressed as: $m \times n$ is expressed as a multi-dimensional matrix. Assuming that there are n redundant features in the civil and commercial law value orientation text data, the defined n value is stored in the database. At the same time, the i redundant feature sample in the image to be trained is placed in column N of civil and commercial law value orientation text data. Assuming that the initial feature weight of each row or column of civil and commercial law value orientation text data is expressed as 0, that is, $W_j = 0$, the data set of redundant feature samples can be expressed as $j=1;2;3;\dots;N$.

At the same time, assuming that the total number of training samples in the civil and commercial law value orientation text data with redundant characteristics is expressed as n , the value of i needs to be assigned repeatedly between 1 and n . at this time, the calculation of iterative weight can be expressed by formula (3).

$$w_j^{i+1} = \theta - \frac{(S, x_i, E(x_i))}{n} + \frac{(Y, x_i, L(x_i))}{n} \quad (3)$$

In formula (3): w_j^i represents the initialization weight of civil and commercial law value orientation text data; S and Y are respectively expressed as redundant samples of the same kind and x_i different kind in the process of sampling the text data of the value orientation of civil and commercial law; $E(x_i)$ is the

coordinate point closest to x_i ; $L(x_i)$ is the nearest coordinate point belonging to a different class from x_i . According to the above calculation formula, in the deletion of civil and commercial law value orientation text data with redundant features, the redundant feature samples are expressed in the form of similar data and non-similar data respectively. Therefore, it can be considered that the redundant feature similarity between feature data sets with large weight is high. On the contrary, the similarity are small. Based on this, the redundant feature of civil and commercial law value orientation text is deleted and the effective civil and commercial law value orientation text feature is selected.

2.3 Constructing the value orientation text of civil and commercial law and mining the emotional dictionary

Based on the above selected text features of civil and commercial law value orientation, text representation refers to converting the content of text representation into digital feature vector that can be calculated by computer. In the process of text mining, the most important thing is to convert the words in the text into numerical vectors for computer processing [14-15]. In this paper, the one hot method is used to represent the text vector. The main content is to sort all the words in the text into an ordered thesaurus, and then establish another numerical vector, and it must be ensured that the vector has the same dimension as the length of the ordered thesaurus [16-17]. In the process of constructing the emotional dictionary of civil and commercial law value orientation text mining, the lexical level is the basis and premise of analysis. It mainly refers to extracting the evaluation words in the sentence, studying the emotion expressed by the vocabulary itself, classifying its emotional tendency, and then judging the emotion of the text by manually labeling the emotional dictionary and corpus. Although the emotion analysis is carried out by labeling words and expressions with artificial methods, the accuracy of emotion classification is high, so the research method of establishing emotion dictionary is a more common word emotion analysis method. Sentence level emotional analysis is to judge the emotional level of a sentence through the emotional level of feature words [18]. By analyzing the logical combination between feature words and feature words, we can judge the emotional tendency of this sentence. Analyzing the composition and structure of emotional words and subjective words in

sentences is a common method to judge subjective texts. Text level affective analysis refers to the overall affective tendency of the whole text. In the process of its analysis, we need to combine the logical relationship between contexts, read the full text through, and cannot judge the overall emotional tendency of the text only by relying on part of the text.

This paper uses crawler tools to actively obtain the text data of civil and commercial law value orientation from different Internet application platforms. Text preprocessing is to delete html links, css tags, useless

punctuation marks and other operations in the data set, and only retain the content useful for emotion analysis in the text. In addition to the text preprocessing operation, emotion analysis based on emotion dictionary also includes matching emotion words from emotion dictionary, judging the emotional polarity of words by point mutual information method, and then judging the emotional level of sentences and chapters. Its working principle is shown in Figure 2.

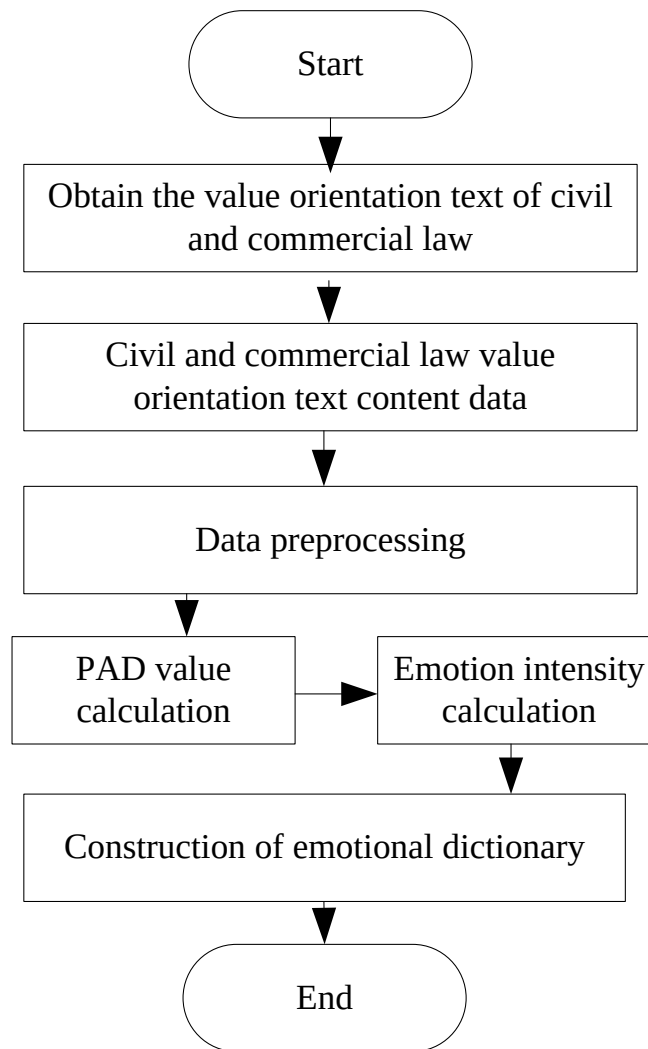


Figure 2 Working principle

In Figure 2, if the PAD value calculation expression is ρ^i , formula (4) can be obtained.

$$\rho_i = \begin{cases} m.t & \max(e^*) \\ s.t1 & \max E(V) \\ s.t2 & \max E(\gamma) \\ s.t3 & j_i(v) > \{[(1-\theta_1)]\theta_2 - r\} / \partial \end{cases} \quad (4)$$

In formula (4), E refers to the parameter matrix from the input layer to the hidden layer; γ refers to the self-cyclic parameter matrix from hidden layer to hidden layer; θ_1 refers to the bias parameter matrix; θ_2 refers to sigmoid function; ϕ refers to the loss value. Through formula (4), the maximum value of ρ_i

is the optimal solution. If the calculation expression of emotional intensity is D , there is formula (5).

$$D = \frac{w}{d} \quad (5)$$

In formula (5), w refers to positive emotion intensity; d refers to the intensity of negative emotions. Through formula (5), the emotional dictionary of civil and commercial law value orientation text mining is obtained, as shown in Table 2.

Table 2. Emotional Dictionary of civil and commercial law, regulation also reimbursement value orientationtext mining

Number	Classification	Word examples
1	Marriage	Marriage law, marriage and family relations, marriage and family system, basic principles of marriage law, effectiveness of marriage law, freedom of marriage, monogamy, equality between men and women, and the inferiority of men over women
2	Protection of women, children and the elderly	Legitimate rights and interests, abandonment, abuse, family planning
3	Civil subject	The significance, nature, basic content, qualification, type, capacity for civil rights and capacity for civil conduct of the civil subject system
4	Citizen	The name, residence, registered residence, natural person, adult, minor, fetus, personality, birth, death, mental patient, full civil capacity, limited civil capacity and no civil capacity.
5	Civil legal acts and agency	Characteristics of legal act, establishment elements, effective elements, effective elements, property legal act, error, misinformation, fraud, coercion, express, false statement, implication and presumption
6	Condition	Delay condition, release condition, positive condition and negative condition

Combined with table 2, it is the emotional dictionary constructed in this civil and commercial law value orientation text mining.

2.4 Text mining to realize the value orientation of civil and commercial law

On the basis of constructing the emotional Dictionary

of civil and commercial law value orientation text mining, accuracy analysis is needed to ensure the accuracy of text mining. Emotion analysis evaluation index refers to the evaluation value standard to measure the quality of emotion classification, mainly including precision, recall and F1 value. There are four marks in the confusion matrix of civil and commercial law value orientation text mining, as shown in Table 3:

Table 3. Four kinds of marks in the confusion matrix

Forecast (column) / label (row)	Positive sample	Negative sample
Positive sample	TP	FN
Negative sample	FP	TN

In Table 3, TP refers to the number of positive samples predicted as positive samples; FN refers to the number of positive samples predicted as negative samples; FP refers to the number of negative samples predicted as positive samples; TN refers to the number of negative samples predicted as negative samples [19-20]. Accuracy refers to the proportion of TP in (TP+FP), which is calculated by formula (6):

$$precision = \frac{TP}{FP + TP} \quad (6)$$

Recall rate refers to the ratio of (TP) to (TP + FN), and its calculation formula is (7):

$$recall = \frac{TP}{TP + FN} \quad (7)$$

F1 is the value used to measure precision and recall. It is the harmonic mean of the two values. Formula (8) is as follows:

$$F1 = \frac{2TP}{2TP + FP + FN} \quad (8)$$

Through calculation, the text mining results of value orientation of civil and commercial law based on emotional dictionary are obtained.

3 Experiment

3.1 Experimental preparation

Design the experiment. The text information of the value orientation of civil and commercial law selected this time is shown in Table 4.

Table 4. Four kinds of marks in the confusion matrix

Number	Source	Data volume
1	MySQL	5423
2	old_db	2879
3	new_db	1689

As shown in Table 4, this experiment compares the traditional civil and commercial law value oriented text mining algorithm with the text mining algorithm designed based on emotional dictionary, and compares the mining accuracy of the two algorithms. During the experiment, the server mainly converts the experimental data information, and the control terminal mainly controls the experimental process.

3.2 Experimental results and analysis

For the verification part of the empirical analysis results, this paper mainly considers the accuracy. The higher the accuracy, the better the performance of the algorithm. Next, python software is used to test the performance of the algorithm, as shown in Figure 3.

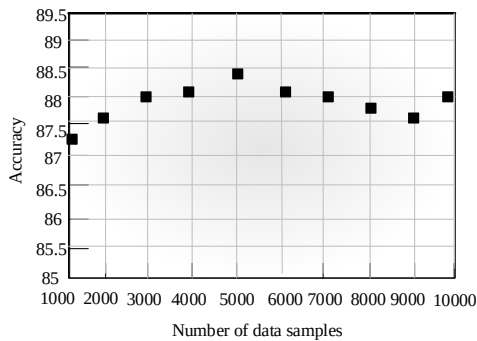


Figure 3 Accuracy test results of the algorithm designed in this paper

As shown in Figure 3, in the test process, the highest accuracy of the algorithm designed in this paper can reach 88.45%. The accuracy test results of traditional algorithms are shown in Figure 4.

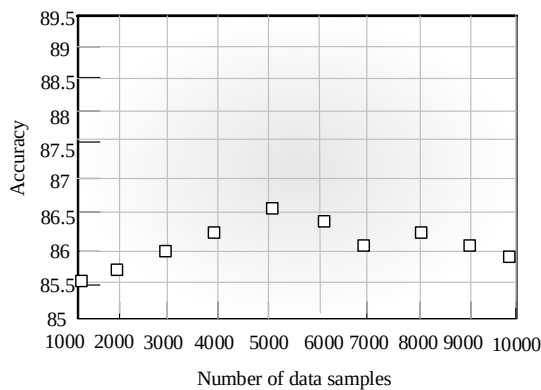


Figure 4 Accuracy test results of traditional algorithms

Through the comparison between Figure 3 and Figure 4, it can be seen that the accuracy of text mining for the value orientation of civil and commercial law designed in this paper is significantly higher than that of traditional algorithms, and has practical application value.

Conclusion

This paper designs a value oriented text mining algorithm of civil and commercial law based on emotional dictionary, which improves the accuracy of text mining. Nowadays, with the rapid development of China's socialist market economy, the value orientation of civil and commercial law is also on the trend of continuous fluctuation. During this period, we should not only pay attention to the different

characteristics of the value orientation of civil law and commercial law, but also try our best to cater to the details of changes in different stages of society and further improve the relevant contents of civil and commercial law. Only in this way can we ensure that the civil and commercial law really escort the implementation of the socialist market economic system and further assist the relevant business entities to win more economic and social benefits

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