Development Mode of Internet Economy Based on Artificial Intelligence Technology

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Abstract. Based on the background of artificial intelligence technology, there are different situations in the mutual development of the Internet economy and artificial intelligence technology, which has a relatively large impact on the healthy development of my country's Internet economy. Whether it is Internet economy or artificial intelligence technology, their ultimate development goal is to achieve the rapid development of our country's economy. This article will conduct an in-depth analysis of the role of artificial intelligence technology in the development of the Internet economy and study its huge commercial value in the development of the Internet economy. This article first analyzes the relevant concepts and characteristics of artificial intelligence technology in the development of the Internet economy, briefly describes the analysis of the development of my country's network market economy, and compares the development of artificial intelligence technology in the market Internet economy with the traditional substantive economic development model. Subsequently, it demonstrated the necessity and feasibility of implementing artificial intelligence technology for the development of the Internet economy, and conducted investigations and studies on the way that 10 Internet companies in the east coast of China used artificial intelligence technology to improve economic development. Finally, it puts forward a targeted strategy for accelerating the improvement of Internet companies in the network economy market and future development goals. The experimental research results show that the application of the Internet and artificial intelligence technology has brought us great convenience, and at the same time promoted the growth of our country's economy, and created huge economic benefits for our country.

Keywords: Artificial Intelligence Technology, Internet Economy, Economic Development, Classification Algorithm

1. Introduction
The Internet economy is a new economic phenomenon driven by the era of artificial intelligence [1]. Its current business types mainly include Internet finance, e-commerce, instant messaging, online games, search engines, etc. The network is the prerequisite for the development of the Internet economy [2]. Whether it is production, distribution, consumption, or estimation, decision-making, transaction, etc., it is inseparable from the support of the network. From many perspectives, the Internet economy has five characteristics: low cost, high efficiency, extensive, rapid development, and high risk. In the context of the progress of the network economy, artificial intelligence technology has gradually appeared in front of people [3]. The so-called artificial intelligence technology refers to the collection, integration, processing and management of these data without the use of mainstream software tools and fixed time, so that the classified data can help companies make correct decisions.

The field of Internet economy based on artificial intelligence basically belongs to the field of pure data. Both network user information and transaction information exist in the form of data [4]. The complex data processing capabilities and precise machine learning capabilities of artificial intelligence can accurately calculate, analyze and learn from the massive data in the Internet economy. From the perspective of network users, if appropriate evaluation rules and decision-making systems are established in advance, artificial intelligence technology can be used as an online intelligent financial advisor [5]. According to the rapid calculation and analysis capabilities of artificial intelligence technology, an appropriate economic plan can be provided for the results and the user's personal investment history, and the risk can be calculated for the user's reference. From the perspective of artificial intelligence platforms, neural networks can accurately judge economic conditions and market trends based on massive and complex big data, and perform early warning analysis of systemic Internet economy or Internet risks [6].

Artificial intelligence technology can reduce transaction costs. In the Internet economy era, artificial intelligence technology is the most widely used technology in online trading platforms [7]. Both buyers and sellers can meet their own needs through artificial intelligence technology, and can use the intelligent analysis functions provided by the platform through the Internet trading platform to find the goods they want to buy without leaving home, thereby greatly reducing the cost of purchase. On the Internet trading platform, sellers can also locate and mine customer artificial intelligence technology in the following ways [8]. On the Internet trading platform, the seller’s operating costs are much lower than those of physical stores. Both buyers and sellers can complete the transaction more conveniently and quickly than before [9]. Artificial intelligence technology can improve transaction efficiency. In today's Internet age, time and space limit more and more transactions between people [10].

2. Algorithm Establishment and Analysis

2.1. The Application of Artificial Intelligence Algorithms in the Intelligent Internet Economic Development Model

Logistic regression model is one of the classic methods to solve artificial intelligence, which can be analyzed from multiple angles. In the logistic regression model, the conditional probability distribution \( P(Y | x) \) indicates that the value range of the random variable \( x \) is a real number, then the binomial logistic regression model is:

\[
P(Y = 1 | x) = \frac{\exp(W \cdot x)}{1 + \exp(W \cdot x)}
\]

The parameters of the model are estimated below. Suppose there are \( N \) samples, and each sample \( f \) is composed of independent variable \( x_i \) and corresponding dependent variable \( Y_i \). When \( Y_i=1 \), it means a positive sample, and when \( Y_i=0 \), it means a negative sample. Assume that \( y \) are independent and obey Bernoulli distribution, namely:
\[ P(Y = 1|x) = \pi(x) \]
\[ P(Y = 0|x) = 1 - \pi(x) \] (2)

Then the likelihood function is:
\[ \prod_{i=1}^{N} [\pi(x_i)]^{y_i} [1 - \pi(x_i)]^{1-y_i} \] (3)

Substituting the above formula into the likelihood function, the likelihood function formula can be obtained as:
\[
L(W) = \sum_{i=1}^{N} \left[ y_i \log \pi(x_i) + (1 - y_i) \log(1 - \pi(x_i)) \right]
\]
\[
= \sum_{i=1}^{N} \left[ y_i \log \frac{\pi(x_i)}{1 - \pi(x_i)} + \log(1 - \pi(x_i)) \right]
\]
\[
= \sum_{i=1}^{N} [y_i (W \cdot x_i) - \log(1 + \exp(W \cdot x_i))] \] (4)

Using the maximum likelihood estimation method to find the extreme value of the above formula, the estimated value of \( W \) can be solved. Therefore, this problem becomes an optimization problem with \( L(W) \) as the objective function, which is usually solved by the gradient descent method and the quasi-Newton method.

2.2. Design of Classification Performance Evaluation Algorithm Module

For the performance evaluation test of the text classification system, the internationally used evaluation indicators include recall rate, precision and F1 evaluation value. Among them, the overall performance of the system is calculated using the values of micro-average and macro-average. The macro-average is to evaluate each class and then average. The weight of each class in the macro-average is the same. The micro-average value is calculated by taking all documents together, and each document has the same weight. The formula is as follows:

Recall rate:
\[ R = \frac{a}{a+c} \] (5)

Precision rate:
\[ P = \frac{a}{a+b} \] (6)

Micro average recall rate:
\[ \text{microp} = \frac{\sum_{i=1}^{n} a_i}{\sum_{i=1}^{n} a_i + \sum_{i=1}^{n} c_i} \] (7)

F1 evaluation value:
\[ F_1 = \frac{2R \times P}{R + P} \] (8)

Macro average F1:
\[ \text{microp} = \frac{1}{m} \sum_{i=1}^{m} F_1 \] (9)

Micro-average F1:
\[ \text{micro}_{F_1} = \frac{2 \times \text{microp} \times \text{micror}}{\text{microp} + \text{micror}} \] (10)
2.3. Integrated Classification Algorithm

The training data set is obtained by sampling with replacement of the weights, and the new classifier is obtained using the obtained training data set as follows:

\[ h_{m+1} = create\_new\_learner(D_k^{m+1}) \]  

(11)

Calculate the weighted error rate of the sample set of the new weak classifier on Dk:

\[ e_{m+1} = \frac{1}{|D_k|} \sum_{i=1}^{|D_k|} |w_i|^m [h_{m+1}(x_i) \neq y_i] \]  

(12)

Finally, the prediction result of the weak classifier is integrated as the integrated prediction result by weighted voting. The calculation formula is as follows:

\[ E(x) = \arg\max_{y \in Y} \sum_{t=1}^{\text{size}(E)} \left( \ln \frac{1}{\hat{p}_t} \right) [h_t(x) = y] \]  

(13)

3. Intelligent Economic Classification Model and Experimental Research Design

3.1. The Establishment of A Statistical Classification Model for the Intelligent Economy

Intelligent economic statistical classification models are mainly divided into two categories: statistical classification models and deep classification models. Statistical classification models are more common in GEC research before the recovery of deep learning. The models involved include average perceptron, naive Bayes classifier, Language model based on N-gram, etc. The perceptron is a linear classification model. Its working principle is that for a certain input feature vector, it is divided into two categories (+1 or -1) by a linear discriminant function. Specifically, the linear discriminant function has the following mathematics Form of expression:

\[ f(x) = \text{sign} \left( \sum_{i} w_i x_i + b \right) \]  

(14)

Where sign is a symbolic function:

\[ \text{sign}(x) = \begin{cases} 
+1 & x > 0 \\
-1 & x \leq 0 
\end{cases} \]

\[ L(w, b) = - \sum_{x \in X} y(x) (w x + b) \]

\[ L = \frac{1}{T} \sum_{t=1}^{T} \sum_{x \in X} \log p(w_{t+j} | w_t) \]

\[ p(w_0|w_L) = \prod_{j=1}^{L-1} \alpha \left( [\ln(w_j + 1)] \right) = ch(n(w,j)) * v_{n(w,j)}^{T} \]  

(15)

Construct a data loss function model based on the squared difference as follows:

\[ L = \sum_{i} f(x_{ij}) (w^T w_j + b_i + b_j - \log(x_{ij})^2) \]

\[ f(x) = \begin{cases} 
(x/x_{\max})^a & x < x_{\max} \\
\text{otherwise} & \text{otherwise}
\end{cases} \]  

(16)

The text automatic classification model studied in this paper is based on RBF neural network, and is constructed using the neural network toolbox and database toolbox under the Matlab platform. At the level of principle and function, the task of intelligent and automatic classification of the text information of the digital library proposed by the Hebei University of Economics and Trade Library has been completed. The core problem of RBFNN design is to determine the number of hidden nodes...
and the corresponding center vector, so as to design a neural network to make the output target error as small as possible.

3.2. Experimental Research Design
This article uses a questionnaire survey method. Combine the development of the Internet economy and the current research situation to carry out purposeful and planned data collection; through questionnaire surveys and on-site interviews, have a comprehensive and systematic understanding of the Internet economic construction model and related issues under artificial intelligence technology. The data collected in the survey are analyzed, compared and summarized. At the same time, for the specific research purposes of the Internet economic development strategy under artificial intelligence technology, we can directly observe the individuals, companies, and industry organizations participating in the research through the senses, so as to obtain the first-hand information needed and use case analysis for them law. Since the specific targets of Internet-based enterprises are relatively clear, it is convenient to conduct individual surveys, group surveys, and problem surveys.

Through the "e-commerce economy", a major economy in the development of the Internet economy, this thesis mainly relies on the "point-to-surface" thinking for research ideas, and uses the research method of first asking questions and then solving problems to develop the writing of the paper. This thesis takes the current innovative methods of the development of the intelligent Internet economy as the main line, and uses the system operation guarantee mechanism as an auxiliary method. Network protection and early warning measures.

4. Evaluation Results and Research

4.1. Analysis of Experimental Research Findings

| Table 1. 2015-2019 Internet economic market entities and total capital statistics |
|---------------------------------|--------|---------|---------|---------|---------|
| project                        | unit   | 2016    | 2017    | 2018    | 2019    |
| enterprise                     |        |         |         |         |         |
| Number of households           | Household | 8321    | 8765    | 9124    | 9631    |
| Registered capital             | Ten thousand yuan | 3551748 | 5453245 | 8726242 | 9826263 |
| Self-employed                  |        |         |         |         |         |
| Number of households           | Household | 15539  | 18769   | 24332   | 27985   |
| Amount of funds                | Ten thousand yuan | 97554   | 112592  | 156980  | 203157  |
| Farmer                         |        |         |         |         |         |
| Number of households           | Household | 832   | 855     | 931     | 1024    |
| Total investment               | Ten thousand yuan | 15467  | 18698   | 20138   | 22379   |

From Table 1, the 2015-2019 Internet market entities and the total capital statistics table shows that due to the rapid development of artificial intelligence technology in 2015, whether it is from Internet companies, individual industrial and commercial households, and rural households, the number of households and assets have increased substantially. By 2019, the number of enterprises will increase to 9,631, and the registered capital will be as high as 98,262.63 million yuan. However, the introduction of artificial intelligence technology has also contributed to the increase in total investment by farmers. It can be found that artificial intelligence technology and big data technology can clearly demonstrate their own development efficiency for the development of the Internet economy.
As shown in Figure 1, from the perspective of age, the random survey results reflect that Internet economy practitioners are mainly young people. The survey shows that the proportion of young people under 27-30 years old is high, and the proportion of young people between 31 and 35 years old reaches 97.5%. From the perspective of academic qualifications, the random survey results show that the current Internet economy is mainly derived from the development of electronic morning, and the e-commerce practitioners in the survey sample generally have a bachelor degree or below, of which 13% have a master’s degree or above. Bachelor degree accounted for 45%, college degree accounted for 39%, and the main college background, master's degree or above, accounted for only about 16%. The education level of practitioners shows the typical "anti-dumbbell feature" is convergent, but there are also the discrepancy reflects that the educated level of working in electronic morning and other Internet economic industries is generally higher than the national level. The main reasons are: first, the surveyed group is mainly the management of e-commerce companies, accounting for 60%; second, the development of e-commerce it is getting bigger and bigger, and the economic development of e-commerce at this stage is mainly engaged in young people with knowledge, and there is still a lot of room for development.

4.2. The Market Scale of the Economic Development of Internet Companies Based On Artificial Intelligence Technology

Figure 2. The market scale of the economic development of Internet companies with artificial intelligence technology from 2012 to 2020
From the above figure, we can see that before 2015, the scale of artificial intelligence was not large enough, and most companies were still very unfamiliar with big data. Less than 20% of the companies recognized big data and brought it in the benefits of the economic management of enterprises are far better than those under the previous manual situation. After 2015, the economic development market scale of enterprises has increased by about 40% compared with that before 2015. The results show that artificial intelligence has entered a rapid development stage after 2015. More and more Internet companies adopt artificial intelligence technology in their economy, and the convenience it brings to enterprises has better promoted its economy. development of.

5. Conclusion
In summary, the application of artificial intelligence technology in the Internet economy has far-reaching significance for its development. It can meet the needs of the times and promote the development of the overall economy. Therefore, people should continue to study the methods that can make full use of big data to maximize its effect, and at the same time, pay attention to avoiding hidden dangers in the Internet economy to promote the sustainable and stable development of the Internet. The Internet economy brings more convenience to human production and life. Based on the above research, when artificial intelligence was not very popular before, the development speed of the Internet economy increased at a rate of 4.8% per year. However, after 2015, the development of the Internet economy, e-commerce and artificial intelligence technology has generally driven the entire economy. Development, thereby increasing about 73.332% or more.

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