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Analysis of Garbage Classification and Processing Methods Based on Text Mining Technology

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ABSTRACT

This article focuses on the current situation of garbage classification and uses text mining technology to explore suggestions for the future development of garbage classification from the perspective of the public. Subsequently, sentiment analysis based online public opinion analysis is used for garbage classification. At the end of the article, based on the above analysis, we draw conclusions on the attention of online public opinion and public sentiment, and propose scientific suggestions for the development of garbage classification from three levels: government, community, and individuals, in order to promote public participation in garbage classification.

KEYWORDS

Garbage classification; Text mining; Analysis of emotional tendencies.

1. INTRODUCTION

Nowadays, with the continuous development of economy and technology, the world is facing a severe climate change situation, with frequent occurrence of extreme weather and meteorological disasters. Therefore, the United Nations has also recognized climate change as a "red warning" status. In September 2020, President Xi Jinping solemnly announced during the general debate of the 75th United Nations General Assembly that "China will increase its national independent contribution, adopt more powerful policies and measures, strive to peak carbon dioxide emissions before 2030, and strive to achieve carbon neutrality before 2060." This important announcement provides direction guidance and a grand blueprint for China's response to climate change and green and low-carbon development.

With the continuous development of human society, there has been a contradiction between the ecological environment and economic activities. Based on this, China proposes to build a "Five in One" path of socialism with Chinese characteristics from the perspective of human social civilization. Human society is advancing from industrial civilization to ecological civilization. Under the concept of industrial civilization, the characteristics of production and lifestyle are "mass production, mass consumption, and mass waste". However, in ecological civilization, it advocates rational production, moderate consumption, and resource recycling.

The total amount of household waste generated in China is continuously increasing, reaching about 215 million tons in 2017. Taking Beijing and Shanghai as examples, both cities produced over 9 million tons of household waste in 2017. Compared with 10 years ago, Shanghai's annual household waste production increased by 28%, while Beijing's growth rate was even more significant, reaching 49%. Taking the above data on average, in 2017, Shanghai produced 1.69 kilograms of waste per

person per day, while Beijing produced 1.86 kilograms. In China, garbage is mainly disposed of in a harmless manner through land filling and incineration. If wet waste (perishable kitchen waste) with high moisture content is directly incinerated with dry waste (other waste) without classification, the moisture will evaporate into water vapor in a high-temperature environment, which will lower the overall furnace temperature. The lowered temperature cannot effectively suppress the decomposition of dioxins at 850 degrees Celsius. In addition, during incineration treatment, recyclable materials such as paper and wood products can also generate dioxins under the catalytic action of metal ions. Exposure to environments containing dioxins may lead to serious consequences such as decreased immune function, loss of fertility, increased incidence of fetal and lactating infants.

The generation of garbage is due to people not making good use of resources and abandoning unused resources as garbage. The loss of these discarded resources to the entire ecosystem is incalculable. Before garbage disposal, by sorting and recycling garbage, it can be turned into treasure. For example, recycling paper can protect forests and reduce waste of forest resources; Recycling biological waste such as fruit peels and vegetables can be used as green fertilizers, making the land more fertile. China uses 4 billion plastic fast food boxes, 500-70 million instant noodle bowls, and billions of disposable chopsticks each year, accounting for 8-15% of household waste. And one ton of waste plastic can be recycled into 600 kilograms of diesel. Recycling 1500 tons of waste paper can prevent the logging of trees used to produce 1200 tons of paper... These successful cases remind us that the utilization of renewable resources is beneficial without any harm. By sorting garbage in advance, many recyclable resources can be reused and turn waste into treasure.

Innovation point of this article: Starting from the dual carbon goal, based on the current living situation and social environment, conducting in-depth analysis of garbage classification, emphasizing the combination with the real society. Using text mining technology to explore suggestions for the future development of garbage classification from the perspective of the public, conducting online public opinion analysis based on sentiment analysis, and proposing scientific suggestions for the development of garbage classification from three levels: government, community, and individuals, in order to promote the participation of the whole population in garbage classification, improve resource utilization, reduce pollution, and protect the environment.

2. LITERATURE REVIEW

In recent years, Chinese scholars have conducted extensive research on the issue of garbage classification and treatment.

Liu Mei(2011) believes that garbage classification can promote resource optimization, improve garbage treatment efficiency, and promote the development of sustainable and circular economy. Scholars such as Jia Yajuan and Zhao Minjuan(2019) believe that garbage classification can reduce tree loss, protect and maintain forest carbon pools. From different perspectives of scholars, the benefits of garbage classification in today's society outweigh the drawbacks. China is a populous country, resulting in an astonishing amount of garbage generated each year. However, the garbage treatment system in China is still not perfect, and the sorting process is still incomplete and lacks execution. Properly classifying garbage can improve the efficiency of the garbage sorting process.

With the continuous acceleration of urbanization, the production of domestic waste in various parts of the country continues to reach new highs and still shows an upward trend, putting enormous pressure on the end treatment of domestic waste in various regions. In addition, with the continuous improvement of living standards, citizens generally have a higher demand for the quality of the surrounding living environment, which prompts the government to build a more comprehensive urban solid waste management system. Scholar Jiang Xia (2023) emphasized in her paper that the classification and treatment of household waste is regarded as a key measure to solve environmental pollution caused by household waste and promote the resource utilization of household waste.

Although it has been developed in China for decades, it has not achieved good results. The reason for this is that the choice of policy tools and their implementation process are key factors. Scholars such as Yuan Xuhua(2023) found in their investigation of the problems in the classification and collection of household waste in universities that students' understanding of garbage classification and collection is mainly through school propaganda, television, and the internet, and their knowledge of garbage classification is relatively scattered and one-sided. Scholars such as Yuan Xiang(2023) argue that college students lack sufficient knowledge about proper littering, have low subjective initiative, and only passively accept existing conditions. In their published paper, scholars such as Feng Yuting(2023) indicate that most college students are familiar with garbage classification work and know that garbage classification and recycling have many beneficial effects on our living and production environment. However, when it comes to the classification of various types of garbage, people's concepts become very vague and their actions are not sufficient. This requires local government departments to increase publicity efforts, make reasonable use of online platforms, and establish a clear system of rewards and punishments.

3. EXPLORING GARBAGE CLASSIFICATION FROM THE PERSPECTIVE OF THE PUBLIC BASED ON TEXT MINING TECHNOLOGY

3.1. Data acquisition based on Python

In the complex context of the big data era, traditional manual methods such as questionnaire surveys and in-depth interviews are no longer able to cope with the dynamic acquisition and analysis of massive information on the internet. Therefore, text mining technology has emerged. By browsing multiple well-known websites, we found that the topic of "garbage classification" has always maintained a high level of popularity in the Weibo and Douban communities, and the quality of related posts and comments has been high, laying a solid foundation for our data mining work. Furthermore, after conducting a preliminary analysis of the information on these websites, we found that most users of the Weibo community grasp "garbage classification" from a macro policy perspective and express their opinions and opinions. On the other hand, the Douban community has very good approachability in daily social interactions, and many users participate in discussions based on their own living environment. This allows us to have a more comprehensive and in-depth understanding of "garbage classification" from the micro perspective of "garbage classification enthusiasts". Fully mining the data information from the above two platforms is conducive to achieving effective integration at the macro and micro levels, helping us understand "garbage classification" policies and public opinions from different perspectives, and providing practical reference for formulating research ideas and forming a scientific questionnaire framework. Based on the above conditions, we use Python software to conduct in-depth mining and analysis of posts and evaluations related to "garbage classification" on both platforms using methods such as data crawling, sentiment mining, and keyword extraction.

3.2. Using web crawlers to crawl data

As a supplement to traditional data acquisition methods, we use text mining to crawl "garbage classification" related posts from two platforms and obtain comments from netizens on "garbage classification". Firstly, we adopt the Python crawler method to crawl posts and Q&A from the two communities. We use third-party libraries such as selenium, urlib, re, Beautiful Soup, scrape, etc. to establish a crawler for posts and comments from the two platforms. Some of the code is as follows:

```
If_ Name_=='_ Main_ ':
    Start time="April 2020-21-0"
    Endtime="2023-4-21-0"
```

```
Book_ Name_ Xls="D: \ \ 17zuoye \ \ Weibo_ Spider \ \ weibo. xls "
Sheet_ Name_ Xls='Weibo data'
Maxweibo=20000
Keywords="refer classification"
Spider (starttime, endtime, bookname_xls, sheetname_xls, keywords, maxweibo)
```

We can identify the commonalities in "garbage classification" among pilot areas across the country from the crawled data, understand the general situation of "garbage classification" reform in various parts of the country, and have a preliminary understanding of the interests and demands of residents in the process of "garbage classification". We can also identify potential problems that may arise in the practice of "garbage classification".

In addition, based on sorting out the current reform situation in various pilot areas across the country, we can summarize and summarize the successful experiences shared by each pilot area, and identify the shortcomings that have emerged in the pilot process in various regions, thereby providing some guidance for the government and other relevant entities to take corresponding measures. Furthermore, the sorted data will be compared and analyzed with the data obtained from field research, in order to discover the advantages and disadvantages of Bengbu City in Anhui Province in the pilot process, and guide local practice towards a better direction.

3.3. Analyzing the support of netizens for "garbage classification" based on emotional tendencies

3.3.1. Understand the perception of netizens towards "garbage classification"

After obtaining data through Python crawlers, we organized and transformed the data to obtain txt format files, and then used jieba library, word cloud, scipy library, etc. to organize them into a word cloud. We found the following situation: most netizens pay more attention to garbage classification policies, they pay more attention to garbage classification reform, and timely follow up on relevant policies. However, we can also see that the majority of people have insufficient understanding of "garbage classification", and their understanding of "garbage classification" is still in the initial pilot stage, which poses significant obstacles to future progress.

3.3.2. Exploring the support of netizens for "garbage classification"

Before conducting sentiment analysis on comments from netizens, each comment is first broken down into a set of words, and further analysis and rating are conducted. The rating result is 0-1, with 0 being the most negative and 1 being the most positive. After using third-party libraries such as pickle, trpcssin, and numpy, the following results were obtained: up to 77.18% of netizens hold negative reviews of "garbage classification", more than three-quarters, while positive reviews only account for 22.82%. The comprehensive evaluation score of netizens on garbage classification is only 0.482, less than half. The code for the sentiment distribution part of the dataset is as follows:

```
Quantile=0.91
Print (list (sent_pentage_list))
For length, per in zip (sent length, sent pentage_list):
  If round (per, 2)==quantity:
    Index=length
    Break
Print ('\ n quantity dimension% of the presence length of s:% d.'% (quantity, index))
```

Plt. show()

Plt. close()

The partial codes in the LSTM model are as follows:

Def create_ LSTM (n-units, input_shape, output_dim, filepath):

x. Y, output_ Dictionary, vocab_ Size, label_ Size, reverse_ Word_ Dictionary=load_ Data (filepath)

Model=Sequential()

Model. add (Embedding (input_dim=vocab_size+1, output_dim = output_dim, input_length = input_shape, mask_zero=True))

Model. add (LSTM (n-units, input_shape=(x.shape [0], x.shape [1])))

Model. add (Dropout (0,2))

Model. add (Dense (label_size, activation='softmax '))

Model. compile (loss='categorical_crossentropy ', optimizer='adam', metrics=['accuracy '])

"Garbage classification" generally refers to a series of activities that classify, store, dispose, and transport garbage according to certain regulations or standards, in order to transform it into public resources, aiming to improve the utilization rate of garbage, enhance resource conversion rate, and protect the environment.

Our research suggests that "garbage classification" has not achieved the expected results of residents, and our research happens to prove our findings. Based on our research, the low satisfaction of residents with "garbage classification" is mainly due to the increased difficulty of garbage classification compared to the past, and the unreasonable government reward and punishment measures for garbage classification. The garbage classification policy was first piloted by Shanghai, but the reward and punishment measures for garbage classification were not reasonable. Blindly imposing fines caused resistance from residents, so some residents were not satisfied with "garbage classification".

In addition, the municipal government lacks sufficient publicity during the process of "garbage classification", and residents lack understanding and support for "garbage classification". This is an important factor that leads to a lack of sense of achievement among residents in the "garbage classification" reform. During the interview, Uncle Yang told us that although the municipal government is implementing garbage classification policies and setting up garbage classification bins in the city, he still has a partial understanding of the classification categories of garbage. Even under sufficient objective conditions, he still finds it difficult to support the implementation of garbage classification policies.

4. CONCLUSION

4.1. Internet public opinion attention

Based on the information gathered from our web crawlers and field research, we have found that the vast majority of people still have a good awareness of environmental protection. According to the word frequency chart obtained from crawling data, the term "environmental protection" has the highest frequency of occurrence in comments, and words such as "green", "society", and "civilization construction" also appear very frequently. This proves that the overall attitude of netizens towards garbage classification is showing a positive trend. Secondly, in the blog posts published by netizens, there are many original posts promoting garbage classification under the garbage classification entry, which indicates that netizens not only strongly support the garbage classification policy, but also

spontaneously participate in promoting the garbage classification policy. Overall, the garbage classification policy is showing a positive and upward trend. Butat present, the difficulty of garbage classification is relatively high for residents, who find it difficult to see garbage classification as their responsibility. Instead, it has the opposite effect, making garbage classification a burden for residents. Secondly, the generation of urban garbage permeates every aspect of life, and the daily production volume cannot be underestimated. The government's regulatory efforts are insufficient, which leads to very low efficiency in policy implementation. In addition, the premise of garbage classification is that residents have the awareness of caring for the environment and protecting their homes, which is a major test of their spiritual level.

4.2. Analysis of public emotions

Most netizens are more concerned about the garbage classification policy, and they pay more attention to the reform of garbage classification and timely follow up on relevant policies. However, we can also see that the majority of people have insufficient understanding of "garbage classification", and their understanding of "garbage classification" is still in the initial pilot stage, which poses significant obstacles to future progress. However, it is regrettable that as many as 77.18% of netizens hold negative reviews of "garbage sorting", more than three-quarters, while positive reviews only account for 22.82%. The comprehensive score of netizens on "garbage classification" is only 0.482, less than half. "Garbage classification" did not achieve the expected results of residents, and our research happened to prove our research. Based on our research, the low satisfaction of residents with "garbage classification" is mainly due to the increased difficulty of garbage classification compared to past garbage classification methods. At present, we can only hope that the public will gradually raise their awareness of environmental protection, and the country and government will gradually reduce the difficulty of garbage classification and disposal methods.

5. SUGGESTIONS

Based on the above analysis, we can conclude that promoting garbage classification policies requires multi-party collaboration. The government faces pressure from multiple parties and cannot achieve the expected results on its own. Therefore, promoting garbage classification requires cooperation from multiple parties. We should mobilize the whole society, and every city, community, and citizen should raise their awareness of environmental protection and recognize the close connection between the environment and personal life.In addition, the promotion and publicity of policies also require the support of communities and other enterprises to cultivate good habits of garbage classification among residents. With the improvement of people's spiritual level, garbage classification has become an inevitable trend.

5.1. Citizens should develop the habit of garbage classification

Garbage classification can effectively avoid environmental pollution caused by garbage and is more conducive to environmental protection. Therefore, the public should actively participate in garbage classification, abandon the bad habit of not classifying garbage, cultivate good habits of diligence, thrift, and thrift, make full use of resources, reduce waste, and consciously classify garbage. At the same time, they should play a demonstrative and leading role in the workplace, at home, and in the community, actively guide colleagues, parents, and citizens to participate in garbage classification and recycling, jointly create a good atmosphere where everyone is responsible and benefits, and cultivate the good character of diligence, thrift, and thrift, Spread civilization awareness, hygiene concepts, and green lifestyles to every corner, root them in everyone's psychology, and practice them in everyone's conscious actions.

5.2. Organize garbage classification related activities in the community and guide residents in garbage classification

As the first department in contact with residents, communities are the peripheral nerves and capillaries of a city. Therefore, communities should promote activities related to garbage classification. In order to better promote public participation in garbage classification, communities should actively carry out activities to allow residents to have closer contact and guide them to actively participate in garbage classification. Play a good role in publicity and supervision. Community is the most crucial step towards achieving universal participation in garbage classification

5.3. The government establishes and improves special systems

When formulating a special system for garbage classification, we should prioritize our own initiative and use limitations and constraints as auxiliary measures. Only when the system is well received by the people can it be more easily accepted by the public. At present, there is no completely unified classification standard for garbage classification, and the standards of cities that do a good job in garbage classification cannot be completely copied and implemented. Different garbage classification standards should be developed based on different cities.

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