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Research on Monitoring Technology of Public Opinion Applied in Sports

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Abstract: With the rapid development of Internet, on-line public opinion has increasing influence in modern society. The real-time and effective processing of on-line public opinion plays a more important role in maintaining the stability and promoting the progress of the state. In the present time, the monitoring technology of on-line public opinion is rapidly developing and applied to related domains while the application of this technology in sports is just at the beginning. This paper presents six application values by analyzing the characteristics of sports and using currently-available research foundation of public opinion, (1) Conducive to identifying and tracking of hot topics in sports, (2) Conducive to cutting and handling sports accidents for the departments concerned, (3) Conducive to monitoring and evaluating of sports' institutions and supervision by the public, (4) Conducive to optimizing public service in sports, (5) Conducive to collecting and analyzing sports intelligence and (6) Conducive to acquiring sports demand and improving the quality of sports goods and services. Lastly, this paper presents the research prospect of the monitoring technology applied to sports.

Key words: Public opinion of sports, monitoring of online public opinion, internet technology

INTRODUCTION

With the rapid development of Internet, the Internet information dissemination has become the "forth media" after newspaper, radio and television and plays an increasing important role in people's life. The 30th China Internet Development Statistics Report released by China Internet Network Information Center (CNNIC, 2012) in July 2012 shows that, by the end of June 2012 China's netizens reached 538 million, with an increase of 24.5 million compare to the end of 2011, Internet penetration rate rose to 39.9%. Microblog, as an emerging self-media platform, is very popular among netizens. Its user growth rapidly to 270 million made it the fastest growing Internet application. It also greatly promotes the dissemination online public opinion.

At present, the network coverage is getting more and more widely, expression of online news is more interactive, autonomy and diversity. In addition, because Internet dissemination has the characteristics of free, openness, concealment, divergent and permeability which cannot be achieved by traditional media, people are more willing to express their views through such channels. Recent years, major sports event happened at home and abroad, such as Tiger Woods sex scandal, the Chinese Football League reform, almost all initial triggered and became a heated topic on the internet. It has great impact on the party's credibility. Therefore, monitoring the online public opinion is a major issue faced by the administrators of the country and will have a profound impact on building a harmonious society.

ONLINE PUBLIC OPINION OVERVIEW

Online public opinion concept and characteristic: The definition of public opinion is relatively complex, because with the development of society, the meaning of public opinion is changing. Wang and Liu (2005), researchers in Institute of the Tianjin Academy of Social Sciences, believe that public opinion means the public's political attitude towards the governor in a certain social space, around intermediary social matters.

Later on, Liu (2007) expanded the concept on the basis, proposed that public opinion is the public composed of individuals and social groups, they are concerned with public affairs that are closely related with their own interests. In addition, public opinion and public voice is different in concept. Public opinion is the aggregation of variety emotions, wills and attitude which include public voice. Public voice emphasizes on "consensus", while public opinion emphasizes on "aggregation of different opinion".

Through the analysis of the concept of public opinion, we can come to the definition of online public opinion: the public opinion that uses the Internet as a medium. Zeng (2009a, b) gives a more complete definition: online public opinion is the aggregation of public knowledge, attitude, emotion and behavioral tendencies disseminate on the internet due to the stimulation of variety event. Online public opinion is from the reality, it just changes the dissemination channel to the Internet. With the rapid development of network technology and

the wide spread of personal computer, Internet becomes a more and more important place for people to exchange each other's opinions.

Compare to traditional public opinion, online public opinion has the following characteristics Zeng (2009a, b): First, the diversity of information sources, from online news, forums, blogs, microblogs, etc. Second, online public opinion contains large amount of information. The third is the directness of public opinion, people can express freely on the internet. The fourth is the burstiness of information, information spread through the Internet quickly. The fifth is the relevance of public opinion, public opinion caused by unexpected events are always interconnected. The sixth is the deviation of public opinion information, information publish online are usually anonymous, made it just a way of self-catharsis for some people, the opinion might be too self-ego or biased. The seventh is the two-side of online public opinion, on one hand it can form a good public management environment, but on the other hand it can disrupt the management, increase the instability of society.

Development of online public opinion and its application in the field of sports: With the increasing influence of online public opinion, people concern more about sensitive topics in politics, economy and culture, many countries are doing research on monitoring the online public information. To effectively monitoring and managing the online public opinion, first we need to mine the online public opinion accurately.

The Newsblaster developed by Columbia University students McKeown *et al.* (2002), it is used for news tracking. The system can cluster the important news occur every day and it can eliminate redundancy, information fusion and text generating for same topic document to generate a concise summary for documents. American TDT (Topic Detection and Tracking) research project (Yang *et al.*, 2009; Li and Yu, 2003) achieved the following 5 studies: the segmentation of continuous text (mainly for broadcast news), topic tracking, topic discovery, new event detection, correlated hot issue detection. In addition, British software company Coppola developed a semantic-based public opinion emotion analysis software in 2005 (Yan, 2007).

China's online public opinion research began in 2005 (Lu *et al.*, 2010). In recent years, the increasing demand for application and related technologies has boosted the online public opinion information mining greatly. Many scientific research institutes, universities and software companies are engaging in the research of systematic integration of technology. Typical achievements are:

Peking University founder technology institute launched Fangzheng Zhisi public opinion warning decision support system (Founder, 2005). It is based on natural language processing technology and data mining technology, using the information correlation analysis and sharing, experience knowledge sharing and machine automatic learning to analyze and predict public opinion events; Zhongke Click and TRS achieved the online public opinion monitoring technique's development and promotion. formed a preliminary scale in the market; in addition, the People's Daily established a public opinion monitoring lab in 2008, it is one of the earliest organization for public opinion monitoring and researching in China. It undertook lots of important public opinion researches, providing public opinions analysis for Bureau of the State Council Information Office and providing public opinion monitoring service for central and local government agencies, enterprises.

The use of online public opinion in the field of sports is still at the preliminary stage, the experiment analyzed the positive and negative influence of stadium violence, puts forward the stadium violence audience news report strategy (Shi and Tang, 2010). Kong (2010) proposed that through the internet and blog people can get sports competitive intelligence faster including opponents' technical characteristics and the latest trends. However, on the whole the application of public opinion on the field of sports has just started. There are still lots of research work need to be done considering the particularity of sports public opinion information mining. This paper mainly discusses the mechanism and functionality of online public opinion monitoring as well as the value of online public opinion in the field of sports.

MECHANISM AND FUNCTIONALITY OF ONLINE PUBLIC OPINION MONITORING

Online public opinion monitoring uses the content based internet information search and intelligent information mining technology to implement automatically crawling, topic detection, hot issue detection, theme focus, public opinion warning for mass information on the internet. It achieved redundancy elimination, simplification, classification, extraction and positive judgment for various kinds of public opinion. It uses briefing, files and charts to represent the result of analysis and quickly and accurately pushed to the user's desktop. Providing analysis basis and making correct guidance for public opinion to fully grasp the ideological trend on the internet. As it is shown in Fig. 1 the mechanism of online public opinion monitoring is consist of the following three aspects.

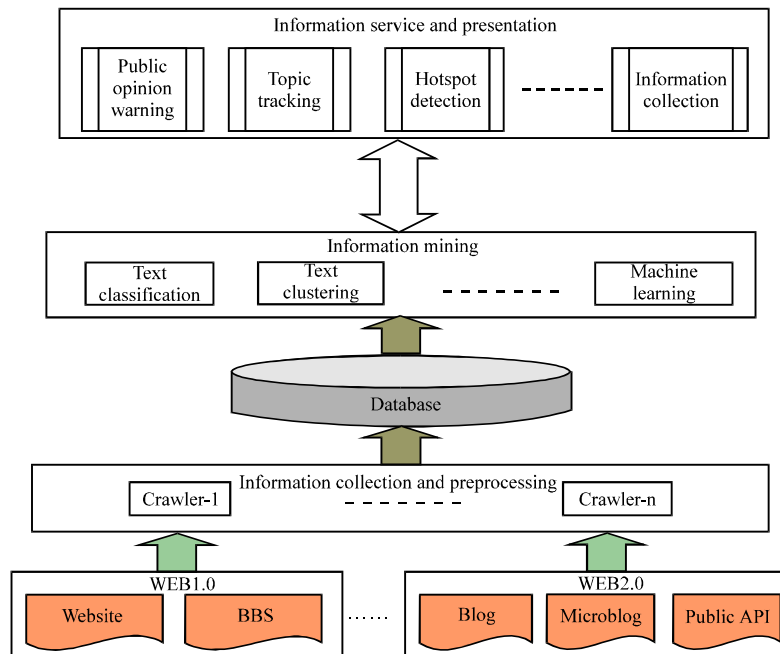


Fig. 1: Mechanism of online public opinion monitoring system

Information collection and preprocessing: By using the web crawler the monitoring system can collect all kinds of public opinions information in the internet, the web crawler traverse the entire web space within the specified range, put the collected information into the database after using the auto redundancy elimination and put the data into the index database after index all the information. Regularly updating must be done to ensure that the information in the index database is synchronized with the web content. Preprocessing must be done before sending the data to computer because the information collected is relatively rough. Information preprocessing is a very important module in the system. In this module, data that is collected by public opinion information collection module need further processing including web page parsing, web page purification, automatic word segmentation and part-of-speech tagging and shallow semantic analysis.

Information mining: Public opinion information mining module is the core processing module of the system and it's also the key to the final processing result. This module mines the data from preprocessing module, providing technical support for specific public opinion service module. There are many information mining approaches, like text classification, text clustering, machine learning, heuristic rules and natural language processing and so on. Through the information mining,

we can mainly implement hot topic recognition, topic emotional analysis, topic trend analysis and other functions.

Information service and presentation: The online public opinion monitoring system can provide users with visual customized search plan, topic tracking, hotspot detection, public opinion warning, public opinion information report, information collection, analysis result presentation and many other functions and services. Through the user defined options, it can meet the need of personalized public opinion monitoring.

RESEARCH ON THE APPLICATION VALUE OF ONLINE PUBLIC OPINION MONITORING TECHNOLOGY

Conducive to discovery and tracking hotspot of sports: With the growth of netizens and structural optimization in China, Internet gradually becomes the mainstream media. Online public opinion can reflect the social sports hotspot. In the 2008 China Internet Public Opinion Analysis report from Zhu *et al.* (2009), in 2008 China public opinion ranking, the sports-related events: ranked third, "Beijing Olympic Games opening ceremony", ranked tenth, "Liu Xiang quit". In the analysis of 2009 China online Public Opinion Summary from Du Junfei which is in the public opinion room from people.com.cn (Du, 2010),

there were 5 culture entertainment and sports events ranked sixth in the top 100 China online public opinion events. The representative of sports events is the “decided door” in the National Games. The phrase “what are you department”, also become the top ten catchword of the year.

In 2012, swimming in Olympic Games was become the focus of the public, Sun Yang and Ye Shiwen’s outstanding performance impressed the world. But netizens were dissatisfied by the western media’s doubt about Ye Shiwen, it became a hotspot in Microblog at that time. Many examples show that the public has high attention for sports events, but the sports management department’s management in online public opinion still needs to be improved. They can use technical approaches to get the real-time hotspots in sports events, understand the public opinion, keeping track of the trends of online public opinion and help sports management department to guide the public opinion.

Conducive to relevant department to improve the ability of preventing and handling unexpected sports events: When the public don’t know or even misunderstood the fake negative public opinion, online public opinion monitoring technology can handle the unexpected public opinion well. It is almost impossible to read and analysis the real-time relevant information, but online public opinion monitoring system can process the online public opinion information in three way: public opinion warning, public opinion report and public opinion guidance. The application of early warning can help the analyst to find hotspot or the clue of negative information, pay attention to the public’s emotion, will and emergency and it can avoid collective unreasoning behaviors. Meanwhile, it even can prevent and eliminate the spread of negative information.

Those systems are mostly used to help government master the public opinion trend and accurately catch the warning information through website, forums and blogs. Quick discover and fast processing on the important event, lead the public opinion positively, create a positive mainstream public opinion and provide objective public opinion information for government decision making (Lu *et al.*, 2010). For the public opinion events that have already outbreak, because of promptly warning and report, the relevant department’s timely public opinion guide, we can always limit the loss of unexpected public opinion events to the least with reasonable response plans. For example, in the ball games, violence involve players and referees, spectators and players, spectators and referees even spectators and police are always happening. If we can use the online public opinion

monitoring approach to get the information about the violence events that have already happened and analyzed it, we can help to establish and perfect the public opinion monitoring system. We can try to answer some question. Is the stadium violence more like to happen with high public attention? Is the stadium violence more likely to happen when opposition fans conflicts significantly on the internet? Is the stadium violence more likely to happen when their teams’ performance is far from the fans expectation? Through the online public opinion monitoring before, during and after the game we can gain high contribution for analyzing these events.

Unexpected public opinion always follows the unexpected events. Netizens are the main body of public opinion, while the government and relevant government serve the role of regulators in the online public opinion. They use the network media like official website and microblog to guide and interact with netizens and release the information timely, make the event handling process transparent (Zhang *et al.*, 2010), ease the public’s misunderstanding of the events to show the public opinion monitoring system’s ability of handling unexpected events.

Conducive to make use of public supervision of sports organizations and sports competitions: Wisdom and knowledge accumulate in the folk, through the internet the wisdom of grassroots can be collected and spread. More and more government departments govern through the internet, government officials use the Microblog. So the sports authorities, sports associations and sports organizations also can get the public opinion initiative, to promote scientific and democratic decision-making, using the internet supervision to build a clean and efficient department. The most distressing sports for Chinese people are man’s football; there are millions of search results for football league muckraking in Baidu.com. If using the public opinion monitoring system to process the data, even if it cannot be used as evidence, it could be warnings for officials and referees at present and in the future. The characteristics of internet determined that many hot spots are first aroused on the Internet then get widespread attention from public. In some degree, it is the prove of a Chinese saying, “if you don’t want others to know, don’t do it”.

At present, more and more netizens like to watch webcast, because people can chat with others freely while watching the game, they can comment on the teams or players performance and referees’ ability. The public opinion monitoring system can collect and analyze fans emotional tendencies for the game, the tendencies will

change with the game dynamically. Due to the increase of the amount of information, the analysis result will be more rationalized. The public are to supervise the players, teams and referees while watching the game. If "match-fixing", "black whistle" happened, fans can post their opinion immediately. The timeliness, divergent and permeability make the opinion spread through the Internet quickly and become strong online public opinion. Then the traditional media will get involved into and supervise the players and referees.

Conducive to optimize the public sports service: In the process of building a harmonious society, the function of the government transfer from management to service, building public service becomes the main responsibility for the government. Public sports services is to satisfy the public's need of public sports. Public sports services include public sports facilities, public sports education service, public sports guidance service, citizen physique monitoring services, public sports system service, public sports information service, Olympic glory services (Huan *et al.*, 2009).

In order to fully realize the functions of public sports service, government and related departments must clearly understand the public's demand for its varying degrees and thinking about how to meet the demand for public sports and so on. Online public opinion monitoring system has the feature that it can monitor specified target, like websites, forums and microblog, understand the public's need in sports dynamically, make the functional department to grasp the public demand in real-time and make timely regulation. It can also get information through the local network channels to analyze regional sports characteristics and promote the related departments to provide public sports services with local features. While the government can use the Internet to interact with public and become the opinion lead in the online public opinion guide the online public opinion in the right direction.

Conducive to collect and analyze sports competitive intelligence: "You will never lose when you know yourself and your enemy". Only with clearly understanding and judgment of own competitiveness can you find your own position in the fierce competition, make and implement a proper strategy and get the final victory. Sports Competitive Information is the accurate, relevant, timely, specific, forward-looking and operable intelligence about sports competition environment, competitors and organization itself that people collect, analyze and spread with sports ethics and professional ethics. The work on sports competitive information is the information

collected, organized and analyzed to match the result of the game that is expected. It provides the basis for coaches and players to make plan for their training and contest. Sports competitive information mainly focuses on own strength, competitor strength and competitive environment. Competitor strength is the core content for sports competitive information (Kong, 2010).

With the development and popularization of the Internet technology, online sports information increase dramatically. Internet becomes people's main source to obtain information. The current way to collect sports competitive intelligence is by collecting information from portal sites, competitors' country or region's sports sites, BBS forum, search engine and all kinds of database. Because the Internet information is huge, updating very fast and without unified management, only manually search sports information is too inefficient and demanding. While the online public opinion monitoring technology can easily customize the search target, tracking the competitive information in real-time, using the intelligent information processing technology to classify and mining the information, get the competitors information more effectively and timely, making effective strategy for the competition.

Conducive to get sports consume demand, improve the quality of sports products and service: With the rapid development of e-commerce as well as the rapid growth of online sports community, reviews for sporting goods and sports services on the network is also increasing. Sporting goods manufacturers and sports service providers can get all kinds of useful information that can promote enterprise development through sport public opinion monitoring. Take the badminton racket as an example, in so many manufacturers only a few provide products for professional athletes, targeting on the unprofessional market is the right choice. Public opinion monitoring technology can help the manufacturers to market acceptance, regional differences of sales, the racket performance and the pricing information. The information has high value for the manufacturers to improve their products quality, select selling points and product pricing. It is more timeliness, authenticity and universality compare to the traditional market research.

CONCLUSION

To sum up, online public opinion is a brand new interdisciplinary research technique. It has been successfully applied to enterprise information collection, online sensitive information monitoring, marketing and many other fields, it gradually shows its application value

in the field of sports. Sports online public opinion monitoring will be a strong support for sports related department to get the hot spots in sports and improve the ability to prevent and handle unexpected events. In sports competitions, sports public opinion monitoring technology will collect, sift and analyze the information to improve the athletes' performance, while monitoring the speech and reaction of the public at the same time to make full use of the public as the supervisory role in competition. Sports public opinion monitoring can provide the sports products manufacturers with more information about the consumer need and improve the service quality.

Future research will primarily focus on the sports-oriented specialized intelligent information processing technology, fake information recognition, hotspot detection and other aspects.

First of all, because of the particularity of the sports field, there must be specified method for intelligent information processing technology, like constructing professional corpus in the sports field, including sports-specific term library, sportsman name library and sports professional technical term library. Only by completing the professional term library can we enhance the performance of the information processing, thereby improving the efficiency of monitoring public opinion.

Second, focus on rumors and fake information pattern recognition and filtering. Because the comments on forums are free and secret, those features brings errors to syntax analysis, some information are manipulated and malicious speculation. It will misleading the public opinion analyst and may even cause social unrest. We can use the intelligent information processing technology and natural language processing technology to do extraction for existing fake information to constructing models to identify rumors and fake information on the Internet. At the same time, we can also try to study the fuzzy inference and fuzzy comprehensive evaluation method to judge the authenticity of the public opinion information. It will be the difficulties in the next step's study.

Finally, hotspot detection and trend analysis will be the key application in sports online public opinion monitoring and it is also difficult to implement. By introducing the natural language processing techniques like segmentation algorithm, part-of-speech tagging, semantic role labeling technology to analyze and understand the text, while mining more feature information in hot spots to improve the efficiency of identifying hot spot.

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