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Retraction

Retracted: Construction and Case Analysis of Sensor News Whole Chain Production Model Based on Artificial Intelligence Technology

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] D. A. Bolaji, "Construction and Case Analysis of Sensor News Whole Chain Production Model Based on Artificial Intelligence Technology," *Journal of Sensors*, vol. 2023, Article ID 9428766, 12 pages, 2023.

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Research Article

Construction and Case Analysis of Sensor News Whole Chain Production Model Based on Artificial Intelligence Technology

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In the current era of data explosion, people's media have access to a large amount of information through the Internet. How to generate effective and realistic news and let interested people accept it is a hot topic in the current news media industry. The continuous development of sensor technology and the application of artificial intelligence technology enable the directional push of intelligent sensor news to be realized. Intelligent sensor media uses sensor technology to monitor and collect information and then combines artificial intelligence and big data to process the information. After obtaining effective media information, it will be pushed in a targeted way and tracked for analysis. By analyzing the current situation and difficulties of sensor news, this paper seeks for an effective combination of artificial intelligence technology and sensor news and establishes a whole process directional push model for sensor news production and thermal tracking analysis. This model is pioneering and practical in the media field. In order to further verify the effectiveness of the model, the important application field of sensor news is selected as the simulation research object, and the specific selection and layout of sensors, the data analysis obtained by sensors, the push of environmental news, and the thermal tracking analysis are simulated. The results show that through data analysis, news editing, and targeted push of water pollution environmental news, the news has gained a certain degree of attention among the main design media. The popularity index is estimated based on the number of likes and comments forwarded by the current mainstream Internet media platforms (Toutiao, Tiktok, and Weibo). The environmental pollution news thermal index of the sensor reached the highest thermal index score of 12 on the 26th day after the activity. On the Weibo client, the message reached the highest heat index of 14 points on the 28th. The simulation analysis of actual cases further illustrates the advantages of this design framework.

1. Introduction

As one of the types covered by data news, sensor media has only experienced more than ten years of development since its birth. Whether it is the academic research, development and popularization of sensor media, or the practice and application of sensor media, it is in the initial stage of exploration and recognition. In the process of using sensors to produce media information sources, it is very important to identify and analyze the information sources, and it is also a problem that needs to be solved in the current sensor media production mode. The use of big data technology can effectively solve the analysis and identification of a large amount of data in sensor media, which is the key research direction of the current sensor media production mode.

1.1. Overview of Sensor Technology. People get information from the outside world through their senses, but there are certain limitations in relying only on the functions of the senses. Sensors are extensions of the human senses. A detection device is capable of detecting the information to be measured, converting it into electrical signals or other output forms according to regulations, and recording, transmitting, storing, displaying, and controlling information [1]. It

is characterized by miniaturization, digitization, intellectualization, multifunction, systematization, and networking. In the Internet age, sensors are everywhere—from electronic chips, GPS, smart phones, to drones and remote sensing satellites. In fact, sensors are a way to collect data [2].

Sensor is an important part of modern information system construction. Sensor technology, along with information communication and computer technology, is called the three pillars of information technology. In recent years, with the development of science and technology, sensor technology has been widely used in military defense, industrial and agricultural automation, aerospace, medical diagnosis, and other fields. A sensor is a device that can capture specific measured values and convert them into effective output signals according to specific laws. From the development process, the sensor has experienced three stages: structural sensor stage, solid sensor stage, and intelligent sensor stage [3]. So far, the intelligent sensor has become the main trend of sensor technology development. There is no unified scientific definition of intelligent sensor in the scientific community. From the perspective of minimizing sensor structure, IEEE links integrated sensors with smart sensors. Smart sensors can provide controllable or measurable dimensions, which can generally simplify their application in the network environment and make them smart sensors. In terms of function, the intelligent sensor mainly performs three functions: signal detection and regulation, signal processing, and communication. It has the characteristics of high precision, stable reliability, high noise, high resolution, and strong adaptability. This technology's intelligent sensor can detect small environmental changes, realize the real-time collection function of scientific data, record various data transmission modes and process changes, and transmit through standardized digital interface and computer connection to share network information. In addition, new research and development directions have emerged in recent years, such as microsensors, multisensor data integration, networks, Bluetooth sensors, nanoprobes, and biosensors [4]. The wide application of sensor technology in the media news industry has brought new opportunities for traditional news production.

1.2. Development Status of Sensor Media. Sensors are used to obtain information and help us study things that we cannot see, hear, or touch. These tools give us new meanings [5]. Therefore, some journalists began to use sensors to collect data and write news articles. In June 2013, the Torry digital information center of Columbia University established a sensor news working group to investigate the practices of sensor media in the industry and the resulting legal, ethical, and moral issues. In 2014, Fergus Pitt, a researcher of the center, organized dozens of scientists and industry experts to write sensor news. According to this book, sensor information refers to the use of sensors to prepare or collect data and then analyze, visualize, and use the data to support the report. The basic principle of sensor media is shown in Figure 1. The basic concept of intelligent sensor media is to use sensors as the production equipment of media data, obtain the basic data of media information, and combine big data and artificial intelligence technology to test the directional distribution and hotspot prediction of media content. Intelligent sensor media is the focus of current research in the field of news and media and also an important grasp of better serving social development in the field of news and media.

1.2.1. Application Direction of Sensor Media

(1) Environmental News Media. Environmental news media is a series of environmental monitoring facilities widely used in the sensor field, such as weather forecast, air quality monitoring, water quality monitoring, earthquake monitoring, and sound intensity monitoring, which provides a large amount of data for the press. The media can work with environmental authorities to obtain data from sensors. Journalists collect information and turn it into stories and public knowledge [6].

(2) Investigate the News Media. The various sensors used in the survey information will provide rich and varied data and various information sources. A wide range of information sources provide a more accurate and reliable basis for the investigation report and improve the tension of the investigation report. Compared with traditional survey information, using sensors in the survey information can reduce the risk. Journalists can rely on a large amount of data provided by sensors. As long as the data analysis is correct, traditional surprise visits and in-depth interviews can be reduced when using data to explain problems [7]. Journalists can reduce their trust in experts seeking the truth. The rollover police reported by the Sun Sentinel is a typical example.

The reporters Sally kestin and John Maines used the police car captured by the electronic toll collection system to calculate its average speed by retrieving the data. The results were surprising. In one year, Florida police broke the speed limit 6000 times. After the report was released, the Florida police handled more than 130 police officers. The reporter avoids traditional investigation methods and uses sensors to retrieve data without the knowledge of the other party's knowledge, reducing the risk and improving the investigation report's authority and credibility.

(3) Drone News Media. Drone news uses radio remote control programs and equipment to control drones and collect information through its surveillance cameras. 2015 is the first year of unmanned aircraft aviation news release. In June 2015, Xinhuanet conducted its first unmanned communication exercise. In August 2015, an explosion occurred in Tianjin. The drone entered the dangerous abdominal space and obtained a large number of photos and videos for the first time. In this case, drones have contributed to media coverage. The drone news regime has become a sharp sword of the media. Unmanned aircraft can also be considered as flight sensors, which transport image detection equipment to inaccessible places and record the accident scene for the first time. It has the advantages of high cost, convenient operation, and wide application. It plays an irreplaceable

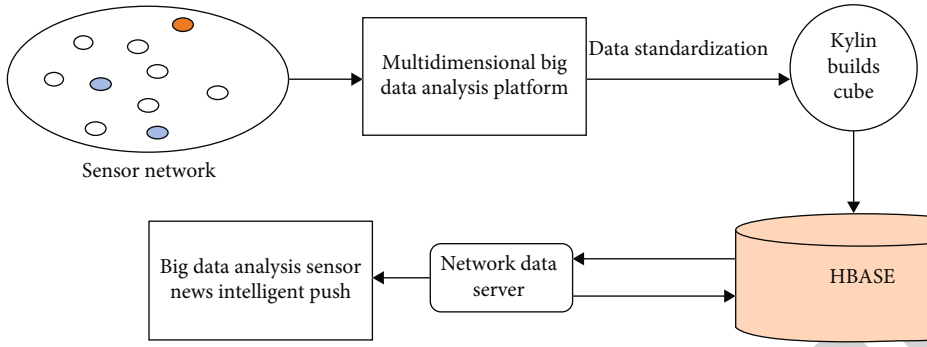

Figure 1: Basic principle of sensor media under the background of big data.

role in the visual communication of news and improving the timeliness of news. It is widely used in emergency live broadcast, disaster live broadcast, and document production.

1.2.2. Main Problems of Current Sensor Media. At present, sensor news is in the initial stage. While highlighting its characteristics and expanding the path for news production, it also faces some difficulties.

(1) The matching degree between existing sensors and media is not enough

There are different types and manufacturers of sensors, and their performance and quality vary greatly. Therefore, the accuracy and accuracy of the sensor's data directly affect the message content's accuracy. Especially in packet data collection, the quality of sensors is difficult to unify, and human errors may occur in the operation process. In view of the heterogeneity of participants in the project package, the downloaded data will inevitably be confused, and it is difficult to obtain accurate data, which will affect the quality of the press release. When it is impossible to obtain professional authoritative data, the media have to use self-developed sensors, and the accuracy of such sensors is low. In addition, due to the influence of the main operation method, the obtained sensing data will be different from the results of professional monitoring institutions. Sally kestin and John Maines of the Sun Sentinel used their own "speed guns" to collect highway data to obtain the police speeding data. However, they soon realized that the quality and operation methods of the instruments would arouse public doubts.

(2) Sensor media may affect public privacy protection

The "unknown" of privacy is easy to conflict with media reports. When the media releases some information, citizens' privacy is violated. Once the citizen information collected through various sensors is made public, it may have a negative impact. Sensors are installed in parks, street corners, squares, intersections, and other public places and collect audio and video information. There is also the risk of violating public secrets. Because a clear concept of personality can be unified from seemingly small information, researchers at the Massachusetts Institute of technology found that 95% of personal data can only be identified by inputting four spatiotemporal movements [8]. If citizens do not know how to use sensors to collect information about them and cannot refuse to cooperate or correct false or misleading information, their privacy will be violated [9].

(3) The sensor medium data is too large and difficult to analyze

Different sensors have different performance and quality. The sensor information requires the operator to first understand the measurement characteristics, accuracy, range, maturity, working distance, and power to find the required sensor. In addition to selecting the correct sensor, the operation of the sensor data should also be considered. Journalists are not programmers, so we need to work with technicians to physically count the sensor data to make it more valuable. What data and information can be understood? This must be made clear before realizing perceptual information. If you do not ask the right questions, even if you have the right sensors, the data you get will not help.

2. Necessity of Applying Big Data Technology to Sensor Media

Big data is applied in more and more fields in different ways, and its concept has been expanded and enriched. The development of this concept is still a dynamic process. From a technical perspective, the term "big data" refers to "a new technology architecture that benefits from a large amount of data through high-speed collection, detection, or analysis." In the media field, "big data" is more a source of information, mainly used to explain phenomena, analyze the connotation and background of data, and draw meaningful conclusions.

2.1. Big Data Technology Extraction of Numerous Data of Sensor Media. The traditional news production is the content production guided by people, while the news report under the big data background is not the extension of the previous latest accurate news or computer-aided report. In data collection, accumulation, mining, and processing, a new news style is formed, and a certain qualitative change is realized. At present, news production under big data mainly has two ways to obtain the data required for

reporting. Query open data through relevant channels. News communication in the big data era changes and promotes traditional news. It changes the way of obtaining news sources in news production and reconstructs the standard of news value. The important part is the application of data and the impact on personal relevance.

2.2. Sensor Media Needs Directional Push of Big Data. With the arrival of the big data era and the explosive growth of data volume, people often have a sense of urgency when facing a large amount of information. They always want to receive more information in the shortest possible time. In order to realize the diffusion of the influence of sensor media, it is necessary to push big data analysis to users.

3. Construction of Sensor Media under the Background of Big Data

The basic principle of sensor media in the context of big data is that the current rich sensors can be combined and deployed according to different needs to achieve the description of events. The big data analysis and extraction technology can extract the massive data obtained by the sensors and analyze and integrate the data obtained [10]. In terms of media promotion, big data can predict the possible social hot spots according to the current social dynamics and grasp the acquisition and placement of sensor data in advance, and at the same time, big data analysis can also realize directional recommendation of sensor media information [11].

3.1. Distributed Sensor Data Acquisition. Sensor news generally refers to the use of sensors to generate or collect data, then analyze, and visualize. Use data to support news reporting. The core point of sensor news is to use data to tell news stories, and the data collection comes from sensors [12]. Therefore, the data acquisition method has become an important part of sensor news.

The data acquisition of distributed sensors mainly indicates the spatial diversity of the current sensors. One is ground sensing and remote sensing. Government and commercial organizations use sensors installed in fixed positions on the ground, aircraft, ships, and even satellites [13]. It can provide more frequent and large coverage data information, including the amplitude of crustal movement, the reduction of forest coverage, and the change of carbon dioxide concentration in the air. Second, wearable sensors, including GPS and accelerometers embedded in mobile terminals and smart phones, as well as apps that can record temperature, light effect, pressure, and exercise conditions, are commonly used for fitness tracking, recording sleep and heartbeat data, and even built-in gyroscopes and accelerometers in the equipment to identify the movement direction and angle of the wearer's head [14]. The bone conduction sensor of the built-in audio system displays the distance direction and temperature.

From the operation practice of the specific news industry, with the continuous development of sensor technology, the industry's understanding of the role of sensor technology continues to deepen [15], and the ways of media organizations to obtain data information through sensors also increase. At present, the division of the main ways of applying sensing technology to news production is mainly based on the difference of sensing equipment. One is to obtain the required data from the existing sensing resources in government organizations and public facilities [16]. Second, collect data through mobile terminals and intelligent devices with built-in sensor settings [17]. The third is to obtain data information through public participation in sensing experience. Fourth, self-made sensors directly acquire information resources [18]. The sensor not only brings the innovation of collection tools and methods but also makes "crowdsourcing" a new normal of data collection [19].

3.2. Intelligent Hot Spot Prediction and Analysis. With the rapid development of information technology, people are increasingly inclined to understand the world through the Internet. The rapid growth of the scale of network users has brought about the rapid rise of the network news media industry. At the same time, the network news information is also increasing day by day [20]. The network news data is huge, the sources of reports are numerous, and the content is complex [21]. As a virtual public communication platform, the quality of news reports is uneven. In order to enable users to understand the development of news events in a timely manner, pay attention to social focus in different time periods, and provide better-personalized news recommendation services, it is of great significance to research news hot topic detection [22]. Considering from the technical level of news hot topic discovery research, the strategy of news hot topic discovery is usually three steps: feature representation, topic discovery, and heat analysis. The news heat analysis model is shown in Figure 2.

From the perspective of clustering, the main test methods are to test the test object based on improving the traditional clustering algorithm. Keywords are extracted from topics that are no longer affected by related words to reduce text redundancy, access embedded words, and transform new text topics into improved keyword based community testing methods. The text topic extraction method establishes a text mapping network by mapping between documents, and documents correspond to nodes on the network. The community consists of many closely related nodes corresponding to glossary topics. The community level test includes finding these closely related community structures in the complex associated network, which also corresponds to the document search process in the associated file network (topic). The technical model of hot topic classification and discovery is shown in Figure 3.

3.3. Intelligent Extraction of Big Data Information. The first step of sensor data news production is to collect the data. After the data information is collected, the data information is sorted and cleaned. The data editor needs to identify the data, preliminarily determine the purpose of the data, and clarify the correlation between the data source and other data. On this basis, the classification and sorting are carried out, so as to summarize the laws and experience and grasp the development trend. In the process of processing, finding

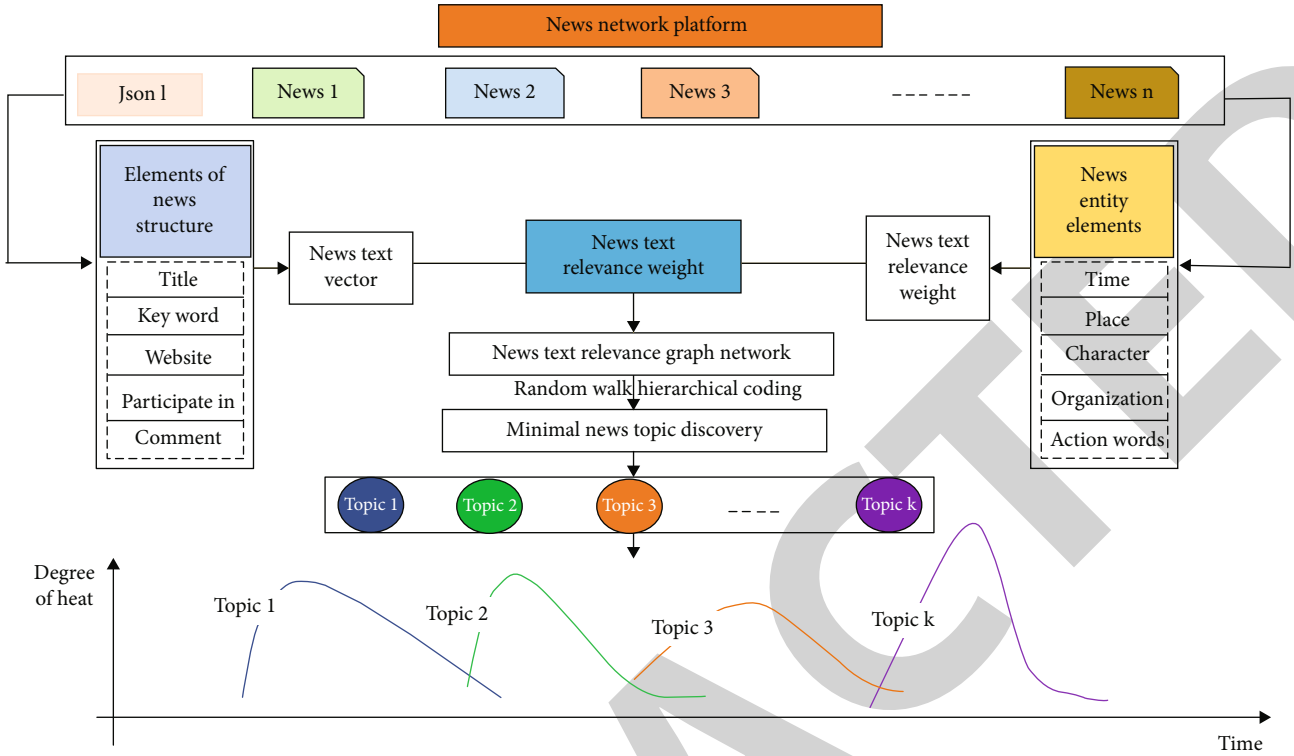

Figure 2: News clustering heat analysis model.

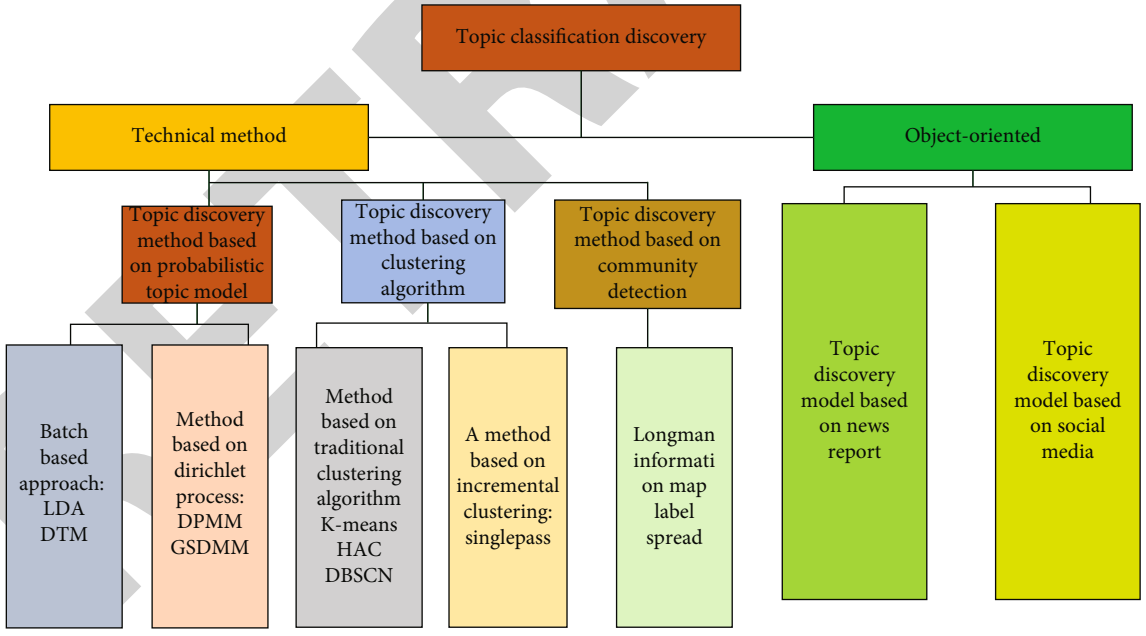

Figure 3: Classification of sensor news topic discovery technology.

hidden information, finding reporting clues and news topics, planning news according to reporting logic, deep mining data, and finding correlation and causality are the main work contents of data reporters. At present, data processing tools emerge in endlessly. Cloud computing, which is well-known to the public, is often mentioned. Its fast computing ability makes it widely used in market monitoring, air index and other aspects. Relatively speaking, it is difficult to understand cloud computing [23]. For journalists, it is difficult to have a deep understanding and skilled application of cloud computing in a short time. Figure 4 shows the intelligent sensor big data information extraction system framework.

3.4. Directional Information Push. Information, suggestions, and media proposals are effective ways to reduce information overload. It helps users select and send messages from

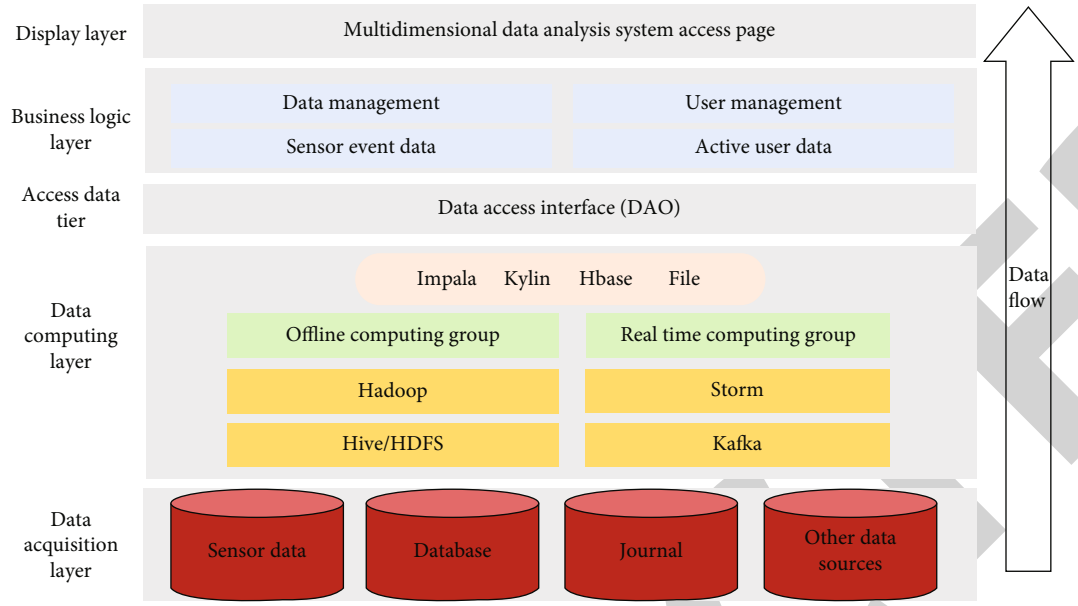

Figure 4: Intelligent sensor big data information extraction system framework.

various interesting information sources. At present, a priority area of the suggestion system is to increase research on public information suggestions through big data analysis. From the perspective of big data analysis technology, this paper analyzes the feature modeling and processing in-depth research technology from the main message object to the user message. The "collaboration" method uses the user's behavior and considers the interaction between adjacent users and messages. In each type of method, according to specific subprojects in the modeling process or different data organization structures based on different subprojects, nontechnical features and design features are analyzed from the aspects of "modeling messages," "general preferences of modeling users," and "modeling users," and "users' interest in time modeling" and "user message dichotomy" are analyzed. Figure 5 shows the news recommendation model based on big data.

4. Case Application of Sensor Media Communication Production Mode Based on Big Data

Environmental news is one of the important directions of sensor application. With the rapid development of our country over the years, we are facing enormous ecological and environmental challenges. Especially in recent years, environmental risks have spread rapidly in traditional and new media, causing public panic and affecting public awareness and action. Effective environmental communication helps to correctly assess and negotiate environmental risks, good governance, and harmonious social governance. Media is the core of environmental information dissemination. Media reports on environmental issues directly affect the public's understanding and views on environmental issues. In addition, the public's awareness and interest in the environment and the demand for environmental information are also increasing [24]. Objectively, the quality of environmental information needs to be improved. In order to better verify the practical application effect of sensor media, this paper takes the news time of heavy metal pollution detected by a river water quality sensor as an example, determines the production and analysis process of relevant data at that time, tracks the propagation range and popularity of the event, and completes the whole chain tracking and analysis of sensor media.

4.1. Selection and Setting of Sensors. Application advantages and current situation of wireless sensor networks in environmental monitoring there are three obvious advantages of using wireless sensor networks for environmental monitoring: (1) low cost and fast network installation; (2) the data transmission can be completed without adding other equipment, which improves the system performance by order of magnitude; and (3) as for the application of wireless sensor networks in environmental monitoring, domestic scholars have done a lot of research and obtained some research results. In the United States, researchers use it to monitor the ecological status of the island. In China, Hangzhou has used it to monitor the water environment of Hangzhou Xixi wetland, and the University of National Defense Science and Technology has used it for environmental monitoring and obtained important research results.

Wireless sensor network (WSN) is a multi-impact network system, consisting of various low-cost microsensor nodes installed on the control point and connected wirelessly. Its working principle is to collect data from the monitoring area and transmit it to the observer under the cooperation of multiple sensor nodes. This task selects a wireless sensor network to capture the environment, acquire monitoring data, and connect through the wireless network. Therefore, its monitoring scope is relatively wide and

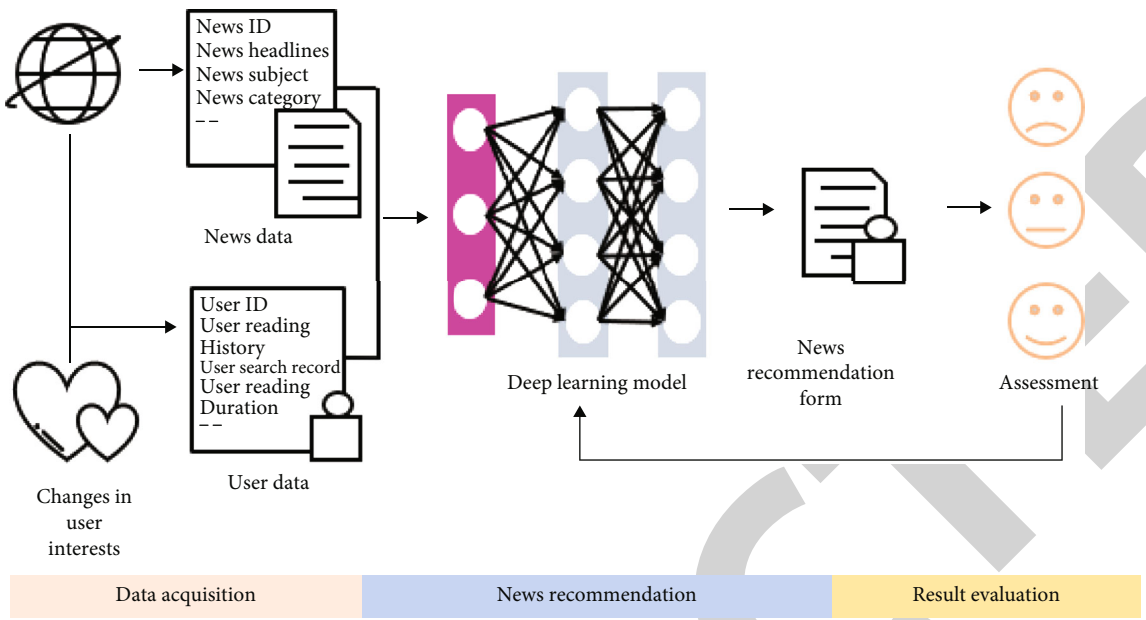

Figure 5: News recommendation process based on big data analysis.

flexible. The monitor configuration can be modified as needed to fix the data accurately. Its main advantages are simple and convenient installation, flexible arrangement, convenient maintenance, and low cost. The main purpose of the sensor is to collect and process the measurement data of the observation object and transmit it to the gateway. In this case, the digital sensor with small volume, low power consumption, simple peripheral circuit, fast startup speed, and no signal regulation loop shall be selected as much as possible according to the actual needs and monitoring categories.

(1) Temperature and humidity sensor: CMOsenstm technology is used to ensure its stable operation in any environment. It is characterized by digital output, no debugging, and no calibration, and all can be exchanged

(2) Light intensity sensor: it has two channels with different functions, one for sensing visible light and the other for sensing infrared light. The chip has a strong anti-interference ability and low energy consumption. The integrated converter can convert the current integration into digital quantity, and the converted data are stored in the corresponding registers according to the source

(3) Pressure sensor: it is an integrated pressure sensor with low voltage, low power consumption, and self-switching power supply (16-bit parameter output, range from 300 mbar to 1100 mbar)

(4) For the selection and application of unmanned aerial vehicle (UAV), the lift generated during the flight of the rotor UAV will cause large air flow disturbance under the UAV and affect the accuracy of the monitor. The monitor is installed above the rotor UAV to overcome the disturbance of the vibration and wind resistance of the UAV through pump suction sampling. Depending on the model characteristics of the selected rotor UAV, complete the tasks of route cruising and hovering at designated points, and realize the three-dimensional remote monitoring of the atmospheric environment. The system adopts the common three-layer architecture of the Internet of things. The sensing layer completes the acquisition of the concentration of air pollutants and the location information of monitoring points, the transmission layer realizes the regular remote transmission of monitoring data, and the application layer is used to analyze and display the three-dimensional monitoring data of the atmospheric environment

The intelligent sensor network is shown in Figure 6.

The node workflow design sensor operates in standby mode. The specific node workflow is as follows: the first step is to put the node into sleep, initialize the node, and delete all original nodes. If there is no monitoring task, the sensor node will not work, and the timer will open according to the data collection time. The second step is to wake up. When the data acquisition time is reached, the sensor node wakes up, enters the working state, completes the data acquisition, processing and transmission tasks, and receives the monitoring tasks sent by other gateways. In the third part, the processor returns to the sleep state after completing the task. The CPU is stopping and waiting for the next monitoring task. At this time, other ports and interrupt systems cannot work and maintain high speed. The radio module does not sleep and only receives weak current. In this way, the sensor node completes the monitoring, collection, and processing of data and realizes the regular transmission of data information.

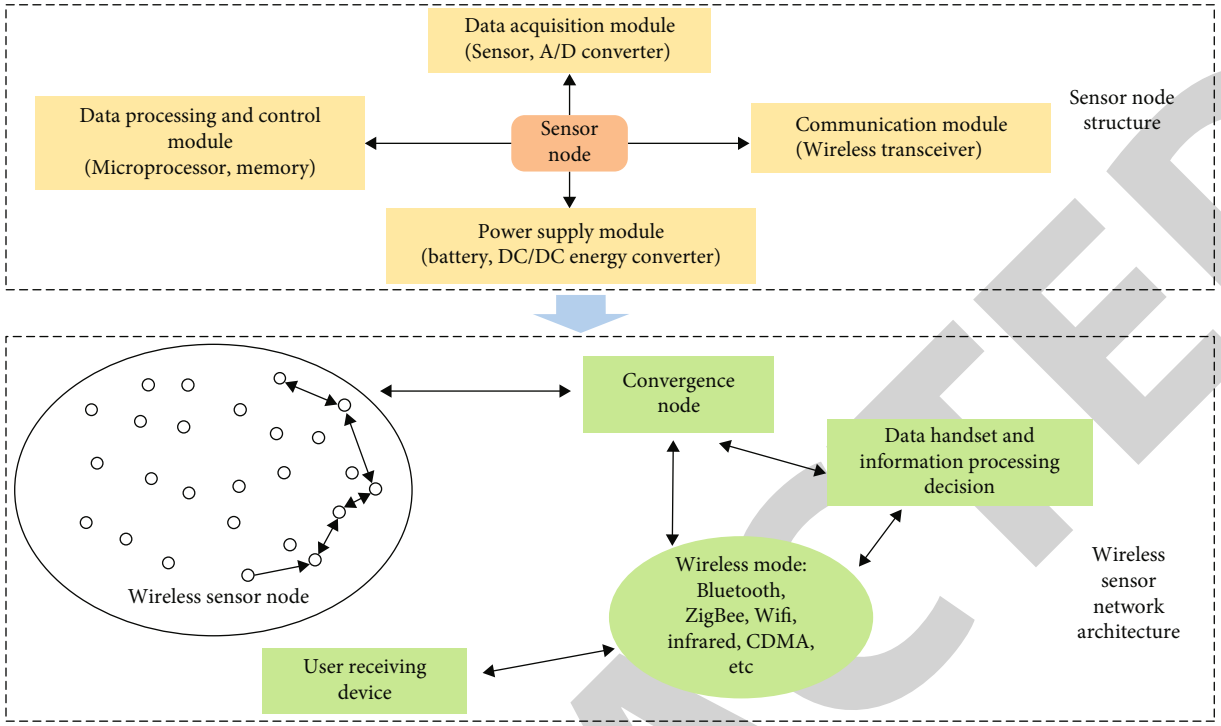

Figure 6: Intelligent sensor network system.

4.2. Key Data Extraction Simulation. Spark is a parallel open-source architecture developed by the amp Laboratory of the University of California, Berkeley. This is a Hadoop-like cluster computing environment [25]. The difference is that spark stores the intermediate run results in memory instead of HDFS. Spark improves the efficiency of real-time data processing in a broader data context. Its advantage is to implement iterative data retrieval and machine learning algorithms. During the spark program, logical operations generate charts that do not contain loops. The working principle is shown in Figure 7. Finally, the planner plans to complete the task. Therefore, in the analysis and extraction of environmental monitoring data, spark data analysis structure is selected.

The big data analysis system is mainly divided into three modules: the environmental data module, the environmental data analysis module, and the environmental data display module. The environmental data capture module uses crawler scrapy to capture sensor network data, the environmental data analysis module uses spark to conduct offline analysis and real-time analysis of news, and the environmental data display module displays the hot information of environmental data through views. Establish the scrapy project, define the environment items to be extracted, then start the distributed crawler to capture the sensor network data and extract the items, finally store the data to MongoDB for offline news analysis, and store the data to Kafka for real-time news analysis. The information read from the MongoDB database is preprocessed, and the environment data information is extracted. Vector space model (VSM) is used to convert the preprocessed data into vectors to obtain the subject and knowledge of the text. The vector space model maps the document into a feature vector $V_{(d)} = (t_1, w_1(d); \cdots \cdots t_n, w_n(d))$. In this formula, $t_i (i = 1, 2, \cdots, n)$ is a different term $w_i(d)$ is the weight of t_i in d, and its value is the occurrence frequency of t_i in d. the formula is:

$$W_i(d) = \frac{t_i(d) \log\left((N/n_i) + 0.1\right)}{\sqrt{\sum_{i=1}^{n} (tf_i(d))^2 \times \log^2\left((N/n_i) + 0.1\right)}}. \quad (1)$$

In this formula, $tf_i(d)$ is a function of the occurrence frequency of the term t_i in d, n_i is the number of documents containing the term t_i, and N is the number of all documents. In information retrieval, TF-IDF function is a commonly used term weight calculation method. The higher the frequency of term t_i in a document, the stronger the document's ability to distinguish content attributes, and the greater its weight. The similarity between documents is expressed by the cosine of the included angle of the vector [24, 26]. The similarity formula between document d_i and document d_j is

$$\mathrm{sim}(d_i, d_j) = \cos\theta = \frac{\sum_{k=1}^{n} W_k^2(d_i) W_k(d_j)}{\sqrt{\left(\sum_{k=1}^{n} W_k^2(d_i)\right)^2 \left(\sum_{k=1}^{n} W_k^2(d_j)\right)}}. \quad (2)$$

When querying, the query condition q is vectorized according to the Boolean model. The similarity formula

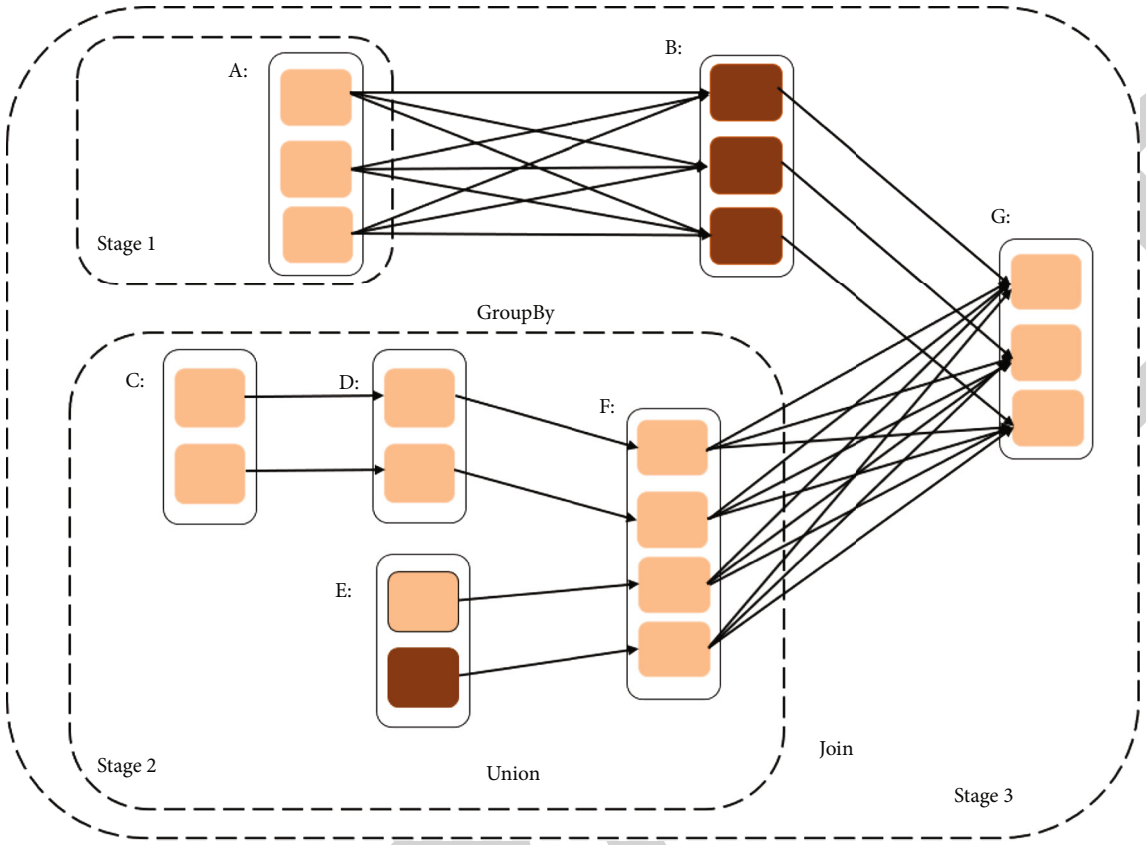

Figure 7: Directed acyclic framework for spark execution.

between the document D and the query q is:

$$\text{sim}(Q,d) = \cos\theta = \frac{\sum_{K=1}^{n} W_K(d) \times q_k}{\sqrt{\left(\sum_{i=1}^{n} W_i^2(d)\right)\left(\sum_{i=1}^{n} q_i^2\right)}}. \quad (3)$$

In this formula, $q_i = \begin{cases} 1 & t_i \in Q \\ 0 & t_i \in Q \end{cases}$ VSM can realize the automatic classification of documents and sort the similarity of query results. According to the similarity between documents, the k-means algorithm is used to cluster the environmental data, and the hot category direction of the environmental data is statistically analyzed. The environmental data has a strong timeliness, and the real-time analysis and research of environmental effective data are carried out. According to the similarity between documents, k-means algorithm is used for news clustering to analyze the direction of environmental data hotspots statistically. Use the k-means class library in Spark's MLlib to obtain environmental data topics through cluster analysis.

4.3. Analysis on the Popularity of Environmental News. The concept of environmental news heat event heat is the collection of the overall event tweet heat. The basis of event tweet heat is the degree of attention, praise, and forwarding of the current mainstream media, including Weibo, today's Toutiao, Wechat, and other related media platforms. At present, there is no established standard index system in the academic community to describe the event tweet popularity quantitatively. The personal information of celebrities and well-known media has an important impact on the popularity of events. On this basis, this study selects three indicators of the author's information, namely, the number of fans, the rate of blogging, and the number of active days, as the secondary indicators to reflect the influence of the author's characteristic popularity [27]. Environmental news itself also has a certain contribution value to the popularity and influence. This time, the number of words, the fullness of pictures, the timeliness of appearance, and other indicators are selected as the secondary indicators of the popularity and influence of content features. Environmental news features can best reflect the influence of tweets (see Figure 8 for the structure diagram of news distribution in intelligent sensor environment).

In this study, the number of likes, the number of comments, and the number of forwarding are selected as the secondary indicators of the popularity and influence of communication characteristics. In the case of comparing the relative importance of each index, the analytic hierarchy process model of event heat is established. According to the scale table, the first level index B_i and the second level index C_i are set for the event tweet popularity a, and the specific indicators are shown in Table 1 [28]. The judgment matrix

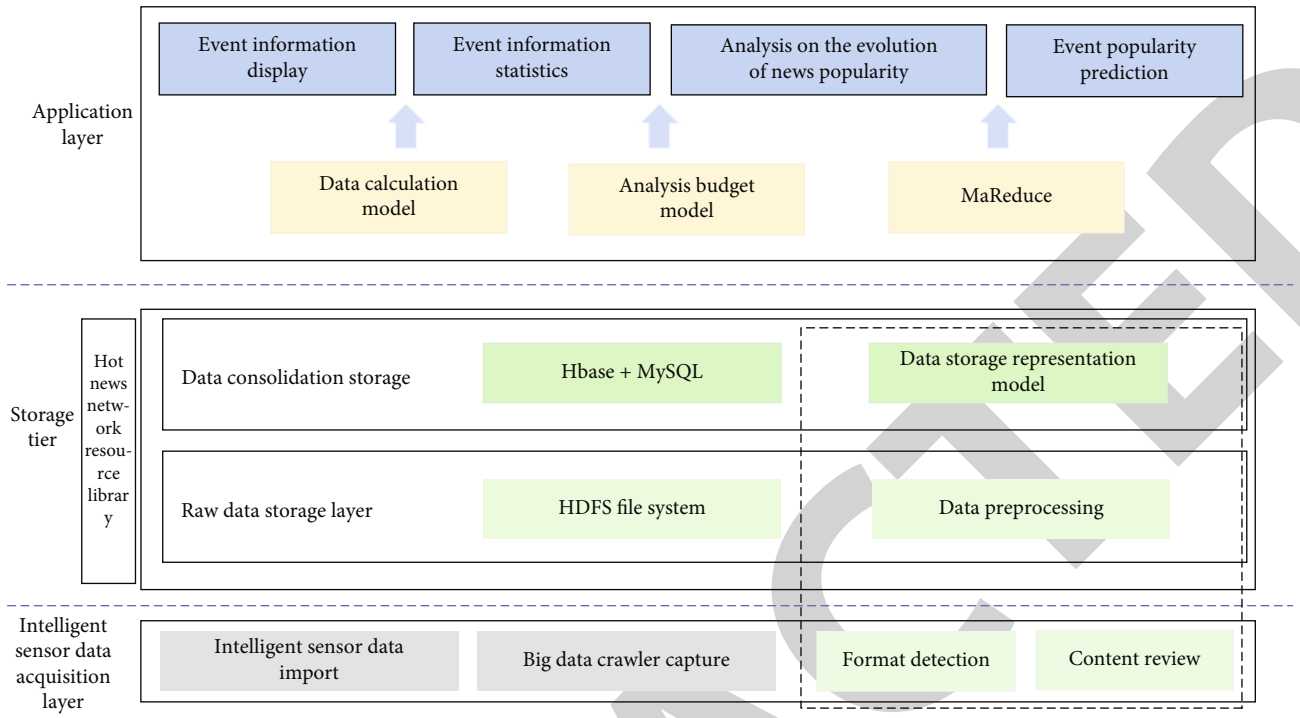

Figure 8: Intelligent sensor environment news distribution structure diagram.

Table 1: Evaluation index of environmental news popularity.

Level I indicator	Secondary indicators
Author characteristics heat and influence B1	Number of fans C1
	Blogging rate C2
	Active days C3
Content features popularity and influence B2	Content fullness C4
	Picture fullness C5
	Travel timeliness C6
Transmission characteristic heat and influence B3	Likes C7
	Number of comments C8
	Number of forwarding C9

of the completed tweet popularity a and the first level index is as follows:

$$\mathbf{M}_A = \begin{bmatrix} 1 & 3 & 1/3 \\ 1/3 & 1 & 1/5 \\ 3 & 5 & 1 \end{bmatrix}, \mathbf{M}_{B_1} = \begin{bmatrix} 1 & 3 & 7 \\ 1/3 & 1 & 5 \\ 1/7 & 1/5 & 1 \end{bmatrix}$$
$$\mathbf{M}_{B_2} = \begin{bmatrix} 1 & 3 & 1/4 \\ 1/3 & 1 & 1/5 \\ 3 & 5 & 1 \end{bmatrix}, \mathbf{M}_{B_3} = \begin{bmatrix} 1 & 3 & 4 \\ 1/3 & 1 & 2 \\ 1/4 & 1/2 & 1 \end{bmatrix}. \quad (4)$$

It is required to check the satisfactory consistency of the judgment matrix. The consistency test criteria are as follows:

$$CI = \frac{\lambda_{\max} - n}{n-1}, \quad (5)$$

$$CR = \frac{CI}{RI} < 0.1. \quad (6)$$

In this formula, λ max is the maximum characteristic root of the matrix, n is the order of the matrix, RI is the average random consistency index, CR is the consistency ratio, and CI is the consistency index.

Through calculation, $CR_A = 0.021$, $CR_{B1} = 0.0360$, $CR_{B2} = 0.076$, and $CR_{B3} = 0.0102$, all of which passed the consistency test. The weights of each level of event tweet popularity are calculated, and the weights W_A, W_{B1}, W_{B2}, and W_{B3} corresponding to a and Bi are, respectively:

$$W_A = \begin{bmatrix} 0.258 \\ 0.105 \\ 0.637 \end{bmatrix}, W_{B_1} = \begin{bmatrix} 0.649 \\ 0.279 \\ 0.072 \end{bmatrix}, W_{B_2} = \begin{bmatrix} 0.226 \\ 0.101 \\ 0.674 \end{bmatrix}, W_{B_3} = \begin{bmatrix} 0.625 \\ 0.238 \\ 0.136 \end{bmatrix}. \quad (7)$$

In this study, the Hacker News ranking algorithm will be

Table 2: Event time heat trend chart.

Time after the event (day)	Heat index Today's headlines/Tiktok	Microblog
20	0	0
21	2	0
22	4	0
23	4.5	0
24	5	1
25	8	2.5
26	10	14
27	10.5	10.4
28	12	4.4
29	9.7	2.7
30	6	2.2
31	5	2.05

used for further model construction. The main formula is:

$$r = \frac{P-1}{(t+2)^G}, \tag{8}$$

where r is the popularity of event tweets, P is the number of tweeted votes, t is the number of days, and G is the gravity factor, usually set $G = 1.8$. From Equation (3), it can be seen that the tweets with more votes in a shorter time will be ranked higher, and with the increase of time, the tweet ranking will gradually decrease. According to the analytic hierarchy process (AHP) model and the weight matrix of each level, this research modifies the Hacker news algorithm and builds the tweet popularity model by using the time factor characteristics. The specific formula is as follows:

$$r_{B_1} = \frac{0.649 \times C_1 + 0.279 \times C_2 + 0.072 \times C_3}{(t+2)^G}, \tag{9}$$

$$r_{B_2} = \frac{0.226 \times C_4 + 0.101 \times C_5 + 0.674 \times C_6}{(t+2)^G}, \tag{10}$$

$$r_{B_3} = \frac{0.625 \times C_7 + 0.238 \times C_8 + 0.136 \times C_9}{(t+2)^G}, \tag{11}$$

where R_{B1}, R_{B2}, and R_{B3} are the influence heat of the author, content, and communication characteristics, respectively. Use formula x to standardize the data, and limit the three types of heat values between 0 and 1. The calculation formula is as follows:

$$F(x) = \frac{x}{1+x}. \tag{12}$$

In this formula, x and $F(x)$ are the heat values before and after standardization. The formula for calculating the overall heat of event tweets is [29]:

$$r = 0.258 \times f\left(r_{B_1}\right) + 0.105 \times f\left(r_{B_2}\right) + 0.637 \times f\left(r_{B_3}\right). \tag{13}$$

According to the event heat model, the event heat is divided into D units, and the total tweet heat of 1D is accumulated, so as to analyze the heat change of the sensor news over time (see Table 2 for details).

5. Conclusion

Sensor news is a frontier research topic in the current media field. This paper builds a complete sensor news production and dissemination tracking analysis model by systematically studying the artificial intelligence-based news data collection mode, data analysis scheme, news production system, news targeted dissemination scheme, and news thermal analysis method. Case simulation is conducted for the environmental news direction in the key field of sensor news application. The multilevel sensor layout scheme is specially designed according to the application scenario. Artificial intelligence technology is applied to analyze the key news data of the environmental intelligent sensor system, and a thermal evaluation model is designed for the environmental news of the intelligent sensor. Finally, the thermal analysis of the sensor after the directional promotion shows that the environmental news of the smart sensor reached the highest thermal index of 12 on the 26th day after the ByteDance media (Toutiao and Tiktok) event, and the microblog reached the highest thermal index of 14 on the 28th day after the event. However, there are still few application cases of the model this time, and there may be some problems with the self-learning data of artificial intelligence data. Intelligent push and hotspot analysis also need more cases to find out the problems of the model and continue to optimize it. This also shows that the sensor news production, directional push, and propagation tracking analysis model based on artificial intelligence technology can play an important role in promoting the whole news media chain and lay a certain theoretical and practical foundation for the subsequent development of sensor media.

Data Availability

The dataset used in this paper are available from the corresponding author upon request.

Conflicts of Interest

The author declared no conflicts of interest regarding this work.

References

[1] C. Intanagonwiwat, R. Govindan, and D. Estrin, "Directed diffusion: a scalable and robust communication paradigm for sensor networks," in *Proceedings of the 6th annual international conference on Mobile computing and networking*, pp. 56–67, Boston Massachusetts USA, August 2000.

[2] A. V. Kulkarni, I. M. Bahuguna, B. P. Rathore et al., "Glacial retreat in Himalaya using Indian Remote Sensing satellite data," *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, vol. 92, no. 1, pp. 69–74, 2007.

[3] H. Leung, S. Chandana, and W. Shuang, "Distributed sensing based on intelligent sensor networks," *IEEE Circuits & Systems Magazine*, vol. 8, no. 2, pp. 38–52, 2008.

[4] X. Fan, I. M. White, S. I. Shopova, H. Zhu, J. D. Suter, and Y. Sun, "Sensitive optical biosensors for unlabeled targets: a review," *Analytica Chimica Acta*, vol. 620, no. 1-2, pp. 8–26, 2008.

[5] V. Alfred, "Sensor-news rund um die Sensor + Test 2017," *Elektronik Industrie*, vol. 48, no. 5, pp. 30–37, 2017.

[6] P. Velmani, *Design and implementation of an efficient topology in environmental sensor networks, Kodaikanal*, 2015, http://www.dissertation.com/abstracts/1205888.

[7] C. J. Vargo, L. Guo, and M. A. Amazeen, "The agenda-setting power of fake news: a big data analysis of the online media landscape from 2018 to 2016," *New Media & Society*, vol. 20, no. 5, pp. 2028–2049, 2018.

[8] Y. A. De Montjoye, C. A. Hidalgo, M. Verleysen, and V. D. Blondel, "Unique in the crowd: the privacy bounds of human mobility," *Scientific Reports*, vol. 3, no. 1, pp. 1–5, 2013.

[9] A. M. Fathollahi-Fard, M. A. Dulebenets, G. Tian, and M. Hajiaghaei-Keshteli, "Sustainable supply chain network design," *Environmental Science and Pollution Research*, vol. 101, pp. 1–3, 2022.

[10] A. S. Farias, S. O. Rezende, and R. M. Marcacini, "A comparison of parameter selection measures for sensor learning from financial news events," *XV Encontro Nacional de Inteligência Artificial e Computacional*, vol. 89, 2018.

[11] G. Elmer, G. Langlois, and J. Redden, *Compromised data: from social media to big data*, Bloomsbury Academic, 2015.

[12] L. Huang and N. J. Navimipour, "Application research of manuscript writing robot based upon laser sensor in news dissemination field," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 4372527, 12 pages, 2022.

[13] A. S. Farias, S. O. Rezende, and R. M. Marcacini, "A comparison of parameter selection measures for sensor learning from financial news events," in *XV Encontro Nacional de Inteligência Artificial e Computacional*, SBC, 2018.

[14] F. Daneshdoost, M. Hajiaghaei-Keshteli, R. Sahin, and S. Niroomand, "Tabu search based hybrid meta-heuristic approaches for schedule-based production cost minimization problem for the case of cable manufacturing systems," *Informatica*, vol. 33, no. 3, pp. 499–522, 2022.

[15] J. Mills, T. Metcalfe, M. Lochrie, and A. Gradinar, "Rare occurrence: exploring IoT, news media, calm interfaces and infrequent interactions," in *BCS Human Computer Interaction Conference 2016*, Poole United Kingdom, 2016.

[16] L. Bode, S. Edgerly, C. Wells et al., "Participation in contentious politics: rethinking the roles of news, social media, and conversation amid divisiveness," *Journal of E Government*, vol. 15, no. 3, pp. 215–229, 2018.

[17] H. Vtj, E. Sirkkunen, and M. Ahvenainen, "A field trial on mobile crowdsourcing of news content-factors influencing participation," in *IFIP Conference on Human-Computer Interaction*, Springer, Berlin, Heidelberg, 2013.

[18] E. Agapie and A. Monroy-Hernández, *Eventful: crowdsourcing local news reporting*, Computer Science, 2015.

[19] H. Lakkaraju, A. Rai, and S. Merugu, "Smart news feeds for social networks using scalable joint latent factor models," in *International Conference Companion on World Wide Web*, Hyderabad India, March 2011.

[20] C. Ardelet and B. Brial, "Influence of the recommendations of internet users: the role of social presence and expertise," *Recherche et Applications en Marketing*, vol. 26, no. 3, pp. 45–67, 2011.

[21] K. Wołk, "Building an internet radio system with interdisciplinary factored system for automatic content recommendation," 2016, http://arxiv.org/abs/1604.00233.

[22] E. Sadri, F. Harsej, M. Hajiaghaei-Keshteli, and J. Siyahbalaii, "Evaluation of the components of intelligence and greenness in Iranian ports based on network data envelopment analysis (DEA) approach," *Journal of Modelling in Management*, vol. 17, no. 3, 2021.

[23] M. Tan and S. Xiao, "Media cloud: when media revolution meets rise of cloud computing," *IEEE 6th International Symposium on Service Oriented System Engineering*, 2011, Irvine, CA, USA, December 2011, 2011.

[24] Y. Liang, N. Guo, C. Xing, Y. Zhang, and C. Li, "Multilingual information retrieval and smart news feed based on big data," in *2015 12th Web Information System and Application Conference*, Jinan, China, September 2015.

[25] M. Zaharia, M. Chowdhury, M. J. Franklin, S. Shenker, and I. Stoica, *Spark: cluster computing with working sets*, USENIX Association, 2010.

[26] L. Rui, Y. Qin, B. Li, and Z. Gao, "Context-based intelligent scheduling and knowledge push algorithms for AR-assist communication network maintenance," *Computer Modeling in Engineering and Sciences*, vol. 118, no. 2, pp. 291–315, 2019.

[27] V. Thakare and D. Deshpande, "Analysis of online news popularity prediction and evaluation using machine intelligence," *International Journal of Computer Mathematics*, vol. 2, no. 2, pp. 120–131, 2017.

[28] M. Akbari-Kasgari, H. Khademi-Zare, M. B. Fakhrzad, M. Hajiaghaei-Keshteli, and M. Honarvar, "Designing a resilient and sustainable closed-loop supply chain network in copper industry," *Clean Technologies and Environmental Policy*, vol. 24, no. 5, pp. 1553–1580, 2022.

[29] Y. Yuan, "Research on algorithm recommendation mechanism and characteristics of personalized news app——taking "Toutiao" as an example," *IOP Conference Series Materials Science and Engineering*, vol. 740, no. 1, p. 012166, 2020.