

Research Article

High Concurrent News Communication Strategy Based on Reliable Routing in Wireless Sensor Networks

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Since information sensing transmission is an inherent requirement of wireless sensor networks, this paper analyzes the traditional reliability routing algorithm that treats all data groups indiscriminately and cannot make the data groups containing important information preferentially transmitted to the sink node and consume too much energy on unimportant data. The healthy development of news communication can be promoted from the three aspects of audience supervision, platform control, and government supervision, and a cross-platform operation model can be established to enhance the sociality of the platform and improve new media technologies to achieve accurate push. This paper attempts to sort out the current news and information communication strategies comprehensively from the aspects of content, communication, operation, and profit in the process of news and information communication from production to profit. The communication strategy of news and information communication is highly adaptable to the 4I principle of network marketing. And from the audience supervision, platform control, and government supervision, these three aspects promote the healthy development of news communication news, establish cross-platform operation mode to enhance the sociality of the platform, improve new media technology to achieve accurate push, innovate business model, enhance liquidity, and so on.

1. Introduction

Sensor network is a data-centered application network. Collecting data is the purpose of wireless sensor network design. How to reliably and effectively transmit the data obtained by sensor nodes to users is one of the important purposes of data transmission in wireless sensor network. Relevant researchers fully analyze the factors influencing the reliable data transmission in the wireless sensor network (WSN), successively put forward a variety of solutions, from initial take more cover method, by using link retransmission mechanism, they use the transmitted data for error correction coding and increase the transmission of reliable data in wireless sensor network (WSN). The success rate of data transmission in the sensor network has been greatly improved, but with the in-depth study of the sensor network under the background of the overall development of the network has been greatly improved than before; the continuous use of unchangeable reliable data transmission technology will

hinder the development of wireless sensor network. Therefore, in the research of reliable transmission methods of wireless sensor networks, we must improve the shortcomings of existing methods according to the application characteristics of sensor networks, develop new methods, and put forward innovations to promote the further development of sensor networks.

With the deep research and wide application of wireless sensor network, wireless sensor network has penetrated into every field of human life. Reliable data transmission technology in wireless sensor networks, as the focus of data transmission methods in sensor networks, will play a great role in promoting the development of wireless sensor networks. It is of great significance to design an efficient, robust, and consumption-balanced reliable routing protocol to realize the reliable routing of sensing information under various adverse factors such as limited network resources, high channel error rate, data packet loss, and difficult network security.

At present, news and information industry develops rapidly and has formed large-scale content output, increasing brand influence and increasingly fierce competition in the capital market. However, some problems have been exposed, such as the uneven quality of the works produced by content producers, undiversified distribution channels, low user stickiness to the platform, and unclear profit model, which have greatly restricted the development of the news and information industry. However, at present, the research on short video of news and information, a new way of news transmission, is very scarce. Most of the research focuses on its rise and development trend. The core of this paper is to study the propagation strategy of highly concurrent news and information related to reliable routing in wireless sensor networks and explore the development direction and prospect of news and information-related short video from the perspective of its industry chain: content, channel, operation, and profit.

2. Related Work

The development of news and information is now more mature in terms of both content production and communication mode. Therefore, the research on the development status of news and information communication is mostly based on mature news and information communication platforms. It is believed that there are two important backgrounds for the rise of news and information. One is that young audiences are more inclined to accept the new media form of news and information communication [1, 2]. According to a survey, in 2017, news and information dissemination on mobile terminals contributed 2/3 of the data traffic of the world. It can be predicted that news and information dissemination will also become the most popular news products. Second, the attention of the audience in the mobile era is getting shorter and shorter, showing the characteristics of shallow reading. By sorting out the operation modes of two news giants, Newsy and Now This New, the author believes that the main reasons why they can take the lead in the field of mobile news service are as follows [3, 4]: strong content subjectivity, fast transmission, multiplatform joint release to achieve viral transmission, professional team production, and manual editor recommendation. Keep your content professional. However, how to ensure the powerful productivity in the mass information is the biggest problem in the development of news dissemination. It holds that the audience's news demand in the mobile social era has new characteristics of mobile, video, and social [5, 6]. The author believes that the reason why companies specializing in producing short video news can quickly occupy the American news and information market and attract a large number of young audiences is that each link of the closed news chain of "production, communication and feedback" closely fits the characteristics of news consumption of audiences [7]. Content production ensures that the video can capture the audience's heart within 5 seconds, infuse emotional factors into the news, and let the news get involved in the audience's social life. The communication strategy lies in multidimensional communication, aiming at different char-

acteristics of the platform, to create content suitable for the characteristics of the audience on the platform [8]. Selecting a representative news information dissemination platform as the research object, combined with the external environment of news information dissemination, [9] believes that the development of news dissemination technology has created a network environment for information dissemination. Attached to social platforms, news and information dissemination has a huge user market. In addition, there are still few news and information dissemination in the field of local information, and there is a relatively loose competitive environment. All these opportunities have won considerable development prospects for news and information dissemination [10]. News and information dissemination not only has the advantages of diversified video content presentation but also meets the demand for immediacy and transmission effectiveness of news. And scholars will be outside the two big news information class representative office articles [11]; this paper compares and analyzes from the content production, content distribution, user interaction comparative study on the three aspects, the reflection of the current news and information dissemination encountered bottleneck and class information transmission of the news and information about the future development put forward its own views, in terms of investment and return. In his opinion, the current profit models of short video platforms mainly include advertising, tipping, and e-commerce [12], but due to the short-sighted news nature of information, the horizontal transplantation of these three profit models is not applicable. Therefore, finding an appropriate profit model will be the development trend of information platforms.

Wireless sensor networks are characterized by limited power energy, limited communication capacity, limited computing capacity, close integration with the physical world, large-scale and intensive deployment, and strong network dynamics [13]. In order to obtain accurate and timely information, it is necessary to rely on the cooperation between nodes. Only when a large number of sensor nodes are connected to a network by low-power radio communication technology can they play an overall and comprehensive role. The performance of sensor network has a direct impact on its availability, and the performance evaluation of sensor network is a problem that needs further study. At present, relevant literature has proposed the standard for evaluating sensor performance, but it has not reached the practical level, so it needs further quantification and modeling [14]. Reliable data transmission in sensor network refers to how monitoring information can be reliably transmitted to sink node through multihop routing after an event is detected. Because of the weak communication ability of sensor nodes in sensor networks, the communication coverage is only tens to hundreds of meters. Wireless communication network is usually hindered by terrain, vegetation, lightning, strong wind, and other weather conditions, and the performance of wireless communication links is poor. In the process of packet transmission, dynamic changes of the network, mutual interference of sensor nodes, and network congestion may also occur, so the error rate of information transmission between sensor nodes can reach 20% or even

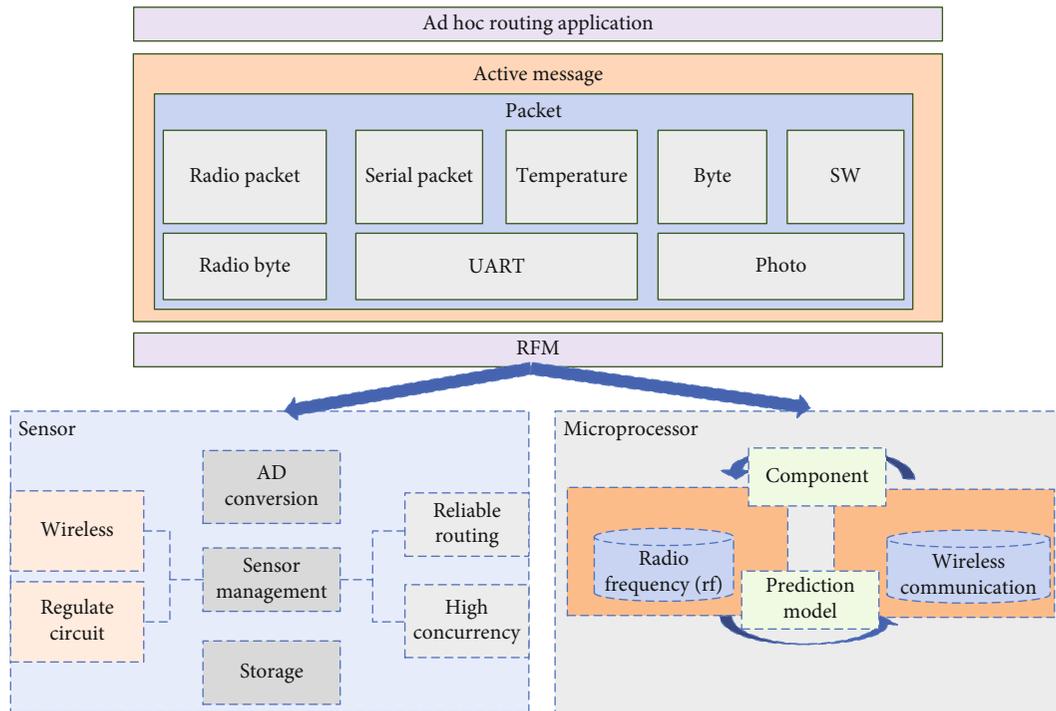


FIGURE 1: Component structure of a sensor application that supports multihop wireless communication.

higher [15, 16]. The reliability of a system is measured by its ability to complete specified functions. Therefore, the reliability of wireless sensor network is defined as follows in this paper: the ability of communication network to complete specified functions under specified conditions and within specified time under the action of man-made or natural destruction [17]. Reliable multisegment transport (RMST) protocol is proposed [18, 19], which is developed on the basis of directional diffusion routing protocol and adds the function of data packet loss detection and repair. It dynamically configures nodes into cached and uncached modes. In the application of hop-by-hop reliable transmission, the cache mode of nodes is used. Each node on the transmission path between the data source node and the sink node performs packet loss detection through cache maintenance. In the end-to-end reliable transmission application state, the noncache mode of nodes is used to maintain the cache only at the sink node and the data source node, and intermediate nodes are not needed. The sink node is responsible for packet loss detection [20].

In recent years, the proposed wireless sensor response network is a new kind of wireless sensor network developed on the basis of wireless sensor network. This kind of wireless sensor network can improve the application capability of wireless sensor network by deploying some reaction nodes in the network. As the deployed wireless sensor response node generally has strong energy reserve, data communication, and data processing capabilities [21], meanwhile, the wireless sensor response node also has corresponding arbitrary execution and can make corresponding response actions according to the collected data and related parameters monitored [22]. Therefore, in the wireless sensor network, a series of wireless sensor response nodes are

deployed, which not only improves the data transmission and data processing capabilities of the wireless sensor network but also enables the wireless sensor network to directly process and execute the monitoring environment [23]. However, the reaction nodes of wireless sensor networks are still powered by batteries in many applications. Therefore, wireless sensor and response networks also face the application challenge of limited energy in traditional wireless sensor networks [24]. At present, many foreign scholars have carried out relevant studies on this issue, such as studying the architecture and characteristics of wireless sensor response network, focusing on the in-depth study of the network protocol of wireless sensor response network, and the communication between reaction nodes [25]. In view of the lack of energy consumption and real-time performance of traditional wireless sensor network routing protocol, WSAN routing protocol adapted to SLR response node selection mode was designed and implemented in combination with the application requirements of wireless sensor response network [26]. In addition, the secure location service of wireless sensor response network is deeply studied [27]. Authentication message packet, passive reception of location request, filtering false information, and other methods are adopted to improve security settings, and a position verification protocol based on voting is designed.

3. Research on High Concurrent News Propagation Strategy Algorithm for Reliable Routing in Wireless Sensor Networks

3.1. Research on Reliable Routing Algorithm in Wireless Sensor Networks. In some wireless sensor network

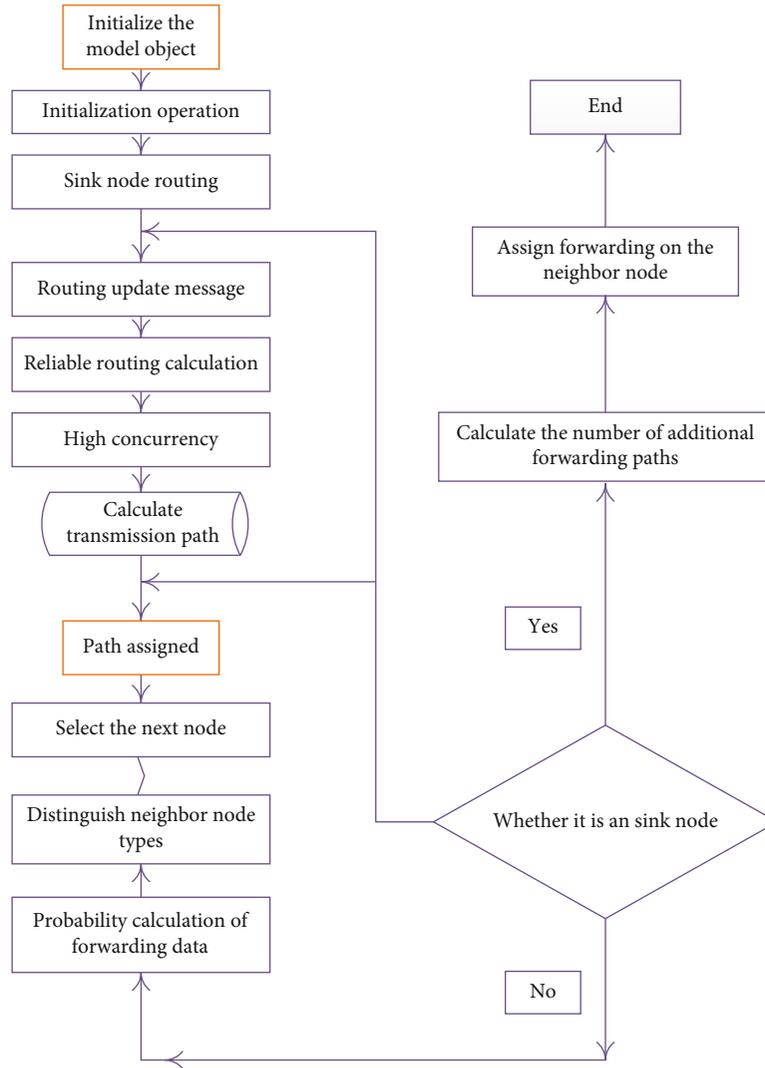


FIGURE 2: Basic flow chart of reliable routing algorithm in wireless sensor networks.

applications, there may be multiple sink nodes, or sink nodes can be mobile. The relationships between different components are specifically described through component files called accessories. Each component declares the interface it uses and the events it wants to notify, and these declarations will be used to wire components together. Figure 1 shows the component structure of a sensor application for multihop wireless communication. The upper component issues commands to the lower component, the lower component notifies the upper component of events, and the lowest component directly deals with the hardware.

As shown in Figure 1, the so-called large-scale includes two meanings: on the one hand, sensor nodes are distributed in a wide geographical range; on the other hand, sensor nodes are densely deployed. The location of sensor nodes can not be accurately determined in advance, and the neighbor relationship between nodes is not known in advance. Therefore, sensor network nodes need to have self-organization ability, can be configured and managed automatically, and automatically form a multihop wireless

network system to forward monitoring data through topology control mechanism and network protocol.

3.2. High Concurrency News Transmission Strategy Algorithm of Reliable Routing

- (1) The sink node periodically broadcasts routing update messages, including a domain of hop count to the sink node. When the node receives the routing update message, it first determines whether it has received the update message. If it receives an update message, it compares it to the number of hops previously marked. If its hop count is less than the recorded hop count, it is updated. If he had more hops, he would give them up. If not, it adds the hop count of the message to the sink and broadcasts the message. In this way, each node can know the number of hops from its own node to sink node and the number of hops from its neighbor node to sink node

TABLE 1: Reliability analysis.

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardized term	Number
0.865	0.867	15

TABLE 2: Fractional reliability.

Reliability statistics			
	Cronbach's alpha	Cronbach's alpha based on standardized term	Number
Audience engagement	0.615	0.635	4
Content satisfaction	0.748	0.748	6
Social drive	0.754	0.754	8

- (2) Calculate transmission paths and determine how many paths are needed to forward data packets to ensure reliability requirements

$$F(r, e, t) = \frac{\log(1-r)}{\log[1-(1-r)^t]}. \quad (1)$$

- (3) Select the next hop node and path allocation. After the data source node calculates the number of required forwarding paths, select the next hop node from the neighbor node and allocate the corresponding forwarding path. According to the hop count to sink node, the source node divides its neighbor nodes into three categories: the node with the same hop count to sink node t , the source node only needs the default next hop to forward data to meet reliability F requirements; otherwise, additional forwarding nodes are required, and the additional path count is

$$F = \frac{\log(1-t)}{\log[1-(1-e)^t]} - (1-r^t). \quad (2)$$

- (4) The neighbor node recalculates the path. The source node S adds three parameters to the header of the data packet sent. After receiving the packet, the neighbor node takes itself as the source node and uses its own recalculation of the number of paths required for transmission. Node I selects its next hop node in the same way as source node S , and this process continues until it reaches the sink node. Because each step of transmission ensures the reliability requirements of the source node, the whole transmission process ensures the reliability requirements of data transmission. Routing algorithm flow chart is shown in Figure 2

According to the route design idea of wireless sensor network based on shared path proposed in this paper, the most

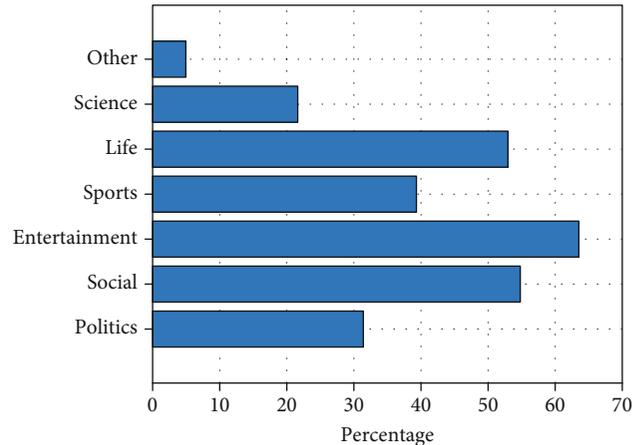


FIGURE 3: Categories of highly concurrent news and information transmission.

critical thing is to select the location of wireless sensor nodes in the shared path. The selection strategy based on the weight of wireless sensor nodes is proposed in this paper; that is, all nodes in the wireless sensor network are analyzed. By each wireless sensor node record, the current area can receive signals to the response node number, the wireless sensor node coverage area; if there is a reaction to the node, then the wireless sensor node can receive a response signal, and its value set to 1; if there are two reaction nodes, then the sensor node can receive two reactions of signals, and its weight is set to 2, and so on. If there are N wireless response nodes in the signal coverage area of a wireless sensor response node, the weight of the wireless sensor node is set to N . After weight identification of all sensing nodes in the whole wireless sensor network, the path with the highest weight in the whole path from the source node to the destination node is selected as the shared path L , and the shared path of all nodes on L meets the following conditions:

$$f(F) = \sum_i^m F(i). \quad (3)$$

Based on this strategy, the coverage area of the entire wireless sensor network is scanned to establish multiple shared paths covering all network areas. All shared paths are combined to form a network subgraph, which is a complete shared path of a single wireless sensor network.

3.3. Optimization of News and Information Communication Strategy Based on 4I Principle. Both media forms and technological development are premised on human needs. With the evolution of newspapers, telegrams, radio, television, and the Internet, the carrier media of news is constantly evolving, making the way of presentation and transmission of news content evolve as well. This process reflects people's unremitting pursuit of high efficiency of information acquisition. In the context of news short videos becoming the development trend of news, how to ensure efficient and large-scale news output is an important indicator to measure content producers. Therefore, with the continuous

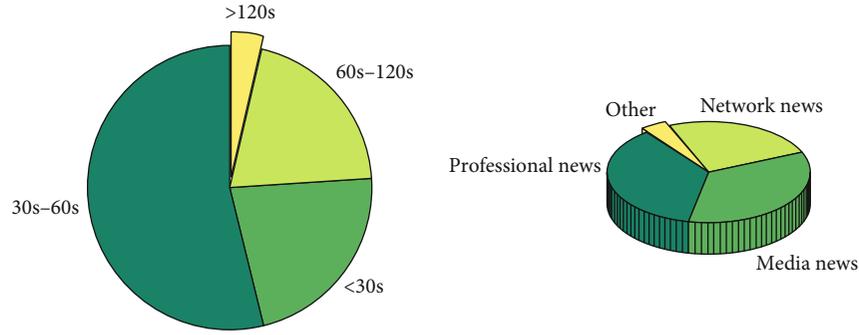


FIGURE 4: Analysis of the proportion of news and information communication strategies of audiences.

intelligence of technology, the machine writing and intelligent editing technology are gradually applied to the news editing link.

Reliability analysis is also called reliability analysis, through which the correctness and stability of the questionnaire can be measured. Therefore, the higher the reliability of the data test is, the more reliable the test result is. In reliability analysis, Cronbach A (Cronbach coefficient) was obtained by reliability analysis function of the SPSS software, and the reliability of the questionnaire was measured by the coefficient. Generally speaking, if the reliability coefficient of the questionnaire is above 0.9, the reliability of the questionnaire survey is good. The reliability coefficient of the questionnaire survey is above 0.8, and the reliability of the questionnaire survey is medium. It is generally considered that the reliability of the test paper is reasonable within 0.5 to 0.9, and if the reliability coefficient is lower than 0.55, the results of the questionnaire are not credible. The Cronbach A coefficient of the questionnaire was 0.865 greater than 0.8, Cronbach's alpha 0.866 based on the standardized term was less than 0.9, and the total number of items was 12. The data results showed that the overall reliability of the questionnaire was excellent. SPSS 20.0 was used to analyze the reliability and validity of the questionnaire, and Tables 1 and 2 are obtained.

In addition, three variables in the correlation analysis of factors affecting the effect of news and information transmission, namely, popularity, content satisfaction, and social drive, were also analyzed and judged by using SPSS to output Cronbach's alpha Cronbach coefficient A. In this questionnaire, the Cronbach coefficient of audience participation is $0.615 > 0.6$, and the Cronbach's α 0.635 based on the standardized term is greater than 0.6. The coefficient A of content satisfaction is $0.748 > 0.7$, and the Cronbach alpha based on the standardized term is $0.747 > 0.7$. The Cronbach coefficient of social driving is $0.754 > 0.7$, and the Cronbach's alpha based on the standardized term is $0.754 > 0.7$. The results show that the fractional reliability is good. See Table 2.

As can be seen from Figure 3, audiences pay more attention to social hot topics, entertainment gossip, and daily life, accounting for 54.8%, 63.53%, and 39.32%, respectively. Among them, entertainment accounts for the highest proportion, which is twice the proportion of current political news. This indicates that in the current communication environment of mobile Internet, social hot spots and enter-

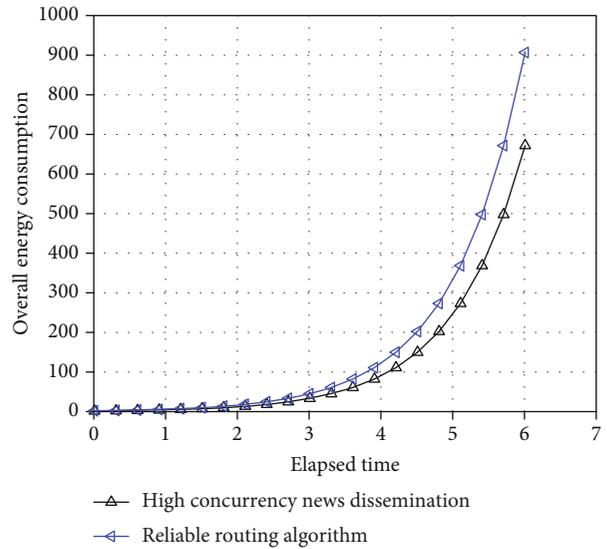


FIGURE 5: Comparison of overall energy consumption of highly concurrent news and information transmission of reliable routing in wireless sensor networks.

tainment news can attract the audience's attention and stimulate their interest in watching, which also shows that with the development of the Internet, traditional news and information tend to be more entertaining in content and production mode.

According to the data analysis of the behavioral intention of the audience in Figure 4, 53.9% of the audience prefer to watch short videos of news and information in the 30s-60s, which meets the audience's demand for fragmented reading. As for short video content sources, most people prefer those published by professional news organizations, accounting for 68.6%, online "we media" 64.7%, and video photographers 46.7%, indicating that more than half of people prefer authoritative and professional news sources for news and information production. More concerned about the credibility and authenticity of the news content, at the same time, 64.7% of the audience for news and information content of network from media production is also very attention; second only to professional bodies, this shows that network from the media, with its rich topic, strong fan effect on the communication effect as the mainstream media, even with the development of mobile social trends. Professional

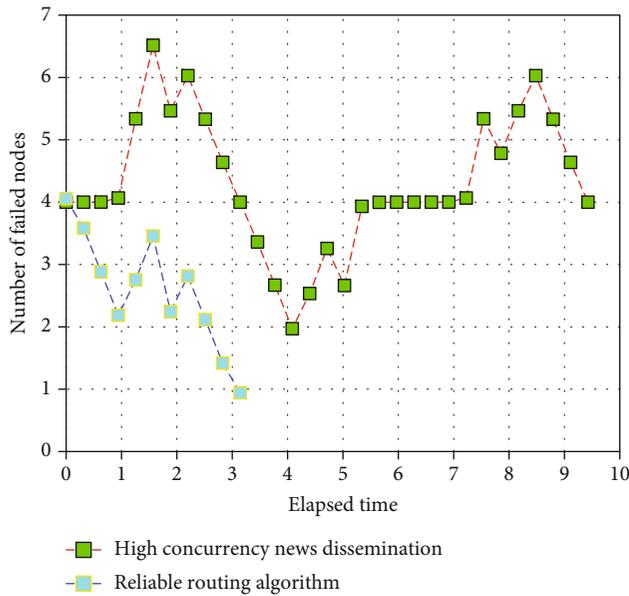


FIGURE 6: Comparison of the total number of failed nodes in highly concurrent news transmission of reliable routing in wireless sensor networks.

news organizations will also use the content resources produced by online we media as one of the content sources.

At the same time, platform-based media adopt unified resource allocation and multichannel content distribution, and the platform itself has considerable traffic. Opening up the social platform can also broaden the communication channels and improve the influence of the media. The platform connects with external resources for content producers, and the settled media can realize rapid development with the help of the platform flow. The head IP with a certain effect can also feed the platform to drive the development of other content, thus building a benign ecological closed-loop of content, distribution, and profit and realizing the win-win interests of all participants in the platform. At present, the short video market of news and information is a blue sea. High-quality content lacks effective promotion channels and profitable platforms, while social platforms with a large base lack high-quality content support. Therefore, it will be the future development trend of news and information to build platform-based media, break down the barriers of content, distribution, operation, and profit and attract all nodes in the news and information short video industry to enter and form a monopoly advantage.

4. Example Verification

The improved algorithm enables the network to have the ability of information sensing transmission. By introducing the service differentiation mechanism, the network can discriminate the data groups of different importance and treat the unimportant data groups and important data groups differently according to different service levels. Improved algorithm for data packet gives corresponding to the importance of the priority level, thus provides the corresponding to

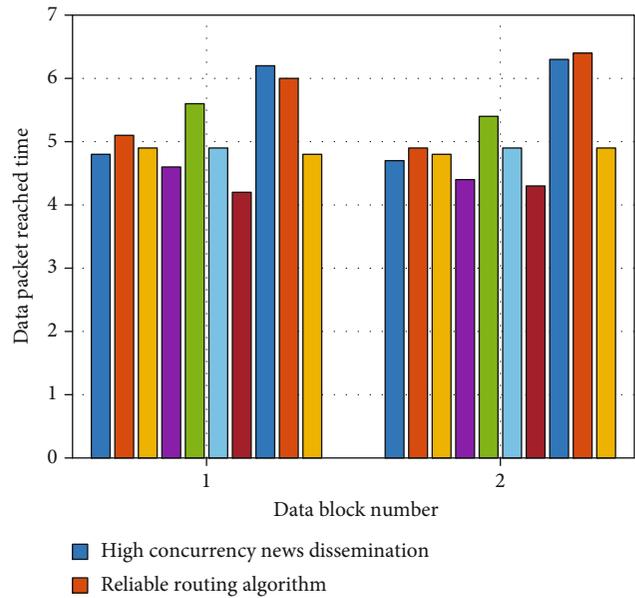


FIGURE 7: Comparison of packet transmission delay of highly concurrent news transmission data of reliable routing in wireless sensor networks.

probability, reduces unnecessary data grouping copy, in guarantee under the premise of data packet transmission reliability requirements, and makes the decline in the overall need to forward data packet in the network, which makes the network corresponding to reduce energy consumption as a whole. The simulation results show that the improved algorithm can effectively reduce the total energy consumption of the network and achieve better results than the original algorithm.

In Figure 5, the blue curve represents the overall energy consumption of the network when the wireless sensor network reliable routing algorithm is used, and the black curve represents the overall energy consumption of the network when the improved algorithm is used to transmit highly concurrent news and information of the wireless sensor network reliable routing algorithm. Due to reliable wireless sensor network, routing algorithm is unable to provide differentiated services and will only make all transmitted data packet under the reliability parameters, the irrelevant data grouping, and important data packet according to the same level of service, in order to ensure the reliability requirements, copy large amounts of data packet in the network transmission, and increase the whole network energy consumption.

Improved algorithm by introducing divisional service mechanism, to discriminate different important degree of data packet, according to the priority of the data packet decision data packet forwarding probability, for not important data packet, will forward to reduce the number of copies, easing the burden on the node, to avoid the individual nodes premature deaths, balance the network load, avoid high concurrent news and information propagation segmentation of reliable routing in wireless sensor networks, and maximize the network survival time. According to the comparison of simulation results, in order to ensure the transmission quality, the traditional wireless sensor network reliable routing

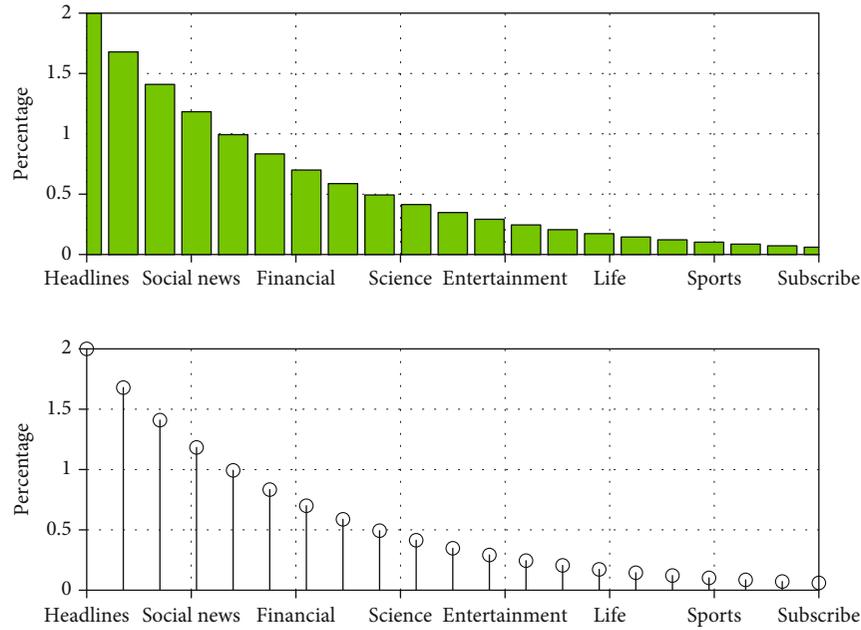


FIGURE 8: News users' concerns.

algorithm will lead to the failure of more nodes when the same transmission task is completed. The improved algorithm based on service differentiation mechanism can effectively reduce the number of failed nodes and balance the load of network on the premise of ensuring the reliability of data grouping. Therefore, the improved algorithm is superior to the traditional reliable routing algorithm in wireless sensor networks in reducing the number of failed nodes.

In Figure 6, the red line shows the reliable network using wireless sensor network routing algorithm runs high concurrency news reliable wireless sensor network routing information propagation overall failure node status; the blue line shows the network using the improved algorithm runs high concurrency news reliable wireless sensor network routing information transmission failure node status as a whole. In order to ensure reliability requirements, reliable traditional wireless sensor network routing algorithms will generate a large amount of data packet duplication during network transmission, which increases the burden of forwarding data packet nodes, and the network will increase the number of node failures during the same transmission task; this is not conducive to prolong the life cycle of the whole network and also causes the phenomenon of network segmentation.

After adopting the improved algorithm, the first five data groups have higher priorities, so the improved algorithm will transmit the five data groups in the shortest path with a small delay. Therefore, the arrival time of the first five data groups using the improved algorithm is shorter than that using the routing algorithm. The last five data groups have lower priorities, so the improved algorithm will group the five data to transmit on a longer path to protect the validity of nodes on the shortest path. Therefore, the arrival time of the last five data groups using the improved algorithm is longer than that using routing algorithm.

Figure 7 shows the arrival time of 10 data packets at the sink node in the simulation process. To ensure reliability requirements, multiple copies of a data packet may be forwarded, so the arrival time of the data packet received by the sink node for the first time is taken as its arrival time. The left column represents the arrival time of the data packet using the wireless sensor network reliable routing algorithm, and the right column represents the arrival time of the data packet using the improved algorithm.

In a large number of news and information mobile phones, the top three with the highest user satisfaction and recognition are Toutiao, Zaker, and Sohu News. At the same time, compared with other users, users of these three phones are more willing to recommend their news and information mobile phones to others. Although NetEase News, Sina News, and Tencent News have more users, their satisfaction and recognition are relatively low. The author believes that this situation is mainly due to the user experience gap between news and information mobile phones. Users' satisfaction with news and information mobile phone comes from two aspects: the user experience of news content provided, and user experience is a crucial factor affecting user satisfaction.

When users use news and information mobile phones, they pay more attention to headlines, social news, financial news, science and technology news, and entertainment news, as shown in Figure 8. However, within a limited time, users only browse headlines and social news, which is the key for news and information to improve user stickiness.

5. Conclusion

Content is king has become the consensus of all news and information producers; how to ensure the efficient and sustainable output of high-quality content will be the focus of thinking direction. In terms of channel distribution, both

social platforms make efforts to expand the user base as much as possible. Compared with only social distribution, they still hope to divert the flow from social media to their own platforms, so they also focus on the construction of their own platforms. The channel coverage of the whole platform can reach the largest number of users, but the problem is that a large amount of homogeneous content could not meet the personalized needs of users. In terms of operation strategies, both of them have clearly positioned their target audience at millennials and focus on creating content that attracts young people according to user characteristics and user feedback data of different platforms. But at present, it is only in the stage of reaching users without forming user operations. News and information will eventually go social, strategic operation of different social platforms; to create a social atmosphere will be the next direction of development. Under the premise of balanced energy consumption of wireless sensor networks, we propose an adaptive forwarding scheme of highly concurrent news transmission based on reliable routing in wireless sensor networks. We assign different priorities to data groups of different contents, and different priority levels correspond to different arrival probabilities. In this way, forwarding nodes can adjust the reliability parameters adaptively according to the importance of data grouping, so that the energy consumption of nodes changes according to the importance of data grouping content. On the premise of ensuring the reliability of network data transmission, the transmission mechanism is optimized to save node energy consumption, balance network load, and extend network life cycle. In the attempt to impersonate attack source detection, the average number of signature and verification signature operations will increase with the increase of network density. How to select an appropriate network density to achieve a high successful detection rate while effectively reducing the number of signature and verification signature operations still needs further research.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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