Network Management Based on Funeral Internet of Things and Incremental Services

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Abstract

With the rapid development of information technology, the application of Internet of Things (IoT) in the field of funeral services has brought revolutionary changes to traditional funeral management. The article aims to explore how to use the Internet of Things technology, combined with incremental services, to realize the networked management of funeral services, in order to improve the quality and efficiency of services, as well as to meet the needs of modern society for personalized and convenient funeral services. The article analyzes the current situation and existing problems of funeral services, and points out the deficiencies of traditional funeral services in terms of informationization, standardization and personalized services. In terms of incremental services, the article discusses how to provide personalized and customized funeral services through IoT technology, such as remote farewells and Internet mourning, etc. These services not only improve the convenience of the services, but also enrich the family's way of commemorating the deceased. In addition, the article discusses the importance of technical standards, data security and privacy protection measures required to implement the management of IoT funeral service networks, as well as related training and education for practitioners. It provides new ideas and methods for the modernization of funeral services, and is of great theoretical and practical significance for promoting the technological progress and upgrading the service level of the funeral industry.

Keywords: Funeral, Service, Internet of Things, Value-added service, Network management

1 Introduction

Internet technology has gradually matured and developed rapidly in the past decade, and the Internet of Things (IoT) established on the basis of the Internet has been extended to the field of funeral, and the combination of Internet of Things (IoT) technology and funeral services has become a new trend in the development of the funeral industry, such as network sweeping, remote farewells, and payment of ash deposit and so on, which become the value-added services of the Internet of Things in funeral, and provide more choices for people in the field of funeral services. Traditional funeral services and rituals under the advancement of the times, the proportion of people's choice is gradually declining, and the demand for incremental services of the Internet of Things for Funeral has increased.

Nevertheless, the network funeral and incremental services still face challenges, the use of IoT devices triggers unclear attribution of responsibility, data protection and privacy [1] how to clarify the application of the law in cross-border services and jurisdiction, and other issues hinder the further development of the Internet of Funeral Things and value-added services. Through the innovation of funeral service management mode, the establishment of data security management mechanism, the development and implementation of funeral informatization standards and norms and other legal regulations can regulate the operation of funeral Internet of Things, expanding the demand for value-added incremental services of funeral Internet of Things, and at the same time, promote the development of the network of funeral Internet of Things and value-added services in a stable and far-reaching manner. This is not only crucial for the development of the domestic funeral industry, but also has far-reaching implications for the international community in terms of cultural exchanges, technological advancement, environmental protection, legal harmonization, data security and public health management.

2 Literature Review

2.1 Humanistic Care of Funeral Services under the Internet of Things

With the continuous development of the times, network funeral service, on the other hand, through digital means, provides people with a way of memorialization beyond the limitations of physical space, so that commemorating the dead provides a new way of mourning and memorialization [2]. More and more people are choosing simple and green burials. However, some people are resistant to this kind of modern funeral, believing that it is disrespectful to the deceased, so much so that they also treat convenient online funeral services such as Cloud Sweeping as formalistic activities, believing that they are just cold network data. But this is not the case, the funeral Internet of Things to cloud storage to help the deceased to record the marks of life,

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recorded deceased voice and deeds, as well as family and friends of the descendants of its eulogy and video, etc., can provide people with diversified, personalized services, can be better in the funeral to help people and the deceased to "love, apologize, thank you, say goodbye," presenting the A unique funeral service can also be followed by further memorialization, so that the life story can be recorded and passed on. IoT funeral service providers collect data and stories of the deceased during their lifetime, and use digital means to record and pass on the life stories of the deceased, providing families and descendants with a way of remembrance and memory, which, even though time has changed, can still touch the deepest thoughts and tenderness of the deceased, and realize the connection and dialogue between life and death. Rawlings, D. states that there are indications that IoT funerals are delivering positive outcomes, such as being able to attend funerals virtually from overseas and creating new ways to say goodbye to loved ones, bringing relief to family and friends who were unable to attend the funeral in person [3]. It shows that the Internet of Funeral Things is equally humane.

Utilizing IOT technology to increase the applicable scenarios of online funeral services is conducive to enhancing the humanistic care of IOT funeral services, such as information query and publicity, remote farewell and online memorial service, personalized service customization, online sacrificial platform, funeral education and cultural dissemination, and emergency response services, etc., so as to make IOT funeral become a systematic and comprehensive online funeral service, and to provide people all over the world with more funeral It provides more choices of funeral services for people all over the world, so that people from all over the world can express their feelings of remembrance for the deceased at any time and any place without the restriction of geographic location, which not only eliminates the need for people to run around and tire themselves out on the road, but also allows people to remember the deceased in a more realistic way. Asgari, Z., Naghavi, A. stated that the three online ways of overcoming grief can be made possible to a certain extent through online ways of remembering, digitization of social support, and continued connection with the deceased [4]. In the rapid development of the times, it is more important to fundamentally recognize that the rituals behind funeral rites are to respect the deceased, to allow the living to grieve, to remind the living of the preciousness of life, and to cherish the present. The gathering of family and friends at funeral rites can also strengthen family cohesion and demonstrate the values and customs of people in a region. Thus, the modernization principle and funeral rites and rituals between the possibility of seeking reconciliation, [5] rather than a moment a local customs of compromise and accommodation. The government should protect the right of citizens to funeral, and gradually accelerate the guidance of the public to abandon the traditional form of burial and funeral concept of thick burial, set up cremation, environmental protection and thrift and other new funeral concepts [3], advancing with the times. Such as the British modern cremation civilization insight into the current situation, respect for folk customs, pay attention to emotional comfort, so that cremation will be the integration of health sciences and beliefs cognitive, strengthened for the individual death of the traditional folk beliefs, and through the construction of crematorium public space, sublimation of the funeral of the emotional comfort, create a new era of humanistic care of the funeral paradigm [6]. So at the same time as the correct cultural guidance, the Internet of Things for Funerals needs to adhere to the people-oriented in the content of each service, abandon excessive formalism, grasp the humanistic care in the funeral digitization, fully demonstrate the human infectious force in the object-physical interest, integrate the Internet of Things into the reform of selective funeral service industrialization, follow the funeral service system to adhere to the center of the humanistic approach, respect the public opinion, and guide the masses of peasants to accept cremation [7]. Expanding the audience area and population of modernized and thrifty funeral service forms, as well as exerting the convenience of Internet of Things (IoT) technology, enriching the entry content of the webpage of the deceased's information in a realistic way, so that the public can actually feel the characteristics of the combination of humanistic care and technology of the Internet of Things of Funeral and its effectiveness, thus enhancing the public's trust and participation. W. Tan, K. T. Tsang, J. Su, and K. Zhao stated that that funeral services should be services that can meet people's social, psychological, and spiritual needs, and they proposed a framework for the practice of funeral social work from the perspective of strategic development and skill learning, which includes services in the areas of administration and research and development of direct services [8], which also reflects the need for modern funeral services to focus on humanistic care as well.

2.2 Laws Related to Funeral Services under the Perspective of the Internet of Things (IoT)

At present, the foreseeable chaos of the application of IoT technology in funeral services mainly includes network security problems, user privacy leakage risks, etc. For these problems, only some countries are currently exploring the construction of the degree of law, and the legal regulation of funeral IoT has not been constructed. This has led to the development of funeral Internet of Things and incremental services being blocked by network chaos. In the context of the development of the information age, a consensus should be formed between countries to jointly construct a network management mechanism for the Internet of Funeral Things and incremental services. However, until there is a law specifically for IoT, existing laws, such as data protection laws and consumer protection laws, are used to adapt and regulate the use of IoT technologies. For example, the use of IoT technologies in funeral services often involves the collection of sensitive personal information, such as the personal information of the deceased and family members. It is therefore important to ensure compliance with data protection regulations, such as the General Data Protection Regulation (GDPR), to protect individuals from invasion of privacy. Consumers' rights should be protected by law when using IoT funeral services. This includes transparency of the service, fair contract terms, and the right to compensation if the service fails. Industry organizations and standardization

bodies are developing standards and guidelines to guide the use of IoT technology in funeral services Therefore, it is important to ensure compliance with data protection regulations, such as the General Data Protection Regulation (GDPR), to protect individuals from invasion of privacy.

In CND [2018] No. 73, "Notice of the Ministry of Civil Affairs on the Issuance of the Action Plan for Promoting 'Internet + Funeral Service'", it is mentioned that the construction of a funeral management service information platform, the strengthening of funeral informatization standards and norms, the improvement of the level of funeral online government services, the promotion of interactive integration of funeral services online and offline, and the advancement of funeral big data governance capacity building are five items. Data governance capacity building five content, visible funeral services Internet + model continues to advance, the network has become the main battlefield of funeral reform, while indicating that the norms involved in the scope of the network will face greater challenges. The Internet of Things technology should first meet the popularization and convenience of basic funeral services, and the government should start from the perspective of demand, and carry out research on the change rule of the total demand for cemeteries, the characteristics of the crowd's categorized demand, the mechanism of total and categorized demand transmission, and the matching relationship between the demand and the supply policy from the levels of the total scale and the categorized attributes [9].

The design and development of Internet of Things (IoT) technology should be guided appropriately and put into use on a pilot basis in order to meet the public's demand for choosing graves. In addition, basic funeral services should conform to social development, gradually realize equalization and sharing, and change from fragmentation and low level to comprehensive development [10].

2.3 Network Management of Funeral Services under the Perspective of Internet of Things (IoT)

The Internet of Things for Funerals is a new type of funeral service linkage network centered on funeral content, connecting things to things on the basis of the Internet, and the process of using IoT technology to manage all aspects of funeral services. The Internet of Things enables the use of data by applying sensors, and other human-computer communication to the Internet, and in 2022, Universidad Regional Autónoma de los Andes proposed a responsive website for optimizing the management of sales in the funeral service [11], and the funeral service implements Internet online operations in the collection of information on the deceased, and the service requirements, funeral goods transaction information, etc. have been transformed into real-time network data, and the contents of various funeral services under the Internet of Things (IoT) technology are also mostly stored in the form of network data, in which the network management of data and information becomes particularly important. The online and offline funeral service content gradually sharing and interoperability, resources should respond to each other, which is more stringent requirements for its network management. In the creation of funeral management information platform and funeral service network and trading platform, but also pay more attention to the transparency of the funeral service projects and charges details, in order to ensure that the people of the service content and charges informed understanding at the same time, but also to do a good job of information anti-theft measures, to protect the deceased and their relatives relevant information is not sold abuse. Simplify the funeral service business procedures, realize the humanization, sunshine, diversified "one-stop" service chain of online and offline combination of funeral network service platform construction, and constantly improve the Internet of things technology funeral service in addition to convenient and beneficial to the people in addition to the humane care, as well as the norms of the law, the network management of the quality and efficiency. While IoT technology offers many advantages, there are also challenges such as cybersecurity risks, data privacy issues and technology maintenance costs. There is also a need to ensure that technological solutions are harmonized with the sensitivity and cultural respect of funeral services.

3 Funeral Information Big Data Network Management Issues

3.1 Conflict with Traditional Humanistic Concepts

With the development of big data technology, the funeral industry has begun to utilize data analytics to improve service quality and operational efficiency may conflict with traditional humanistic concepts and values, triggering ethical and cultural considerations. Big data technologies enable funeral service providers to collect and analyze information on customer preferences, service usage patterns, and other information to provide more personalized services, emphasizing respect for the deceased and delicate handling of the family's emotions. In many cultures, information about the deceased is considered extremely private and sensitive, and needs to be treated with care. The collection and analysis of big data may violate the privacy rights of the deceased and the family or be seen as an infringement on the dignity of the deceased. In addition, over-reliance on data analysis may lead to a lack of human touch and affect the mourning experience of families.

Under the rapid development of the times, the acceleration of the time structure is becoming a worldwide problem (7), affecting some people's understanding of life and death, as well as the expression of the temporalization of death [12], and the traditional concept of funeral is also undergoing changes, such as the enhancement of the awareness of environmental protection, and ecological and environmentally friendly funeral methods have been emphasized. In the funeral reform, emphasis has begun to be placed on the inheritance and innovation of excellent traditional culture, with more emphasis on personalization, and funeral services have begun to provide more personalized options, such as customized funeral services and souvenirs. Holding a funeral in modern society is a very complex process that requires the intervention of professionals with specialized knowledge and skills [13]. In order to adapt to the changes in the funeral industry, countries have updated

and improved their laws and regulations accordingly to regulate new funeral service models. While traditional funeral practices are often closely related to specific cultural and religious beliefs, modern funeral services may respect traditions while incorporating more innovative elements, such as the use of technology for life memorialization. Both traditional funeral services and IoT funeral services are more than just a simple ceremony; they also carry the family's thoughts and feelings for the deceased. The Internet of Things funeral service focuses on the simplification of the ceremony and the traditional funeral focuses on the conflict between the ritualization, people will feel that the network service may lack face-to-face emotional communication and comfort, and how to take into account the humanistic care in the technologized service, pay attention to and satisfy the emotional needs of the deceased and their family members, at present, the Internet of Things funeral service does not have a comprehensive solution to solve the problem, so the big data technology for the funeral industry brings great potential, but at the same time, it needs to deeply understand and respect the traditional humanistic concepts. By formulating reasonable policies and strengthening communication, a balance between the two can be found to promote the harmonious development of the funeral industry. With the development of the times, the change of funeral concepts is also a general trend, and more and more people are choosing modernized funerals.

3.2 Lack and Enforcement of Relevant Laws and Regulations and Industry Norms Construction

Laws, regulations and industry norms provide a basic code of conduct for social and economic activities and ensure the healthy and orderly development of the industry. However, in some areas, especially in traditional industries such as funeral services, the relevant laws and regulations and norms may be inadequate or poorly enforced, leading to lagging development of the industry. Security threats are one of the biggest and growing challenges facing the IoT [14]. Despite the existence of some basic laws and regulations, the rapid development and technological innovations in the funeral service industry have exposed the inadequacies of the existing legal framework, especially in the areas of data protection, consumer rights, and service quality. Even if relevant laws and regulations exist, they are poorly enforced due to limited resources of regulatory agencies, insufficient law enforcement, or a lack of awareness of the regulations within the industry. China's 14th Five-Year Plan for the Development of Civil Affairs proposes to promote the integration of funeral services with "Internet Plus", explore and promote new modes of funeral services, such as remote farewells and online mourning, and enhance the convenience and intelligence of funeral services. Promoting the digitization of funeral services requires the maintenance of laws and regulations, but China's existing funeral-related laws and regulations include the Funeral Management Regulations and the Basic Data Specification for the Funeral Management Service Information System, and there is a lack of specialized legal norms in the field. From 2016 to 2023, China's Ministry of Civil Affairs issued a number of documents emphasizing the enhancement of funeral informatization standards and norms, the improvement of the level of funeral online government services, and the promotion of funeral services and the integration of funeral services with "Internet+". service level, promoting the interactive integration of funeral services online and offline, and promoting the construction of funeral big data governance capacity.

3.3 IoT Funeral Service Information Security Issues

In the context of digital development that emphasizes information and numbers, the network management of big data for funeral information faces the challenges of data security, privacy protection, data quality assurance, and the development of technical infrastructure. Protecting the privacy of the deceased and their families is a top priority in funeral information management. It is important to ensure that all data collected and analyzed are compliant with data protection regulations, such as GDPR [15], and that appropriate measures are taken to prevent data leakage. Weiqiu Long pointed out that there are cyber information and data security issues in the digital era, as well as the risky characteristics of cyber information data that depend on the continuous iteration of network operations and IT usage, and that keeping it secure and trustworthy is a major challenge [16]. Oliver Nock stated that the technology paradigm of the Internet of Things (IoT) has now reached a high level of maturity, but this is not the case for cybersecurity [17].

The key technologies of the Internet of Things mainly include radio frequency identification technology, sensor technology, embedded system technology and cloud computing technology, which have been applied to various industries today to realize the interconnection of things. The establishment of IoT funeral service digital platform needs to collect users' personal information as data for storage, which will inevitably involve network security issues, personal privacy leakage, identity impersonation, signaling congestion, unfair competition, equipment compatibility and interoperability issues and other network chaos cannot be ignored. In order to achieve long-term IoT funeral incremental services, it is necessary to strengthen network management, build a clear network environment, and develop a standardized network management system. While building a digital platform for Internet of Things funeral services, the state and the country should develop a unified business process specification and information system construction standards to ensure the compatibility and interoperability between systems and equipment. Establish a sound user data protection system to ensure that user data is not exposed and to strengthen the protection of personal information. Operate within the scope of legality to protect the legitimacy of data and consumer rights and interests. Integrate technologies such as the Internet of Things, mobile Internet, big data and cloud computing to realize the intelligence and automation of funeral services. User feedback is also needed, and the platform should support user interaction through websites, mobile APPs, microblogs and other means to provide convenient online services. Finally, it is also necessary to utilize big data analysis and IoT technology for service supervision to ensure service quality and establish a service credit evaluation system. T. A. Ahanger also pointed out that in the face of a variety of security threats on IoT nowadays,

proposing a corresponding security response mechanism for each logical level is considered to be a stable and lasting solution [14].

As shown in Figure 1, the situation of personal information leakage in 2023 is grim. Article 8 of the Law of the People's Republic of China on the Protection of Personal Information states that the handling of personal information should ensure the quality of personal information and avoid the adverse impact on the rights and interests of individuals due to inaccurate and incomplete personal information. Therefore, the concept of using massive user data only to provide customers with more accurate and efficient services should be strengthened, and there is a need to guard against data leakage, data dumping and other chaotic events, to keep users' personal information properly, and to improve the people's trust, attention and utilization of the IoT platform.

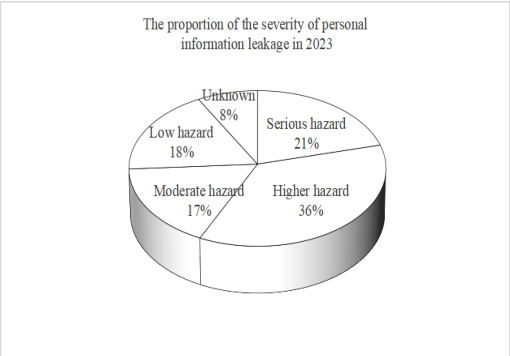

Figure 1. Proportion of the severity of personal information leakage in 2023
(Source: Flash Information Security and Strategic Research Center "2023 Data Breach Situation Analysis Report")

4 Improvement of Big Data Networked Management of Funeral Information

4.1 Re-conceptualizing Funerals

China's cremation rate has been increasing year by year (Figure 2), and the number of cremated remains in the funeral service industry will reach 5,966.456,000 on December 1, 2021, which is an increase from 5,558.154,000 on December 1, 2020, indicating that there is a trend of development from the burial of human remains to the trend of saving land resources, but the traditional concept of funeral is still deeply rooted, and the only way to promote further funeral reforms is to advance the concepts of people with the times. However, traditional funeral concepts are still deeply rooted, and only when people's concepts keep pace with the times can we promote further funeral reforms, and further development of Internet of Things (IoT) funeral services from tangible funerals to more land-saving services. The traditional concept of burial in the ground is difficult to be reversed in a short period of time, which is an obstacle at the ideological level in the process of reforming China's funeral system. In the existing general society, new funeral methods can be promoted through publicity and education, policy guidance, demonstration, respect for tradition, and economic incentives. The convenience of IoT funeral services can also be improved through physical display or on-site demonstration so that people can experience the high-tech features and operational convenience of IoT funeral services. However, the prerequisite is to understand and respect the traditional funeral culture and customs of different regions, to ensure that the promotion of IoT funeral services does not violate local cultural beliefs. Secondly, demonstration sites can be created to show the actual effect of IOT funeral services through successful cases, so that people can more intuitively feel the convenience and benefits it brings. In rural or remote mountainous areas where traditional concepts are deeply rooted, publicity and education can be carried out to advocate the concept of generous care and low funeral and promote the new funeral method of leaving no graves and replacing monuments with trees. The publicity and education work can not only change the traditional funeral concepts of the people, but also effectively take care of and pacify the people's emotions. Government departments can make use of the village sage in the people's trust and recognition, invite the village sage to carry out the Internet of Things funeral service tour and publicity, increase the people's understanding of the Internet of Things funeral service and trust, to a certain extent, play a role in reshaping the people's funeral concepts, and revolutionize the people's concept of funeral at the same time to help the people realize the far-reaching significance and value of the funeral reform.

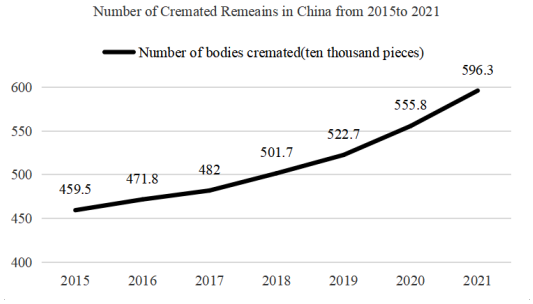

Figure 2. The number of cremated bodies in China from 2015 to 2021

4.2 Information Security for IoT Funeral Services

The rapid development of the Internet of Things (IoT) promotes the development of funeral service data, but at the same time, it also brings the possibility of leakage of funeral information, therefore, engaging in online funeral service should first have the corresponding legal qualification and business license, and also strengthen the concept of using the massive user data only to provide customers with a more accurate and efficient service, and the collection and use of any data must obtain the informed consent of the user, and should not apply the user information for private gain and infringement of the legitimate rights and interests of users, and should carry out strict data protection of user information to improve the people's trust, attention and utilization of the IoT platform. At the same time, security education and training for funeral service organizations should be carried out, and the person responsible for security should be required to be responsible for the education and training of security management personnel, so as to enable them to comprehensively master the theories, professional knowledge

and skills of security detection, control and management of funeral service organizations, and to be able to guide the actual work.

5 Conclusion

With the rapid development of Internet of Things (IoT) technology, its application in the field of funeral services is promising. IoT technology can significantly improve the efficiency and quality of funeral services and realize intelligent control of funeral facilities through remote monitoring and management, thus providing more personalized and high-quality services. In addition, the application of IoT technology also helps to promote the digital transformation of funeral services, through the construction of an information platform, to realize the integration and sharing of data, and to improve the science and accuracy of management decision-making. While realizing the construction of the Internet of Things for Funerals, it realizes the incremental services of the Internet of Things for Funerals, and then promotes the construction of the management mechanism of the Internet of Things for Funerals network platform.

However, the promotion and implementation of IoT funeral services also face some challenges, including technical standards, data security, user acceptance and other issues. In order to overcome these challenges, it is necessary to strengthen the top-level design, develop unified technical standards and data specifications, and ensure system compatibility and security. At the same time, it is also necessary to increase the training of funeral informatization talents and establish a professional talent team to support the development of IoT funeral services.

In short, the application of Internet of Things technology in the field of funeral services is a general trend, and through continuous technological innovation and policy guidance, it is expected to realize the modernization of funeral services, better meet the needs of the people, and promote the healthy development of the funeral business.

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