Research on the Application of Internet-based Technology in Integrated Meteorological Services

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Abstract. With the continuous development of information technology, the rapid progress of the Internet and computer technology, the life of the public has become convenient, fast, intelligent. A lot of computer software has gradually penetrated into people's work and life, playing an important role in every field. Similarly, Internet technology also plays a very important role in meteorological services, making a great contribution to the improvement of information processing efficiency in the integrated services of meteorological departments. To a certain extent, the application of Internet in meteorological services improves the quality of comprehensive meteorological services. This paper discusses the current situation of the integrated meteorological service, analyzes how the Internet should be applied in the integrated meteorological service and the requirements for its use, looks forward to the future, and considers the application effect of the Internet in the integrated meteorological service in the future.

1. Introduction
In recent years, the application of Internet technology in meteorological comprehensive services has become more and more extensive. With the popularization of "Internet + meteorology" in meteorological modernization, the application of Internet technology in meteorological comprehensive services become more and more extensive [1]. It can be seen that the popularization of Internet technology in meteorological comprehensive services plays a very important role in the development of China's meteorological undertakings. In recent years, the state has gradually increased its emphasis on meteorological work and increased the number of researchers conducting research on "Internet + meteorology". As a result, the scope of meteorological services has been continuously expanded, the specialization of meteorological services has been enhanced, and the capability of meteorological disaster monitoring, prediction and early warning has been significantly improved. Most of this is due to the development of Internet technology, which enables the meteorological industry to have a high-end information interaction system, which integrates and unifies the data of satellite data, meteorological network communication and satellite data broadcasting, and makes a great contribution to the improvement of meteorological service quality [2].

2. Current situation of meteorological operations
With the continuous progress of the society and the continuous improvement of the level of science and technology, China's meteorological undertakings have also been rapidly developed. In particular, the development of the Internet has brought great convenience to the meteorological business, and has greatly helped the collection, transmission and processing of meteorological information, making it significantly improved. Today, the meteorological service has three main characteristics: first, the information contained in the meteorological service is huge, information processing and analysis
requirements are high; Secondly, the improvement of people's living standard makes the public put forward higher requirements on the accuracy and timeliness of weather forecast. Finally, the effective dissemination of meteorological information needs more media to participate in it [3]. The communication object of meteorological information is the public. Only by spreading the information to the public can it better serve the people's livelihood.

3. Advantage analysis of Internet technology in meteorological comprehensive service

Internet technology has many advantages that cannot be replaced by human beings and has been widely used in meteorological services. Pick up & apos; Next, the advantages of Internet technology in meteorological comprehensive services are analyzed.

3.1. enhance the ability to collect and transmit meteorological information

There is a huge amount of meteorological information, which requires a lot of manpower and material resources in the process of collection. At the same time, due to the inevitable omissions and high possibility of errors in the process of manual collection, manual information collection is very inconvenient for meteorological work. Since the introduction of Internet technology into the integrated meteorological service, information collection has been brought about a great change. The collection of information has become more and more efficient and less and less mistakes have been made through the high-speed retrieval of the Internet. At the same time, the meteorological departments at various levels and departments. Need frequent exchange of information and information transmission, Internet access, transfer files and information exchange process is complex, but after the Internet into the meteorological operations, received the support of the wireless network and broadband network can achieve communication anytime and anywhere, anytime, anywhere information transmission, to improve the accuracy of weather reports timeliness and made a significant contribution [4].

In addition, many advanced systems have been built based on the Internet to collect meteorological information, such as the new generation of doppler weather radar, lightning location monitoring system and so on, the information of these systems can be transmitted at high speed through the Internet. With the continuous development of the Internet, the distortion of information in the transmission process is lower and lower, the accuracy is higher and higher, and the quality of meteorological services is higher and higher.

3.2. enhance the processing capacity of meteorological information

Weather analysis requires a lot of meteorological data, and also a lot of computation and processing. In this process, manual labor and brain power are required more than when collecting information, and the error of manual processing of information is larger. Therefore, there are high requirements for people who process information. After the Internet entered the weather industry, computers on the Internet were able to process large amounts of information at a single time with high accuracy. In this case, the Internet data comprehensive analysis system, help business personnel to reduce the workload, but also avoid manual error, so that the work efficiency has been significantly improved.

3.3. improve the accuracy of weather forecast

The accuracy of the weather forecast has an important impact on People's Daily work, life and travel, and is also an important sign of the development of meteorological business. Therefore, in order to improve the accuracy of the weather forecast, the meteorological staff has made a lot of efforts for "Internet + meteorology".

In the course of Internet information technology continues to advance, the meteorological department attaches great importance to the weather forecast and analysis all the more, - straight heavily in research on high performance computer system as the core of meteorological forecast analysis system, forecast analysis system as a whole the meteorological information, allow business people to suggested global, at the same time, the present data way is through the clear ICONS and graphics to display, let a person be clear at a glance, reduce the workload and improve work efficiency and quality.
This weather system can also help meteorologists to use different models to calculate in different situations, which makes a great contribution to improving the accuracy of weather forecast.

Figure 1. Analysis on the Advantages of Internet Technology in Integrated Meteorological Services.

4. Application analysis of Internet in meteorological comprehensive service
With the continuous development of Internet technology, there are more and more links of using Internet technology in the meteorological comprehensive service. Next, the application of Internet in the meteorological comprehensive service is analyzed.

4.1. ground communication
With the rapid development of science and technology and the continuous improvement of Internet information technology, the Internet has been gradually introduced into meteorological services to help improve the efficiency of meteorological work. One of the main application methods in the application process is ground communication.

Ground communications can to some extent operate and transmit information and data from the entire network at high speeds, and can be automatically repaired within the system in case of network anomalies or failures. This will ensure rapid operation of the entire system, reduce the actual cost of manual maintenance and improve the economic efficiency of the meteorological service.

In the future, with the development of Internet satellite and ground station communication technology, it forms a meteorological data communication network, which has the characteristics of wide coverage, high resource utilization, fast transmission speed and convenient monitoring. Ground communication is a good and high quality data transmission method for the transmission of meteorological information.

This communication method can improve the accuracy of meteorological forecast information, speed up the efficiency of meteorological information processing, help to improve the computing capacity of satellite data, and play an important role in improving the level of meteorological integrated services.

4.2. application of LAN technology
A local area network (LAN) is a network of computers in a region that are interconnected into a single computer. These computer groups can achieve network coverage, so that the coverage of the computer can more easily complete the file management, file sharing and other work requirements. At present, the LAN is widely used in the meteorological department, and the staff can easily realize the daily information interaction and publication and carry out frequent and complex information exchange. In the 2015 action plan of meteorological informatization (2015-2016), the state requires the improvement of the meteorological business Intranet, the integration of the weather business Intranet, the climate business Intranet, the meteorological product sharing platform, and the development of a national-level business management system. This integration enables national and local climate business systems to connect and become a unified gateway, enabling business personnel and management personnel at the four levels of national, provincial, regional and county level to realize the station access service.

4.3. mobile communication technology
In recent years, the gradual development of mobile communication technology has provided great convenience for meteorological information services. From 3G to 4G and now to 5G, the communication and transmission of meteorological information has made great progress. As the communication
bandwidth continues to expand, the transmission rate and quality of information in the case of 4G and 5G are getting higher and higher. At the same time, the fast network is conducive to the operation of meteorological information observation system, which is conducive to the faster collection and analysis of meteorological data.

5. **Thoughts on the future development of "Internet + meteorology"**

Current within-depth application in meteorological comprehensive business Internet technology, the work quality and efficiency of meteorological operations have been significantly improved, the meteorological department also puts forward development. "Internet + weather" of the new strategy and new methods, to better adapt to the needs of the development of era, combined with the development of the Internet to optimize the meteorological operations, further strengthen the Internet technology and the fusion of meteorological operations, continuously improve 'degree of the combination of "Internet + weather"'.

At present, some regions have tried to integrate meteorological observation with the Internet and other service systems, so that people can use the Internet technology to realize real-time data monitoring and real-time monitoring. Many experts are studying the construction of these platforms in order to make future weather more efficient and easy to understand [5]. Many regions have also started a higher level of research, the full integration of the weather platform with the Internet, through the cloud platform to achieve the rapid storage, processing and analysis of information, data acquisition and processing more convenient, innovative weather service model.

6. **Conclusion**

To sum up, today the Internet application in meteorological comprehensive business is becoming popular, the meteorological operation mode has changed dramatically, significantly reduced the workload of staff, reduce the mistakes in the work, and to a certain extent, improve the quality of the meteorological integrated service work, this will let people see the potential of Internet and meteorological comprehensive business integration, to further promote the depth of the fusion between them. Looking into the future, the integration of Internet and meteorological services will surely improve the overall strength and scientific and technological level of meteorological services and meet the needs of economic and social development and people's better life in the new era.

**Reference**

[1] Zhang Zhiping. The application of Internet technology in the meteorological integrated business in Wendeng District [J]. Agricultural Development and Equipment, 2019, (09): 77.

[2] Ren Xiaojuan. Application of Internet technology in comprehensive meteorological services [J]. Hubei Agricultural Mechanization, 2019, (17): 72.

[3] Liu Qihai, Jia Siyang, Wang Shuai, et al. On the application of virtualization technology in meteorological information network [J]. Computer Knowledge and Technology, 2017, 013 (023): 185,211.

[4] Liu Qihai, Jia Siyang, Wang Shuai, et al. Discuss the application of virtualization technology in meteorological information network [J]. Computer Knowledge and Technology, 2017, 013 (023): 185,211.

[5] Lei Yunlong. Research on the Application of Internet in Meteorological Services [J]. Scientific Research, 2016, 000 (002): P.202-202.