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The Management Platform for Online Rate of Meteorological Early-warning Loudspeakers

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Abstract The meteorological early-warning loudspeaker is a specific initiative for the meteorological departments to address the issues concerning issues concerning agriculture, countryside and farmers. Its significance is that it can promptly deliver the early-warning information concerning some meteorological disasters (such as torrential rains, typhoons, cold wave, hail) to the areas affected, so as to provide reference and protection for agricultural production and effectively reduce the loss of agricultural producers. Up to now, the meteorological early-warning loudspeakers in Benxi have covered the villages. However, due to irregular occurrence of meteorological disasters, the listeners will turn off the information receivers of meteorological early-warning loudspeakers when they fail to receive meteorological information for a long time, so that the users can not promptly know the early-warning information regarding some sudden meteorological disasters. In view of this, the meteorological departments have introduced a series of management measures, such as the daily use of loudspeakers to publish weather forecast information, aimed at improving the online rate and usage rate of meteorological loudspeakers. And the management platform for online rate of meteorological early-warning loudspeakers is an important part of the management system.

Key words Meteorological early-warning loudspeakers, Weather LAN, Storing process, SMS

1 Software and hardware requirements

(i) Management platform software (developed by C#, needing the support of Microsoft .NET Framework 3.5 framework). (ii) Management platform core (SQL2003 database). (iii) Hardware requirements (GSMMode module and SIM card sending SMS about online rate).

2 System functions

Fig. 1 shows the structure of management platform for online rate of meteorological early-warning loudspeakers.

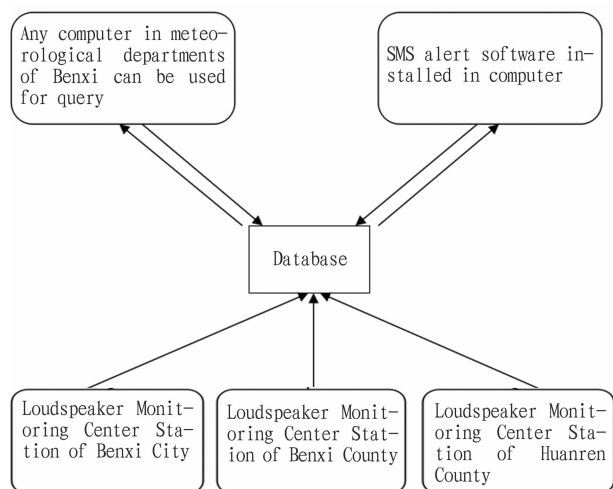


Fig. 1 Structure of management platform for online rate of meteorological early-warning loudspeakers

(i) Data collection. The decoding software is installed in every loudspeaker service center, and the interconnected meteorological wide area network is used to store the real-time information of loudspeaker online rate of each center in the database (database built in LAN of Benxi Meteorology Bureau. (ii) Database storage. There is only one table in database. A field in the table is set as the primary key, and the primary key is used to prevent duplication of data at the same time. The storing process is used for data storage and retrieval. The advantage of storing process lies in its fast execution, confidentiality, and query software and SMS software source code optimization. (iii) Loudspeaker online rate query. Owing to the wide area network of meteorological departments, we can install query software in any computer in Benxi, and the departments of Benxi can use this query software for local loudspeaker online rate query. (iv) SMS alert software of loudspeaker online rate. Based on database, according to the pre-set address book, the percentage of online rate of the day before in different counties, districts, towns and villages can be extracted and regularly sent to the persons in address book to remind them about the loudspeaker online rate of the day before. SMS alert software is automatically running.

3 Realization of functions

Benxi now has three loudspeaker monitoring center stations: Loudspeaker Monitoring Center Station of Benxi City; Loudspeaker Monitoring Center Station of Benxi County; Loudspeaker Monitoring Center Station of Huanren County. The main role is to monitor the online situation of loudspeakers (produced by Shenyang Hengyuantong Electronic Co. Ltd.). Monitoring center station produces a file per hour, and the content of this file is: the moment the file is generated, the center can monitor whether the loud-

speaker is online.

3.1 Data collection The real-time collection of loudspeaker online rate is based on the above-mentioned file (hereinafter referred to as "online file"). The data acquisition software uses the information stored in a default XML file to identify the information of various loudspeaker sites. At the beginning of software running, the information will be read into a <List > type variable, and when the software interprets online file, this variable will find the information of the site corresponding to online file. And then the information is sorted out into the required data to be written in the remote database through the LAN. The multi-threaded processing is used for the process of writing database.

3.2 Storing process in database In this system, the core of all tasks is the database. The database used here is SQL2003 database. The storing process method is used for the reading and writing of database. The advantages of stored procedures: (i) allowing modular programming, that is, we can call the process at any time in the program after creating only one process; (ii) allowing faster execution, that is, if the operation needs to execute or repeat a large number of SQL statements, the execution of storing process is faster than that of the SQL statement; (iii) reducing network traffic, for example, a process of operation in need of hundreds of SQL codes can be completed by one execution statement, and there is no need to send hundreds of lines of codes in the network; (iv) better security mechanism, that is, for the users who do not have permission to execute storing process, they can also be authorized to execute a stored process. In this database, six storing processes are established, and they perform different tasks and return different results.

3.3 Loudspeaker online rate query The loudspeaker online rate query is an effective measure adopted by Benxi Meteorological Bureau to manage the loudspeakers in the region. The basic query time unit of this query software is a month, that is, we can search the 1-N month online rate data. This is the need of loudspeaker management work. In the loudspeaker online rate query software,

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it needs 197 kinds of query results in 3 categories, and some query results can not be obtained at a time. Therefore, the query software is very powerful in function, and the combination of query methods is very flexible. If the query method of storing process is not used, many SQL query statements will appear in the source codes, reducing the execution efficiency and readability of the codes. The frequent connection to database will increase burden on the SQL database server and slow down the query. The query results are displayed in two ListView controls, and the query results can be saved to Excel documents according to needs. Thus the loudspeaker online rate is reported to the governments at all levels on this basis, and it can play a supervisory role.

3.4 Loudspeaker online rate SMS alert software This is an autorun software. The SMS transmission objects are stored in an Excel document in advance, and with the operation of the software, the information is read into memory variable. At 0:15 every day, the software will automatically calculate the loudspeaker online rate of the day before according to different areas in address list, and it is saved to a temporary text file. Then, based on user-defined time, the information in the temporary file is read, and sent to the persons in the address book by GSMMode module.

4 Conclusions

In 2015, Benxi Meteorological Bureau focused on improving the loudspeaker online rate, and achieved remarkable success. From January to July, the online rate of meteorological early-warning loudspeakers was 93.83% in the city; during the flood season (May to July), the online rate was 98.69%, much higher than that of Liaoning Provincial Meteorological Bureau; from May to September, the online rate achieved the goal of 85%.

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