Research on computer control method of marine environmental monitoring data quality

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Abstract: Our country has a vast coastal area, most of which are economically developed areas. At present, there are very large environmental pollution problems in these areas. Relevant state departments have paid attention to these problems. They have monitored the actual situation of marine ecological environment and can understand the sea in real time. The ecological environment and timely warning of problems. In this paper, the related plans of large data and virtual platform are used to study the monitoring of marine environmental data.

Key words: marine environment, monitoring data, data quality, computer control.

1. Preface
Oceans play a leading role in global climate and environment, and are closely related to human production and life. Their abundant resources are the important material basis for the future development of human society. To develop and utilize marine resources, we must first understand the ocean and conduct a comprehensive monitoring of the ocean. In view of this situation, this paper designs a set of marine information automatic monitoring data acquisition system, which is conducive to the centralized storage and management of marine data information and the monitoring of system working status.

The role of the ocean is self-evident, it has a great impact on the global climate and environment, but also related to our daily life, marine resources for our human development to play a solid foundation. This urges us to monitor the ocean comprehensively. Based on this, this paper proposes to design a set of marine information automatic monitoring data acquisition system, which is conducive to the development of related work.

2. Integration framework, model and data selection

2.1. Integration of related frameworks and models
Marine environmental monitoring system is a comprehensive system monitoring, including the monitoring of the overall marine environment, weather, water level, environment and many other aspects of monitoring. Many of the data we monitor are difficult to integrate because of its different data formats and storage methods, so that we can not monitor the marine environment as a whole, which is also the main problem we are facing in the marine monitoring system.
Now due to the development of science and technology, the full use of advanced technologies such as big data technology and virtual platform technology, the technology of marine environmental monitoring data has been successfully solved.

We can use ontology semantics in this way, which can reasonably deal with some differences in concepts and contents of ocean monitoring, so that many different users can use it smoothly, and make all kinds of software tools easy to operate at the same time, so as to facilitate the building of the system.

Ontology semantic framework can solve the differences in concepts and terminology in the field of ocean monitoring, make communication and communication between different users smoothly and maintain semantic equivalence, and enable interoperability between different tools, software and application systems, which is helpful to the construction of integrated systems. The MMI ORR framework is shown in Figure 1. The DIF of MMI ORR and IOOS can be used as a simulation framework for marine environmental monitoring information integration.

Fig. 1 Collaboration diagram of the main components of the semantic framework

MMI ORR is an ontological framework based on ocean observation. It uses ODM2 information model (as shown in Figure 2), which is used in many observation systems. ODM2 includes some data and information content of observation, collection, sensing and so on, which meet the content requirements of our daily marine data environment monitoring. ODM2 has a very good expansion effect and can fully apply to system data integration.
This paper fully studies the actual situation of ocean observation data at home and abroad, optimizes the MMIORR framework and ODM2 model, then fully uses the large data virtualization platform, and uses the large data technology to realize the integration of ocean environment monitoring data.

2.2. Selection of marine environmental monitoring data
According to the requirement of ODM2 information model, we have searched some relatively up-to-standard data from the relevant databases of the National Marine Environment Monitoring Center for research, including observation, buoy, remote sensing, geographic information system and other data.

3. Technology to solve key problems

3.1. Big data computing mode integration
Hadoop MapReduce generally uses a large amount of data processing offline. When we collect and analyze the monitoring data, we usually need to choose the computing model, such as Table 1.

| Typical large data computing mode                  | Typical system                                                                 |
|----------------------------------------------------|-------------------------------------------------------------------------------|
| Big data query analysis calculation                | HBase, Hive, Cassandra, Impala, Shark, Hana etc.                              |
| Batch processing calculation                       | MapReduce, Spark etc.                                                          |
| Flow calculation                                   | Scribe, Flume, Storm, S4, Spark, Steaming etc.                                |
| Iterative calculation                              | MapReduce, Twister, Spark etc.                                                 |
| **......**                                         | **......**                                                                     |

According to on-the-spot observation, on-the-spot sensing and different processing methods in remote sensing data, we should choose which calculation method to adopt and use resource management frameworks such as Mesos and Yarn to make full use of those models to data virtualization platform.

3.2. Metadata research
Metadata label can fully integrate monitoring data of different structures in many places, and can fully display data integration. It mainly contains four levels of content, user data, metadata (model), metamodel, ontology (meta-unitary model).

3.3. Application construction of open source data virtualization platform
Now we use virtualization platform to integrate large data. This process mainly includes three stages: data connection, organization and consumption. We can see that the structure of the data oriented virtual platform is shown in Figure 3.
After completing the above work, we can construct a system database, that is, to build a large multi-source heterogeneous database, which mainly includes several contents: data query and use; full-scale display; Rest service.

**Fig. 3 Data virtualization platform architecture**
4. Design of marine environmental monitoring system

According to the foregoing content, the technical route is shown in Figure 4.

![Fig. 4 Technical route map](image)

5. Summary

Based on the main problems existing in marine environmental monitoring data in our country, the characteristics of diverse data sources and data structures, this paper proposes a framework of two-tier metadata and ontology semantics based on data virtualization and big data technology, so as to realize the system integration of marine environmental monitoring. It has a certain reference value to solve a large number of multi-source heterogeneous data integration in marine environmental monitoring data.

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