Based on the DDMap API Web frontend geographic data analyze and visualization

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SUMMARY

As the volume of spatiotemporal data experiences explosive growth, traditional statistical charts struggle to reveal the rich implicit spatiotemporal information contained within massive datasets. To address this challenge, this paper focuses on designing and constructing a user-oriented general thematic data visual analysis system aimed at deeply mining and intuitively showcasing the intrinsic value of spatiotemporal data. This study conducts in-depth research on web-based front-end geographic data visualization technologies and the Cassandra distributed database. Based on this foundation, and relying on the DDMap software platform independently developed by the GIS Institute of the Chinese Academy of Surveying and Mapping, this paper successfully develops a web front-end geographic data visualization interface. This interface fully utilizes DDMap's powerful map rendering and data processing capabilities to vividly and intuitively present the spatiotemporal information of geographic data on maps.

Using Linyi City as a research area, this paper selects rainfall analysis and comprehensive population analysis as two thematic studies for in-depth exploration. The thematic data visualization effectively demonstrates the distribution and changing trends of rainfall in Linyi City over different times and spaces, while also deeply analyzing the spatiotemporal distribution characteristics of population data and the underlying socioeconomic factors. These visualization effects not only enhance the readability and comprehensibility of the data but also provide strong data support for decision-makers.

Additionally, this paper employs the Cassandra distributed database to store, manage, and analyze these massive spatiotemporal datasets. Known for its high scalability, performance, and fault tolerance, Cassandra effectively addresses the challenges of big data storage and processing. By integrating the Cassandra database, this study alleviates the pressure on front-end map rendering to

some extent, improving the overall response speed and query analysis efficiency of the system. Furthermore, Cassandra offers rich querying and analytical capabilities, enabling the rapid extraction of valuable information from vast datasets, thus providing robust technical support for thematic data visual analysis.

In conclusion, the general thematic data visual analysis system designed in this paper not only achieves a comprehensive display of the spatiotemporal information of geographic data but also enhances the system's data storage, management, and analysis capabilities through the introduction of the Cassandra distributed database. The system has demonstrated significant application effects in thematic studies such as rainfall analysis and comprehensive population analysis in Linyi City, providing new ideas and methods for the in-depth mining and visual presentation of spatiotemporal data.