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Analysis of Current Status and Future Prospects of Big Data Applications (Postprint)

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Abstract

With the continuous development of information technology, contemporary society has gradually entered the information age. The development and progress of our society are inseparably related to big data, whose widespread application has brought considerable convenience to people's work and daily life. To achieve effective application of big data, we must fully leverage its positive role in economic, social, and political domains, continuously analyze its characteristics, and enable our country's data systems to possess innovation and proactivity, thereby promoting the development of our society. This paper analyzes the current application status and future prospects of big data.

Full Text

Preamble

As information technology continues to develop, society has gradually entered the information age. China's social development and progress are inseparably linked to big data, whose widespread application has brought significant convenience to both work and daily life. To achieve effective utilization of big data, we must fully leverage its positive roles in economic, social, and political domains, continuously analyze its characteristics, and enable China's data systems to become innovative and proactive, thereby promoting national social development. This paper analyzes the current application status and future prospects of big data.

Keywords: status analysis; prospects; big data; application

1. Application Evolution

1.1 Business Application Evolution

Traditional data processing methods suffered from significant limitations, particularly in data storage. As data volumes increased dramatically, conventional approaches to data access became inadequate. However, with the development of modern technology, new techniques have emerged that provide far greater convenience for information retrieval and processing within large datasets, fundamentally transforming how people interact with data content.

1.2 Network Application Evolution

Early network services employed relatively basic technological approaches. Data mining techniques found initial application in search engines, where they processed query data to improve retrieval accuracy. With the subsequent development of multimedia content—including text, images, and video—semi-structured and unstructured data processing technologies became necessary, prompting further evolution in network application architectures.

1.3 Scientific Application Evolution

In scientific domains, sensor-based data collection has become a primary application mode. For instance, in scientific experimental processes, sensor networks generate extensive data encompassing various parameters and simulation results. This data-rich environment requires sophisticated processing capabilities to extract meaningful insights.

2. Sector-Specific Applications

2.1 Enterprise Applications

Within enterprises, big data applications effectively enhance core competitiveness and market positioning. By leveraging big data, companies can monitor market conditions in real-time, dynamically adjust business models, and conduct targeted product research and development based on detailed customer preference analysis. This ensures that products align closely with market demands. Furthermore, big data optimizes personnel allocation and operational efficiency, while enabling predictive analytics for resource planning, ultimately supporting sustainable enterprise development.

2.2 Internet of Things Applications

The Internet of Things (IoT) derives substantial benefits from big data technologies, which provide comprehensive data support across interconnected devices. IoT products facilitate data exchange, significantly increasing market information accessibility and operational convenience. However, as IoT deployment

becomes more widespread, the associated data volume grows exponentially, creating challenges in data management and application quality. For example, logistics companies utilize big data to optimize supply chain operations, enabling real-time tracking and significantly improving logistical efficiency.

2.3 Social Platform Applications

In social interaction contexts, big data plays a crucial role in enhancing user experience. Derived primarily from social platforms themselves, big data enables more convenient user engagement. Applications such as WeChat and Weibo leverage big data analytics to process user behavior patterns, deliver personalized services, and increase user satisfaction. By collecting and analyzing individual user data, these platforms can provide tailored information and services, effectively driving the development of social networking technologies.

2.4 Smart Grid Applications

The development of smart grids has introduced considerable convenience to daily life, with big data serving as a fundamental driver of this transformation. By effectively integrating information technology with grid infrastructure, big data enables large-scale analysis of electricity consumption patterns. This capability allows for accurate prediction of potential failures, prevention of service disruptions, and overall improvement in grid reliability. The resulting intelligent systems enhance both operational efficiency and user convenience while minimizing outage risks.

2.5 Broadcasting and Media Applications

Big data technology has profoundly impacted the broadcasting and media industry. Modern data collection and analysis techniques enable media organizations to gather audience data efficiently and process it at scale. Information analysis—defined as the use of computational technology to collect and interpret data—allows broadcasters to predict audience preferences and tailor content accordingly. This data-driven approach has become essential for media development, facilitating more effective audience engagement and content personalization.

3. Development Trends

3.1 Data Development Trends

The advent of the big data era has precipitated rapidly increasing demand for data across all sectors. Traditional IT technologies alone cannot accommodate this growth. Consequently, data development trends are evolving toward multi-modal and more complex structural forms to better handle diverse data types. This shift enables more sophisticated data processing capabilities, as exemplified by comprehensive data models employed by major technology companies.

3.2 Data Resource Utilization

The widespread application of big data has led to increasingly rich data resources. Large volumes of information now reside within data technology systems. Effective integration and utilization of these resources in organizational processes significantly promotes enterprise development and builds core competitive advantages. Technical personnel can consolidate disparate data resources, analyze them systematically, and transform raw information into strategic assets that support business expansion and operational excellence.

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Note: Figure translations are in progress. See original paper for figures.

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