The Applications of Big Data Technology to Electronic Information System

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Abstract. Based upon the synopsis of electronic information system and big data technology, this paper puts forward elementary survey of big data technology and overall architecture of electronic information system, and sets forth related applications of big data technology to electronic information system, such as strengthening the construction of system data engineering, intensifying data apperceiving capability, and advancing data decision-making capability. This will benefit the system perfection and capability advancement of electronic information system.

Introduction
Electronic information system is constructed to organize related resources, conduct information processing and actualize business activities. Along with the theoretical and practical development of computer network, big data and related technologies, electronic information system needs must be properly improved to deal with various kinds of information and real-time transaction, and satisfy the requirements of dynamic function evolvement and fast assignment realization [1, 2, 3].

Big data is generally considered to be information assets of magnanimity, diversification and high increase rate that possess strong capabilities of decision-making sustainment, percipience discovery and flow optimization. It is marked by volume, variety, velocity and value. Big data is essentially systematic and intellectualized information organization models and service modes that can meet the needs of business information and decision activities more effectively.

To view from the life cycle of information system, big data need to pass through stages of data provision, storage management, calculation disposing, data analysis, and knowledge exhibition. Big data technologies comprise a series of technologies that deal with a great deal of structured, semi-structured and non-structured data by nontraditional approaches such as big data collection technology, analysis technology, calculation technology and storage management technology.

Resume
Big data technology is increasingly involved in the all process layers of electronic information system, so that electronic information system can carry out efficient storage and high-speed transfer, effective obtainment and fast retrieve of magnanimity data, and the translation into knowledge for decision-making [2, 4, 5].

Big data technology administers magnanimity data by new thinking and methods, and constitutes one system of independent operation and flexible availability. It can strengthen data circulation degree and provides users with quick approach to the obtainment of business dynamic and state information. Big data technology systematically aims at key demands of business decision activities, prudently deals with complicated data by new means and tools, intellectually syncretizes and analyses present and history data, and properly provides precise trend prognostication and conclusion report, so that users can finely grasp business pulses and dominate activity courses.

Appropriate devotion on big data technology will certainly give rise to a new wave of base technologies, and be materialized into related analysis and management product and platform. The
integrity value of big data represents as cooperation of manifold technologies. File system provides support to bottom storage capacity, database system is convenient for data management, indexes are constructed to realize data inquiry, and data analysis technology devotes to knowledge obtainment.

Big data technology is essentially to obtain valuable information from various and enormous data by means of sensor network and sociality media. Data collection is the first step to obtain structural, semi-structural and non-structural data, and data pretreatment and storage are carried through, while a lot of data is cleaned up, integrated and transformed. Furthermore, data analysis and mining are processed to gain important information via parallel computing, real time computing, stream computing and deepness learning technologies.

There are many big data tools that include integrated processing platform and specific applications, and they are shown in Table 1.

<table>
<thead>
<tr>
<th>Table 1. The list of big data tools.</th>
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<tbody>
<tr>
<td>Category</td>
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<tr>
<td>Platform</td>
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<td>Local</td>
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<td>Cloud</td>
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<td>Stream</td>
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<tr>
<td>Query Language</td>
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<tr>
<td>Statistic and Machine Learning</td>
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<td>Log Processing</td>
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**System Architecture**

In virtue of its intellectuality, practicability and expansibility, big data technology is certainly applied to the construction of electronic information system. The overall structure of electronic information system generally comprises system application layer, function service layer, common supportive layer, basic data layer, data supportive layer and physical layer [5, 6].

**System Application Layer.** It aims at the specific application that includes normal affairs and special missions.

**Function Service Layer.** It provides special components and supportive services such as circes synthesis, business scheme and task cooperation for the business service of information transacting.

**Common Service Layer.** It provides common components and supportive services such as information syncretization and decision support services for uniform service of information transacting.

**Basic Service Layer.** It provides the services such as security, message and directory services for upper application.

**Data Supportive Layer.** It provides the monitoring and management of synthesis database, database and sharing knowledge database for the business application and universal application.

**Physical Layer.** It provides infrastructure services and substance support for system service and application.
During the construction of electronic information system, the technology research, validation and integration are carried out to strengthen overall system capability, development works sequentially deepen with respect to the physical integration, data integration and function integration along with phase transition, and system stability and interoperation level are continually stepped up.

**Technology Application**

Big data technology can advance the function and performances of electronic information system, and guarantee business information and action advantage [6, 7, 8].

**Strengthening the Construction of System Data Engineering**

System data engineering should be advanced to demonstrate data resources requirements of related fields, establish unitive metadata set and basic database, and ascertain data structure, data precision and data scope; meantime data transfer platform is established to provide sufficient data support for data collection and data processing, and data center is constructed to guarantee requirements for computation capability by means of cloud storage and cloud service.

In the process of data centre construction, virtualization technology is introduced to conform existed faculty and resources to unitive system scheme, cloud storage technology and distributed file system are integrated to ensure receiving and sharing of business information so as to satisfy the demand of continuous running, flexible capacity and balanced load, and various information support modes and perfect disaster avoidance system are adopted to guarantee data and information security. The framework of system data centre is shown in Figure 1.

![Figure 1. The framework of system data centre.](image)

**Intensifying Data Apperceiving Capability**

Big data technology should be applied to apperceiving realm that comprises the collection, processing, distribution and exhibition of apperceiving data. Primary data from various sources is preserved, processed and given out to exhibition layer of multi-configuration based on the kernel of data apperceiving service, so as to step up veracity and real time of information delivery.

Based on the related big data and cloud computing technologies, users can not only carry through data collection, create and visualize knowledge, and arrive at new cognition, but also process knowledge searching and knowledge acquiring. Data processing technologies, such as big data analysis, online analysis and data excavation technology, are applied to the operation of knowledge database, and various configurations are exhibited via user customization, multi-terminal match and
multi-dimension exhibition while subscription and distribution service is available. The framework of data apperceiving system is shown in Figure 2.

Advancing Data Decision-Making Capability

Big data technology should be introduced to decision-making system so as to promote technical dominance of decision-making. Composite data structure can meet the application needs of field decision making, trend analysis and pattern identification can supply mature data product and decision information service, and further it can ensure information availability and action dominance.

Figure 2. The framework of data apperceiving system.

Big data analysis, online analysis and data excavation technologies are properly applied to databases from multi-sources so that decision information and decision knowledge are produced to improve model database and knowledge database, and decision report is established to devote to business decision making, while business information is fed back to business department for further demand and to related database for new knowledge. The framework of decision support system is shown in Figure 3.
Summary
In the face of new situation and fast development of information technology, big data technology should be further applied to the electronic information system, so as to strengthen overall scheme, establish new pattern architecture of electronic information system, promote the syncretization of big data technology, especially a series of kernel technologies such as system data framework, data apperceiving and syncretization technology, decision support technology and information protection technology, enhance apperceiving and decision-making capability of system big data, and accelerate the development toward intelligentization and agility of electronic information system.

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References

