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BIG DATA AND CLOUD COMPUTING: INNOVATION OPPORTUNITIES AND CHALLENGES

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ABSTRACT

Big Data is a new paradigm that has emerged over the past few years, providing abundant data as well as opportunities to improve and/or enable research and decision-support applications with unprecedented value for digital earth applications including business, sciences, and engineering. Big Data has been described as a "data deluge" and "data lake." At the same time, Big Data poses difficulties for digital earth in terms of storing the data, transporting the data, processing the data, mining the data, and serving the data. Cloud computing provides fundamental support to address the challenges with shared computing resources including computing, storage, networking, and analytical software. The application of these resources has fostered impressive advancements in Big Data. Cloud computing provides fundamental support to address the challenges with shared computing resources including computing, storage, networking, and analytical software. This paper examines the two new frontiers of Big Data and cloud computing, and it discusses the benefits and drawbacks of using cloud computing to tackle Big Data in the digital earth and other relevant scientific domains. Additionally, the paper examines the advantages and drawbacks of using cloud computing to tackle Big Data. The following remarks are presented from the perspectives of a general introduction, sources, difficulties, the status of technology, and research opportunities: I science discoveries and application developments are made possible by both cloud computing and Big Data; (ii) cloud computing offers major solutions for Big Data; (iii) Big Data, spatiotemporal thinking, and various application domains are driving the advancement of cloud computing and relevant technologies with new requirements; and (iv) the intrinsic spatiotemporal principles of Big Data and geospatial sciences provide the source for finding technical and theoretical solutions to optimize cloud computing.

Keywords : Spatiotemporal Computing, Digital Earth, Geospatial Cyber infrastructure, Geoinformatics, Cyber GIS, Smart Citie