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Big Data Analytics for Healthcare Applications Mobile Cloud Based

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ABSTRACT

Mobile devices are increasingly becoming one and more indispensable part of our daily lives, as it facilitates to perform various useful tasks. Mobile cloud integrates mobile and cloud computing to extend the benefits of the cloud itself, and overcome limitations in times of cloud such as limited memory, CPU power, big data analytics technology allows extracting value from data that has four Vs: volume, variety, speed, and honesty. This paper discusses mobile cloud-based healthcare and big data analytics in its application. The conclusion is drawn about the design of healthcare systems using big data and mobile cloud technologies.

KEYWORDS: Big Data, Health, Mobile Cloud

1. Introduction

Lately there have been many advances in the field of information and communication technology that have changed the world in just one genggeman. Among these technologies are Cloud Computing, wireless communication (3G/4G/5G), and other competitive mobile device industries. Mobile devices can provide a variety of services to facilitate lifestyle. They are integrated into our daily routines to help perform a variety of tasks such as location, time management, image processing, buying and selling online, and so on. There's an app to help you measure and manage your health through blood pressure, exercise, and weight loss apps.

Mobile device mobility features are changing the way people use various technologies around the world. No longer need to stay in your office doing your work or daily activities, Users can move to many locations based on many parameters for ease of life such as efficiency, stable and fast internet connection and data privacy not worrying to impose the need to protect user data from unauthorized disclosure especially through insecure wireless channels. All these features of mobile devices and incorporating them in our lives accelerate the transition towards greener and smarter cities.

This paper discusses the concept of networked health and its empowerment through cloud computing, computing and big data analytics technology. The motivation and development of networked healthcare applications and systems is presented along with the adoption of cloud computing in healthcare. The cloud-based mobile cloud computing infrastructure that will be used for healthcare big data applications is described. Big data techniques, tools, and applications

Analytics are reviewed. Conclusions were drawn about the design of networked healthcare systems using big data and mobile cloud computing technologies.

2. Methodology

Data collection was done in this study by modeling data from patients collected in Excel and client applications for data entry and user interaction interfaces, and bridging the gap between client and Cloud, running Cloud-scale data analysis algorithms to extract information from large data sets, running data visualizations, and then saving

the data back to the Cloud with the help of spreadsheets. This development is a way between any client application like Excel and a new class of data analysis algorithms that are being implemented in the Cloud. It then calls Cloud-scale data analysis algorithms to extract information from large data sets, runs data visualizations, and then saves the data back to the Cloud with the help of spreadsheets.

In research on health care applications, there are several stages of the process carried out. Modeling used with mobile computing is becoming a better solution in the use of health big data networks.

In a mobile cloud architecture with relevant healthcare applications can store and manage its data. Modeling methods that utilize high-performance computing and are able to handle big data, will be required in healthcare learning. Networked healthcare systems are presented along with the adoption of cloud computing in healthcare. The Cloudlet-based Mobile Cloud Computing infrastructure to be used for healthcare big data applications is shown in figure 1. Cloudlet can be considered as a better cloud to deploy with many advantages to avoid some cloud limitations.

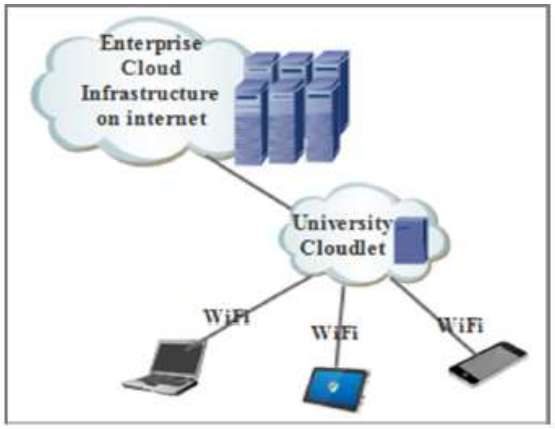

Figure 1. Cloudlet concept

3. Results and discussion

There are many mobile cloud computing infrastructures for different uses including healthcare applications. Traditional infrastructure involves a set of cloud resources that are accessed remotely by users of different types of devices over the Internet as shown in Figure 1.

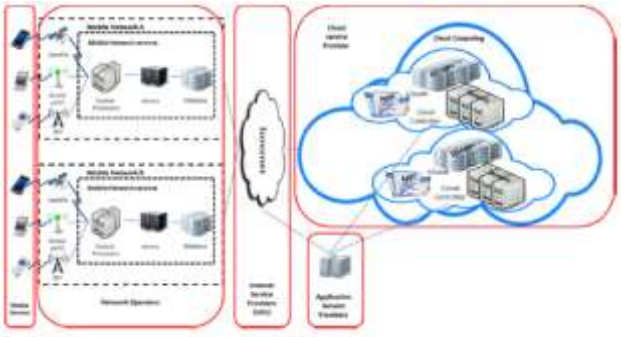

Figure 2: Traditional infrastructure of mobile cloud computing

The massive spread of mobile applications in all and every area of people's lives results in large amounts of data that need to be processed and analyzed efficiently in less time and power complexity imposes the need for a new competitive MCC (Mobile Cloud Computing) model in addition to the traditional model. Framework and Performance Improvement using Cloudlet. Cloudlet (Figure 1) can be considered a better cloud to deploy with many advantages to avoid some cloud limitations. Therefore, cloudlets that have limited resources will not help, and may adversely affect performance. With this, it is believed that the cloudlet scheme is introduced as an intermediate stage between clouds. And mobile devices have an excellent opportunity to address MCC-related challenges such as latency and power consumption [1].

However, in some cases, mobile users have no choice but to connect directly to EC. This happens when a mobile device needs to update files stored in the Enterprise Cloud or request certain services that are not available in Cloudlet.

Motivated by the cloudlet concept, the authors in [2]. built mobile cloud systems for use in various applications such as universities. Their system uses different sensors to perform multiple tasks. They propose and implement two main applications in traffic management and fire detection and data from sensors is processed in mobile

cloud systems. In the same context, researchers in introduced an efficient cloudlet MCC model where mobile users communicate directly to the cloudlet rather than the enterprise cloud. Their model can be applied in many environments including hospitals where large amounts of data need to be stored and processed.

Some of this large amount of data can be processed directly, but some applications require time for data processing, such as healthcare applications where data analysis and extracting informed decisions makes the difference between a patient's life and death. These MCC cloudlets are placed near hospitals and cover areas accessible by authorized persons who can access patient information and follow their status remotely. In addition, in this model, there is a large amount of patient data generated and needs to be analyzed, and the next section deals with data analysis.

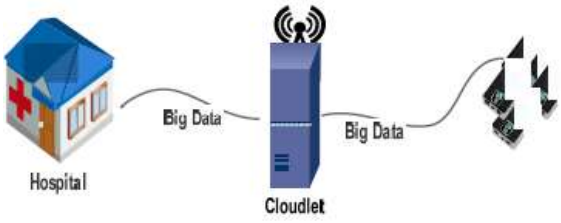

Figure 3: Healthcare Big Data at MCC

3.1 Data Analysis

The science of examining raw data with the aim of drawing conclusions or examining, cleaning, modeling and transforming data with the aim of highlighting useful information is called data analytics [4]. This method is used in many industries to enable managers to take the best business decisions and verify or disprove existing theories and models. This science differs from data mining by the purpose, scope and focus of analysis, in data mining, miners sort through large data sets with the help of sophisticated software to identify hidden relationships and undiscovered patterns. While data analytics focuses on conclusions reached based on evidence and reasoning, methods obtain results based only on what the researcher already knows. Recently Big Data and Big Data Analytics are being used to describe data sets and analytics methods into very large applications, for example, TB to exabytes and complex from sensors to social media data that require sophisticated and unique data management, storage, and data management, visualization and analysis technology. See for example [5].

It is said [6] Scattersheets are an established data collection and analysis tool in technical computing, business, and academia. Excel is an example that offers an attractive user interface and provides an easy-to-use data entry model that supports interactivity for what-if analysis. The downside of spreadsheets and other common client applications e.g., Excel is that they don't support analytical computing and large-scale data exploration. Researchers in the fields of social sciences to environmental sciences face a flood of data and they often sit on worksheets or other client applications with a lack of easy methods to explore data, or use scalable analysis models over data or find related data sets. Developers developed a Cloud data analytics service based on Daytona.

Daytona is an interactive MapReduce runtime optimized for data analysis. In its model, Excel and other client applications provide users with data entry and other interaction interfaces, and bridge the gap between clients and the Cloud, users can use these services to discover and import data from the Cloud, run Cloud-scale data analysis algorithms to extract information from large data sets, run data visualizations, and then save the data back to Cloud with the help of spreadsheets or other client applications already familiar to users. This development is a way between any client application like Excel and a new class of data analysis algorithms that are being implemented in the Cloud. Users only need to select analytical algorithms from the Excel research tape with attention to how to start a virtual machine in the Cloud or how to scale the execution of the

selected algorithm in the Cloud. call Cloud-scale data analysis algorithms to extract information from large data sets, run data visualizations, and then save the data back to the Cloud with the help of spreadsheets or other client applications that users are already familiar with.

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3.2 Tools for analyzing data

Users can drag and drop files into the work area and get help from the software to suggest visualization types and then customize everything, for example, labels and tooltips for size, legend display and interactive filters. This tool runs on Windows 7, Vista, XP, Server 2008, 2003.

Talend Open Studio for Big Data is an open source vendor for data analytics that provides everything you need to easily design and implement big data transfer and big data analysis using Hadoop technology. With this feature, Users of rich open-source solutions can quickly work with big data and Hadoop. Talend is one of the largest companies with an open source business model. It was established in 2005 and is the first commercial open-source data integration software vendor. Hadoop is also an open-source software framework that supports data-intensive distributed applications. Map/reduce a computational paradigm is implemented by Hadoop, where applications are divided into various parts of work and Each can be executed or executed on any node in the cluster. Hadoop is written in Javanese, it is a top-level Apache project under construction and used by a global community of contributors. It operates on a cross-platform, the type is a distributed file system, and the developer of this software is the Apache Software Foundation. Consisting of a Hadoop Common (package) that offers access to file systems supported by Hadoop, this package contains the JAR files and scripts needed to start Hadoop. This package also provides documentation, source code, and various projects. Another open source tool for data analysis is called Weka [8]. which is a collection of machine learning algorithms for data mining. These cloud algorithms are called from java code or directly applied to data set. Weka provides tools for data pre-processing, regression, classification, clustering, visualization, and association rules. Weka has two versions main, (i) stable version and (ii) development version. The stable version is the latest edition of the data

mining book that only accepts bug fixes. A development version that receives new features and exhibition package management. a system that makes it easy for Weka developers to add new methods to Weka. To download the latest Weka nightly, snapshots from the subversion repository are taken and compiled and put together in a zip file for download, Weka 3.6 is the latest stable version available. Another tool called Rapid Analytics is open source and is one of the most widely used data mining and predictive analytics solutions worldwide, this tool is built on around RapidMiner which is a powerful engine for data analysis. It relies on industry-standard application servers. Users can schedule the execution of analytical processes remotely. It also offers web-based access to results, reports and processes built on industry-standard applications and web services. It combines the advantages of RapidMiner with a collaborative work environment and dedicated computing power.

4. Conclusion

Mobile devices are increasingly becoming an indispensable part of people's daily lives, facilitating to perform various useful tasks such as scheduling meetings, ordering food, booking flight tickets, buying cars online, real-time navigation, etc. Mobile cloud computing maximizes the utilization of mobile devices' capabilities to run compute-intensive applications.

The motivation and development of networked healthcare applications and systems is presented along with the adoption of cloud computing in healthcare. Mobile Cloud Computing Infrastructure based.

Healthcare applications require large amounts of computing and communication resources, and involve dynamic access to large amounts of data inside and outside healthcare organizations. This is discussed as the main motivation of health network systems where big data such as patient records need to be analyzed in real time, An important trend to enable the next generation of networked healthcare systems is the networking and integration of healthcare and other smart city systems.

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