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Managing Healthcare and Medical Information Utilizing Cloud Computing

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Cloud Computing provides functionality for managing information data in a distributed, ubiquitous and pervasive manner supporting several platforms, systems and applications. This work presents the implementation of a mobile system that enables electronic healthcare data storage, update and retrieval using Cloud Computing. The mobile application is developed using Google's Android operating system and provides management of patient health records and medical images (supporting DICOM format and JPEG2000 coding).

Detailed analysis

Cloud Computing provides the facility to access shared resources and common infrastructure in a ubiquitous and pervasive manner, offering services on demand over the network to perform operations that meet changing needs in electronic healthcare application. The location of physical resources and devices being accessed are typically not known to the end user. It also provides facilities for users to develop, deploy and manage their applications 'on the cloud', which entails virtualization of resources that maintains and manages itself. Pervasive healthcare systems focus towards achieving two specific goals: the availability of e-health applications and medical information anywhere and anytime and the invisibility of computing. Applications and interfaces that are able to automatically process data provided by medical devices and sensors, exchange knowledge and make intelligent decisions in a given context are strongly desirable. Natural user interactions with such applications are based on autonomy, avoiding the need for the user to control every action, and adaptivity, so that they are contextualized and personalized, delivering the right information and decision any time.

Conclusions and Future Work

The sharing of medical information resources (electronic health data and corresponding processing applications) is a key factor playing an important role towards the successful adoption of pervasive healthcare systems. Moreover, due to the mobility of the patients and the medical personnel, healthcare networks are increasingly equipped with capabilities to share healthcare-related information among the various actors of electronic health. In this context the concept of Cloud Computing will attract the interest of scientists and developers working in the field of biomedical informatics.

Impact

In this context a pervasive healthcare information management system for mobile devices utilizing Cloud Computing and Android Operating System has been developed. The prevalent functionality of the application is to provide medical experts and patients with a mobile user interface for managing healthcare information. The latter interprets into storing, querying and retrieving medical images (e.g., CT scans, MRIs, US etc.), patient health records and patient-related medical data (e.g., biosignals). The data may reside at a distributed Cloud Storage facility, initially uploaded/stored by medical personnel through a Hospital Information System (HIS). In order to be interoperable with a variety of Cloud Computing infrastructures, the communication

and data exchange has to be performed through non-proprietary, open and interoperable communication standards. Utilizing Web Services connectivity and Android OS supports the following functionality: Seamless connection to Cloud Computing storage utilizing Web Services, Patient Health Record Management, DICOM image viewing support, JPEG2000 viewing support, Image annotation support and proper user authentication and data encryption.

Keywords

Cloud Computing, pervasive healthcare management, mobile interfaces

URL for further information

not available yet

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