

Performance Analysis of Search Medical Imaging Service on Cloud Storage Using Decision Trees

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Abstract : Telemedicine services use a large amount of data, most of which are diagnostic images in Digital Imaging and Communications in Medicine (DICOM) and Health Level Seven (HL7) formats. Metadata is generated from each related image to support their identification. This study presents the use of decision trees for the optimization of information search processes for diagnostic images, hosted on the cloud server. To analyze the performance in the server, the following quality of service (QoS) metrics are evaluated: delay, bandwidth, jitter, latency and throughput in five test scenarios for a total of 26 experiments during the loading and downloading of DICOM images, hosted by the telemedicine group server of the Universidad Militar Nueva Granada, Bogotá, Colombia. By applying decision trees as a data mining technique and comparing it with the sequential search, it was possible to evaluate the search times of diagnostic images in the server. The results show that by using the metadata in decision trees, the search times are substantially improved, the computational resources are optimized and the request management of the telemedicine image service is improved. Based on the experiments carried out, search efficiency increased by 45% in relation to the sequential search, given that, when downloading a diagnostic image, false positives are avoided in management and acquisition processes of said information. It is concluded that, for the diagnostic images services in telemedicine, the technique of decision trees guarantees the accessibility and robustness in the acquisition and manipulation of medical images, in improvement of the diagnoses and medical procedures in patients.

Keywords : cloud storage, decision trees, diagnostic image, search, telemedicine

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