

Chapter 25

A Simple Web-Based Image Database System for Facilitating Medical Care in Dermatological Clinics

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ABSTRACT

In Japan, electronic health record systems are gradually becoming popular at large hospitals, but are not yet frequently implemented in clinics. This is due to both prohibitive costs and a lack of interest in checking electronic health records on the part of patients. Doctors also may be opposed to showing patients their health records, as it then may require a doctor to let patients observe images to check for improvement of symptoms at follow-up. In this study, the authors developed a database system of dermatological images accessible to both doctors and patients. In this system, doctors can photograph affected skin areas and tag the images with keywords, such as patient ID or name, disease or diagnosis, symptoms, affected bodily regions, and free words. The images and keyword tags are transmitted to a database housed on an Internet server. The authors implemented this system on a smartphone for quick and easy access during medical examination and on a tablet terminal for patients to use while waiting in the clinic. Using the tablet terminal, a doctor and patient may check for improvement of symptoms together.

DOI: 10.4018/978-1-4666-2770-3.ch025

INTRODUCTION

In the field of Information and Communication Technology, the 1980s was a decade of technological innovation in personal telecommunication networks as copper lines in fixed networks gave way to optical-fiber lines and high-speed, high-capacity communications. In the 1990s, innovation continued as the cellular network expanded rapidly and became an alternative to the fixed network. In the 2000s, wireless network technology benefited from further innovation as the cellular network made a dramatic conversion to broadband service, allowing new broadband mobile telecommunication systems, such as Wi-Fi and mobile WiMAX to emerge and begin to converge with existing networks. This period also witnessed the introduction of ubiquitous and widespread communication using cellular phones, personal digital assistants (PDAs), and notebook computers, which have become smaller, lighter and cheaper. In addition, the latter half of the 2000s witnessed technological advances in mobile devices with the appearance of smartphones and tablet computers.

In the current decade, it is expected that smartphone and tablet use will spread rapidly and that a wide variety of cloud services supporting diverse lifestyles and work environments will be created. Furthermore, events such as the devastating Great East Japan Earthquake of March 11, 2011 and the subsequent nuclear accident are expected to dramatically increase the demand for cloud services. The prominence of diverse work environments, such as remote offices and telecommuting, is also expected to grow in the coming years. To meet these new and diverse service needs, it will be important to develop simple, highly versatile and adaptive systems that can recognize the surrounding environment and current circumstances and change accordingly. The increased reliance on remote systems also has applications in the fields of medical care and healthcare engineering.

One such potential application is the ability for a dermatological doctor to photograph patient's

skin ailments during a medical examination and subsequently allow patients to view these images to assess improvement of the symptoms. The specific aim of this chapter is to present a simple web-based cloud database system of dermatological skin disease images for medical care purposes developed using Hypertext Transfer Protocol (HTTP). By developing the database system using HTTP, rather than specific standard technology, such as Digital Imaging and Communications in Medicine (DICOM), the system can be more easily applied to various systems and services that may arise in the future. Further studies will examine the effectiveness of the system in increasing patient satisfaction with medical care and facilitating the medical examination. To do this, we will perform the following:

- Introduce the background for the necessity of this system.
- Describe service and system specifications required of dermatological doctors in clinics.
- Outline the proposed system architecture.
- Highlight the developed system.
- Conclude this chapter with applications and future research directions.

BACKGROUND

Electronic health record (EHR) systems have come into increased use in recent years, particularly in Europe and the United States (Phung, 2011; Frost & Sullivan, 2010). Studies on network-based EHR systems have been progressing as telecommunication networks convert to broadband (Ovum report, 2010; Varshney, 2010; Lenert, Kirsh, Griswold, Buono, Lyon, Rao, Chan, 2011; Cabrnach, Hasić, 2011). Some current EHR systems are expanding their service to include a function that enables patients to view their own EHRs from home or elsewhere over the network (Hassol, Walker, Kidder, Kim, Young, Pierdon, Deitz, Kuck, Ortiz, 2011;

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