

Chapter 18

Computer Based E-Healthcare Clinical Systems: A Comprehensive Survey

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ABSTRACT

Over the years, interactive computer-based systems have provided crucial support to clinics, hospitals and other health-based centers. These systems have continued to influence the manner in which clinical tasks are organized and fulfilled in terms of performing tests, diagnosis procedures, treatment methods, as well as storing, analyzing and accessing patient and staff information. At the present time, the computer-based systems used in healthcare settings of high standards are the result of joint efforts of clinicians, software developers and clinical informaticians hence triggering the outcome of the desired system to outdo that of existing applications. Major concerns arise in designing clinical application including data privacy, minimal bias offered by a system (i.e. in terms of searching and decision-making), a user friendly GUI and an efficient integration of the new system with the existing standard applications at the health based setting being considered. In this paper, we provide a comprehensive survey on the existing research work on computer based E-Healthcare applications for clinicians highlighting both the challenges and benefits of such applications which would be of value to both patients and clinicians.

1. INTRODUCTION

The application built for a particular healthcare setting should complement the workflow in progress. Some of the issues that one would be concerned about at some point of designing such an application consist of data privacy, minimal bias offered by a system (i.e. in terms of searching and decision-making), a user friendly GUI and an efficient integration of the new system with the existing standard application at the health based setting being considered (Pagliari, 2007). Acquiring input from professionals of diverse qualifications and expertise who aim towards the same goal, offer various advantages as the result of added involvement. Healthcare systems, whether in the form of desktop applications or mobile applications, have managed to replace paper-based systems to a large extent. One of the major themes of interest for biomedical IT systems, in today's time, comprises of web-based and wireless healthcare facilities. Reasons include wide access vicinity, and quick and easy access of information.

Clinical Informaticians have been considerably effective at replacing paper-based medical data with healthcare applications. Presently, the theme of interest for biomedical IT systems comprises of web based and wireless healthcare provisions. To explore into this area of research, we began by familiarizing the audience with the theme of healthcare applications in Section 1. This was followed by listing and discussing the advantages provided by generic computerized systems developed primarily for the assistance of physicians in Section 2.1. In Section 2.2, we considered all possible challenges that these applications have provided. Similarly, Section 3.1 comprised of benefits offered by web-based applications for clinicians, whereas Section 3.2 focused on the challenges offered by web-based applications. Section 4.1 delivered an overview on the subject of wireless healthcare technology in regard to physicians, whereas Section 4.2 listed and defined its benefits in detail. Section 4.3 gave a brief coverage to wireless healthcare devices that could be of significance to clinicians. Furthermore, Section 4.4 consisted of a clarified consideration of wireless applications that currently provide assistance to certified physicians, followed by Section 4.5, focusing on its challenges. We conclude this paper in Section 5, providing an insight of how the future of generic, web-based and wireless technologies could lead to added development in our lives as clinicians and as patients.

2. COMPUTER-BASED HEALTHCARE APPLICATIONS FOR CLINICIANS

Computer-based applications at diverse healthcare sites have led to many improvements over a prolonged period of time. Some of these advances include efficiency (in comparison to paper based data), effectiveness (in terms of support in the various processes carried out at the healthcare setting) and more categorized data. The benefits of computer-based Healthcare applications using different existing systems are outlined in the following.

2.1. Benefits

2.1.1. BioTIFF

Health specialists radically benefit by a means of having their medical data of interest to be organized with relevance. The BioTIFF holds various such advantages. The BioTIFF is an application which comprises of encapsulating a number of images of standard TIFF (Tagged Image File Format) in a

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