



Chapter 18

Scanning and Image Processing System (SIPS) for Medication Ordering

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This chapter presents a physician order entry system in the ward (for medication prescriptions) by using scanning and image processing. Important design and operational requirements are presented. Then the scanning and imaging processing system (SIPS) is described. SIPS integrates different information technologies including scanning, bar code and other marks recognition, intelligent image capturing, server database access and retrieval, and network communication and printing. SIPS uses specially designed order forms for doctors to write orders that are then scanned into the computer that performs recognition and image processing. The resulting orders, including doctor's handwritten images and other order information, are transmitted to the destinations electronically. SIPS reduces human effort (and errors). We observe that SIPS is an innovative use of information technology to meet the needs of a hospital that requires paper-and-pen operations. SIPS can be extended to meet other operational needs as an alternate input method.

INTRODUCTION

This chapter presents a physician ordering entry system in the ward (for medication prescriptions) by using scanning and image processing. Important design and operational issues that need to be considered by developers of similar end-user computer systems are presented. Then the scanning and imaging

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processing system (SIPS) is described. SIPS was developed for the Hong Kong Baptist Hospital (HKBH), Kowloon, Hong Kong, and has been in successful operation for over three years in the hospital.

The development of SIPS was based on end-user directed requirements. SIPS makes use of and integrates different information technologies, including scanning, bar code and other marks recognition, intelligent image capturing, server database access and retrieval, and network communication and printing. The use of SIPS led to the implementation of new operational procedures, resulting in improved quality healthcare delivery in the ward and increased productivity of the medical personnel.

The End-User Context

The end-user context of an end-user computer system is important. A recent study can be found in establishing the role of an end user per se in strategic information systems planning (Hackney, Kawalek & Dhillon, 1999). There are studies in establishing the importance of the end-user context in identifying requirements in end-user systems development (Gammack, 1999) and in measuring end-user computing success (Shayo, Guthrie, & Igbaria, 1999). As discussed in the study by Komito (1998) of the use of a system of electronic files to replace paper files, the end-user considerations were identified as the difficulties for the transition. Paper documents are perceived to be 'information rich', providing control of information for occupational status and position. As a result, there is a perceived need for the user to defend 'occupational boundaries,' thus discouraging the use of electronic information. Indeed, in our effort to computerize ward procedures, we found that the end-user context was very crucial in determining the available technical options. More specifically, in developing a medication ordering system in HKBH, we have the following real-life scenario.

It is a 700-bed private general hospital. The ordering of medication by the doctors is dominated by the practice of using the traditional paper-and-pen operations. For several reasons, it is considered not possible to replace this traditional way and to introduce a direct physician order entry (POE) method in which the doctors enter the medication orders directly into the computer. Firstly, there is a large number (1,000+) of visiting doctors. These doctors have very different backgrounds and their age range spans over 40 years. Furthermore, some of the doctors visit the Hospital only occasionally when their patients are admitted to the Hospital. Therefore, it is not practical to hold training classes for these doctors. Even if they are trained, they may not be able to remember how to use a POE system in their occasional visits. Secondly, the doctors are specialists in their own medical fields and many are not proficient in the use of the computer. For some individuals, even their typing skills are in doubt. (Typing skills were recognized as

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