

Issues in Developing Clinical Applications for the Wireless Environment

Elizabeth S. Chen MA, Lawrence K. McKnight MD, Peter D. Stetson MD, James J. Cimino MD
Department of Medical Informatics, Columbia University, New York, NY

The use of wireless technology in the clinical setting is increasing. There are a growing number of clinical applications being developed to run on mobile devices and communicate wirelessly. There are numerous issues that arise when developing for the wireless environment and a number of options available. At New York Presbyterian Hospital (NYPH), many of these issues were dealt with for the implementation of a wireless clinical application called PalmCIS (Palm-based Clinical Information System).

ISSUES

Security: When dealing with sensitive data, the client, server and communication between them must be secure. On the client-side, security features like locking can be used to protect the physical device. The server should perform authorization and authentication. Wireless communication service providers should support end-to-end encryption.

Device Features: Criteria to keep in mind when it comes to choosing a client device include the operating system, processing power, size, input mechanism, and screen features (such as resolution and color).

Wireless Communication Service: A wireless network is needed for a device to communicate. Because certain devices can use only certain services, decisions about the device and service must come together. The criteria for choosing a service include throughput, response time, coverage, always-on vs. intermittent communication, and security.

Client Application: The client application serves as the means of communication between the server application and the user; it can be platform dependent or platform independent. A platform dependent application is more complex to develop but provides flexibility and is more configurable. A platform independent solution allows use of a variety of devices running different operating systems.

Server application: In order for communication to be secure, the server programs must reside on a secure server. For Web-based wireless applications, there are a number of programming languages and technologies that can be used.

User Interface: There are numerous design principles and guidelines for the user interfaces of applications. Additional considerations need to be taken with wireless handheld devices because of features like screen size, input mechanism and bandwidth.

IMPLEMENTATION

PalmCIS is a palm-based extension to the Web-based clinical information system (WebCIS) at NYPH¹. The goal of PalmCIS is to provide clinical information to the health care provider anytime, anywhere via a handheld device capable of wireless communication.

We chose to utilize the Kyocera QCP 6035 Smartphone and SprintPCS wireless service. The Kyocera Smartphone offers an all-in-one solution by being a combination of a PalmOS device and cellular phone. End-to-end SSL encryption can be obtained using SprintPCS wireless service and the EudoraWeb browser. We installed an Apache server and purchased a Thawte SSL server certificate.

We decided to develop a platform independent application which would operate like a Web-based application. Our server-side application is a combination of C, CGI and subset of HTML. This application is responsible for retrieving patient data from the clinical data repository via DAMs (Data Access Modules), performing data translation using the MED (Medical Entities Dictionary) and formatting the data for the handheld device.^{1,2} The application also performs authorization, strong authentication, session management and logging.

To achieve the goal of displaying as much as possible on the screen while allowing the data to be easy to manipulate and read, we use a combination of lists and pull-down menus to display a summary of a patient's departmental results from today and yesterday. There are also a number of links so that the user can get more details for each result and retrieve more results.

CONCLUSION

We resolved our technical issues through a combination of commercially available and homegrown solutions. Our next step is to perform evaluations of the function and impact of PalmCIS. Feedback about the user interface and functionality are needed so that a well-designed and useful application can emerge that satisfies the information needs of users which can improve the health care process.

References

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