Chapter 3.1
Application of Mobile Technologies in Healthcare Diagnostics and Administration

Ketan Vanjara
Microsoft Corporation, India

ABSTRACT

This chapter explores various advancements in mobile devices and corresponding software applications that enhance diagnostics and administration in the healthcare domain. This chapter further proposes networking and integration of these devices with the existing networks and devices as further development in healthcare.

A ROAD ACCIDENT SCENARIO

In 1992, a colleague of mine was traveling from our offices in western India to our manufacturing facilities about 50 kilometers away. He had worked late the previous night and again come to the office early in the morning. We had our lunch together and he left for the manufacturing facilities (factory) around noon, driving his own car. Even after two hours, he had not reached our factory and, increasingly, the office and the factory administrators were panicking, trying to locate this employee of ours. Around 6:30 p.m. we received a call from the general hospital of the city

that a semi-conscious accident patient had been admitted to the hospital. In short, my colleague had met with an accident around 1 p.m., and he was admitted to the hospital only around 6 p.m. The treatment could not begin before 8 p.m. The end result was that he became paraplegic. Based on the information provided by the doctor on duty, had he been treated within three hours of the accident, paraplegia could have been avoided. Did mobile devices—or their lack of—have a role to play in this incident? The answer has to be a 'yes'.

Though just a little over a decade ago, this era was devoid of any mobile devices in India. My colleague did not have a cell phone, nor did his family (it took a while to contact them). His car did not have a Global Positioning System (GPS). The hospital and doctors too did not have any mobile devices. Finally, even after arriving at the hospital, the doctors had to wait for the family before starting treatment, as they needed medical information of the patient such as existing diseases, allergies, sensitivities, and so on. Overall, the above scenario shows the lack of our ability to manage emergency medical situations without

immediate communication. Today, though, with the advancement of mobile technologies, such events are better managed. However, there is still a need to provide integration of various mobile tools with the existing devices, technologies, and networks in order to reap full benefits of mobility in the healthcare sector in general and emergency medical situations in particular.

This chapter explains how mobile technologies are shaping the face of healthcare today. This chapter also discusses the potential for improved healthcare through mobility in the future. The primary focus of this chapter is on the integration of mobile devices/gadgets in diagnostics, healthcare administration, and healthcare information systems. Finally, this chapter also proceeds to identify issues and challenges involved in such integrations and how to handle them.

THE HEALTHCARE LANDSCAPE

Healthcare is one of the major domains in life that is full of amazing advancements. However, it also comes with its ever evolving challenges. For example, of late this domain has been mired in controversies on ethical issues like cloning and stem cell research. While medical science still continues to struggle with challenges like eradication of malaria and treatment of cancer and AIDS, its achievements have not been mean by any standards.

The progress made in the last 20 years (is) amazing if one looks at it now. In short, the advances made in the last 10-15 years are equal or even surpass the advances made in the last 100 years. (Majeed, 2005)

Medical science has discovered new diseases and invented new treatments and therapies. In fact, a number of medical scientific disciplines like Pharmacogenomics that allows creation of personalized medicine, toxicokinetics, pro-

teomics, therapeutic vaccines, stem cell research, bioinformatics, and telemedicine, to name a few, evolved in the last 20 years.

Complex diagnostics, short-duration intensive care, acute medicines, and micro-surgeries are all becoming common in today's healthcare.

Another major contributor to advancements in medical sciences has been the developments in digital technologies. Be it bioinformatics or telemedicine, the need for modern healthcare to offer the best treatment for complex diseases in the fastest possible manner with resource constraints makes it highly dependent on digital technologies. Data-intensive areas like bioinformatics also need to depend heavily on high-end computing devices.

Thus, today's healthcare is characterized by the following:

- **Multiplicity and Complexity of Diseases and Treatments:** The breadth and depth of knowledge on various medical disciplines, diseases, their symptoms, causes, and various alternatives of treatment have been growing exponentially in the last couple of decades. This has led to increased complexity in the fields of diagnostics and therapies. So much has been the growth in knowledge and complexity that it is almost impossible for a medical practitioner to function effectively without supporting devices like computers and PDAs.

  An indicator of this fact is the vast amount of literature available on all the medical disciplines—a simple search on Google (2005) returns thousands of medical journals, 1,440 of which are free. Hundreds of viruses and their mutations have been identified for something as simple as the common cold (Health-Cares, 2005).

- **Quick Response:** Given that the number of accidents is increasing every day, the demand for quick response from medical services is growing too. Continuous efforts

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