

## Chapter 76

# Mobile Application for Patients' Waiting Time Control and Management of Diagnostic Imaging Examinations

**Dimitrios Zarakovitis**

*University of Peloponnese, Greece*

**Dimitrios Tsoromokos**

*University of Peloponnese, Greece*

**Nikolaos Tsaloukidis**

*University of Peloponnese, Greece*

**Athina Lazakidou**

*University of Peloponnese, Greece*

### ABSTRACT

*Geographic information systems (GIS) are useful informative systems for reducing the waiting time of diagnostic imaging examinations. ArcGIS software is used to develop a digital questionnaire which is used as a data collection tool. The information concerns the patients' personal information, type of examination required and medical history. Data is collected in real time and through GPS capabilities, the patients' exact coordinates are determined. GIS applications are used to create digital maps which display the average waiting time for performing imaging tests. Questionnaire data and interactive maps are uploaded to a digital platform. Through this application, it is possible to locate patients who actually need diagnostic imaging examinations in real time. Observing the location of patients on digital maps makes it easier to redirect them to the nearest health care units with the shortest waiting time. Data can also be acquired by mobile phones.*

DOI: 10.4018/978-1-7998-1204-3.ch076

## **INTRODUCTION**

In recent years the digitization of health services has greatly optimized the quality of the services provided. The continuous improvement of online applications helps users to deal with the rising health needs and contributes to cost savings. The use of digital media requires the handling and processing of large volumes of data. In the past, most data was stored in hard copy form, but nowadays, big data digital processing is considered to transform the way of living and working in most business areas. By digitizing, potential benefits occur that include early detection of diseases, effective prevention of healthcare fraud and prediction of financial outcomes (Raghupathi & Raghupathi, 2014). Big data analysis helps healthcare providers to develop cost-effective treatments and improve the quality of healthcare services. The release of big data enables health companies to develop innovative applications that help patients to improve their health status. Web-based applications use Informatics Technology (IT) to guide patients to the most effective treatment methods and thorough diagnosis.

Several review papers reveal the advantages of Geographic Information Systems (GIS) in healthcare services. GIS enable users to identify spatial inequalities inaccessibility of healthcare services (Neutens, 2015). They can be used to direct patients in neighboring healthcare services, in a very short time, especially when patients desire specific treatments (Masoodi & Rahimzadeh, 2015). The GIS analysis supports advanced calculations of disease distribution and environmental risk factors (Béland et al., 2014). Furthermore, the majority of review papers report positive results in integrating GIS applications and mobile applications (Nhavoto & Grönlund, 2014). Recent studies also reveal that GIS systems can easily be connected to mobile cloud computing systems for effective big data processing (Lo'ai et al., 2016).

The aim of this paper is to identify how mobile technologies and GIS applications can be used for estimating and reducing waiting time for diagnostic tests. The paper proposes a digital application that helps patients to choose the most appropriate hospital unit, in terms of the shortest waiting time, for performing diagnostic imaging examinations, by using their mobile phone. The whole process is done in real time and enables the processing and analysis of dynamic elements. The paper also aims to promote the knowledge and practice in the fields of management of technology in healthcare between health professionals and policy makers.

## **BACKGROUND**

Recent studies focus on the benefits of Informatics Technology (IT) in the public sector. The most commonly used information systems that are used in the public sector are the Geographic Information Systems (GIS). GIS require a great investment in financial and human resources. They are mainly financed by public investors (Kurwakumire, 2014). In most cases, the implementation of GIS technology is used to test the efficiency of healthcare units and hospitals. They are used for analyzing and understanding the spatial dimension of health care (Topol, 2015). GIS tools enable the transformation of quantitative healthcare data to geographic objects. The process is known as geocoding and is used in data analysis (Yasobant et al., 2015). The use of GIS can solve many spatial-orientated management and planning problems (Jawad et al., 2013).

Besides all the significant benefits of using GIS mobile technologies, there are also some limitations. For example, great delays can be encountered when GIS applications access cloud services. There are also many challenges associated with GIS mobile applications and mainly is the privacy protection of

13 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/mobile-application-for-patients-waiting-time-control-and-management-of-diagnostic-imaging-examinations/243180](http://www.igi-global.com/chapter/mobile-application-for-patients-waiting-time-control-and-management-of-diagnostic-imaging-examinations/243180)

## Related Content

---

### Exploring the Language Learning Challenges of Dyslexics

Ömer Akpınar and Feryal Çubukçu (2024). *Emergent Practices of Learning Analytics in K-12 Classrooms* (pp. 7-25).

[www.irma-international.org/chapter/exploring-the-language-learning-challenges-of-dyslexics/336010](http://www.irma-international.org/chapter/exploring-the-language-learning-challenges-of-dyslexics/336010)

### Characterization and Predictive Analysis of Volatile Financial Markets Using Detrended Fluctuation Analysis, Wavelet Decomposition, and Machine Learning

Manas K. Sanyal, Indranil Ghosh and R. K. Jana (2021). *International Journal of Data Analytics* (pp. 1-31).

[www.irma-international.org/article/characterization-and-predictive-analysis-of-volatile-financial-markets-using-detrended-fluctuation-analysis-wavelet-decomposition-and-machine-learning/272107](http://www.irma-international.org/article/characterization-and-predictive-analysis-of-volatile-financial-markets-using-detrended-fluctuation-analysis-wavelet-decomposition-and-machine-learning/272107)

### Data Analytics in the Pharmacology Domain

Maryam Qusay Yousif Helae, Dariush Ebrahimi and Fadi Alzhouri (2022). *International Journal of Big Data and Analytics in Healthcare* (pp. 1-16).

[www.irma-international.org/article/data-analytics-in-the-pharmacology-domain/314229](http://www.irma-international.org/article/data-analytics-in-the-pharmacology-domain/314229)

### Using Key Performance Indicators to Reduce Perceived Perioperative Complexity and Improve Patient Workflow

Jim Ryan, Barbara Doster, Sandra Daily and Carmen Lewis (2020). *Data Analytics in Medicine: Concepts, Methodologies, Tools, and Applications* (pp. 1738-1757).

[www.irma-international.org/chapter/using-key-performance-indicators-to-reduce-perceived-perioperative-complexity-and-improve-patient-workflow/243191](http://www.irma-international.org/chapter/using-key-performance-indicators-to-reduce-perceived-perioperative-complexity-and-improve-patient-workflow/243191)

### Using Smartphones to Capture Personal Travel Behavior

Sheila Ferrer and Tomás Ruiz (2014). *Mobile Technologies for Activity-Travel Data Collection and Analysis* (pp. 171-186).

[www.irma-international.org/chapter/using-smartphones-to-capture-personal-travel-behavior/113210](http://www.irma-international.org/chapter/using-smartphones-to-capture-personal-travel-behavior/113210)