

Chapter 9

Towards Clinical and Operational Efficiency Through Healthcare Process Analytics

Vassiliki Koufi

University of Piraeus, Greece

Flora Malamateniou

University of Piraeus, Greece

George Vassilacopoulos

University of Piraeus, Greece

ABSTRACT

In the rapidly changing healthcare industry, keeping up with new technologies and innovations has become less of a desire and more of a requirement. Currently, business intelligence and analytics technologies are becoming breakthrough business drivers. In the face of the demand for provision of high-quality healthcare in a cost-effective way, healthcare organizations are recognizing the strategic role that advanced analytics can play in optimizing their processes. The ability to use data analytics in real time in order to evaluate the efficiency and effectiveness of healthcare processes can lead to better financial and budgetary performance, deeper citizen/patient-centric relationships and significant improvement in the way health care is conceived and delivered. This paper presents a framework for optimizing healthcare processes by analyzing process-related data in order to ensure that processes meet the stated operational and performance objectives. The framework is built on top of a data infrastructure that integrates process-related data from various sources into a structured view, suitable for analytics and decision support. Emphasis is also placed on security and patient privacy during execution of the optimized healthcare processes.

INTRODUCTION

Recent years have found healthcare organizations to be placed in the eye of an information overload storm, which is further exacerbated by the proliferation of clinical information systems, electronic health records and network-enabled health devices (Cortada et al., 2012). However, no matter how data-rich healthcare industry has become, it still remains knowledge-poor as the abundance of data that bombards healthcare professionals, lumped under the term “big data”, has complicated their ability to glean useful insights from them which could drive clinical and operational improvements. This becomes more obvious as evidence is continuously mounting that, nowadays, healthcare industry is increasingly being challenged by entrenched inefficiencies, while, at the same time, clinical outcomes remain suboptimal (increased deaths from conditions considered amenable to healthcare, high levels of preventable errors, etc) (Cortada et al., 2012). In this context, healthcare providers are pushed to focus anew on seeking for means to achieve and influence desirable outcomes.

Over the past few decades, business processes have become increasingly important in healthcare enterprise, as they guide healthcare delivery and, as such, they constitute key drivers behind critical success factors, such as cost containment and healthcare quality improvement. However, as healthcare organizations reach higher levels of business process management (BPM) maturity, they often find themselves maintaining very large process model repositories, not being able to exploit the valuable knowledge these represent about their operations (Baquero, 2013). The last few years, big data analytics has emerged as a key business driver for service providers and enterprises as they transform into the digital era. In particular, business process analytics tools have been developed which can be used by businesses to manage, mine, and monetize vast stores of unstructured event data generated by business process executions on large and complex supply chains and more. Thus, several sectors can move away from the traditional baseline of transaction monitoring using basic reporting tools, spreadsheets and application reporting modules and toward a model that will eventually incorporate predictive analytics (Cortada et al., 2012). For the healthcare sector in particular, such a transition could enable organizations to “see the future,” create more personalized healthcare, allow dynamic fraud detection and predict patient behavior (Cortada et al., 2012). Although, currently, healthcare providers consider business process analytics their top investment priority, significant barriers remain to effective use of analytics tools. The biggest issues include having unstandardized data in silos, lack of technology infrastructure and data and analytics skills gaps.

This paper presents a framework for optimizing healthcare processes by analyzing process-related data in order to ensure that processes meet the stated operational and performance objectives. The framework analyzes process-related data, which are integrated from various sources into a structured view, suitable for analytics and decision support. To this end, a compliant to Health Informatics Service Architecture (HISA) EN/ISO 12967 standard (ISO/TC 215, 2008), IT infrastructure underlies the proposed framework and integrates existing systems both within and across different healthcare organizations by integrating the common data and business logic into a specific architectural layer (i.e. middleware) distinct from individual applications and accessible through the whole Health Information System (HIS). Within this infrastructure, both workflow and agent technologies are utilized for supporting healthcare process collaboration and coordination requirements and for resolving data integration issues. In particular, a set of cooperating agents is used for managing healthcare processes and handling all the interactions between the client applications and the existing HIS initiated during healthcare process enactment. Moreover, java-based workflows are used for modeling both the healthcare processes and the logics of all interac-

17 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/towards-clinical-and-operational-efficiency-through-healthcare-process-analytics/235311

Related Content

Aging and Suicide

Hitesh Khurana and Aishwarya Raj (2018). *Handbook of Research on Geriatric Health, Treatment, and Care* (pp. 409-429).

www.irma-international.org/chapter/aging-and-suicide/201395

Bioactive Nutraceuticals for Amyotrophic Lateral Sclerosis

Sakshi Bajaj, Neeraj Kumar Fuloria, Faizana Fayaz, Bhumika Kumar, Shivkanya Fuloria and Faheem Hyder Pottoo (2023). *Exploring Complementary and Alternative Medicinal Products in Disease Therapy* (pp. 1-37).

www.irma-international.org/chapter/bioactive-nutraceuticals-for-amyotrophic-lateral-sclerosis/329628

Fall Prevention Education: Good Examples From Higher Education

Marja Anneli Äijö, Cidalina da Conceição Ferreira de Abreu and Nandu Goswami (2021). *Integrated Care and Fall Prevention in Active and Healthy Aging* (pp. 171-181).

www.irma-international.org/chapter/fall-prevention-education/285637

Butterfly, Emerging: How Trauma-Informed Services Help Survivors to Heal

Melissa Lucchesi (2019). *Healing Through the Arts for Non-Clinical Practitioners* (pp. 44-55).

www.irma-international.org/chapter/butterfly-emerging/211664

Evaluation of the Parotid Gland

(2021). *Diagnostic Techniques and Therapeutic Strategies for Parotid Gland Disorders* (pp. 34-59).

www.irma-international.org/chapter/evaluation-of-the-parotid-gland/256610