

Chapter 27

Data Mining Applications in the Service of e-Government

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ABSTRACT

E-government refers to the use of information and communication technologies for improving government services and interactions with citizens. In today's digital information era the successful delivery of public policy is of paramount importance and significantly dependent upon the effective technology deployment. In this respect, many researches and business organizations have studied the means via which public administrations and citizens can benefit from the availability of e-government applications and services. Despite the plethora of existing studies on how technological means can serve governmental decision-making policies, still there is ample of room for improvement before Information Technology services are fully exploited.

In this chapter we propose the exploration of text and data mining techniques for empowering e-government applications and services for the citizen's benefit. In particular, we start by providing a field overview with respect to the current trends in e-government services and we demonstrate via proofs of concept the limited adaptation existing e-government applications entail. Stimulated by the need to transform e-government services to e-inclusion applications, we suggest the utilization of data mining techniques for processing the governmental data so as to extract and associate information fragments with real citizen needs and thus enable the encapsulation of the latter in future governmental decisions. To demonstrate the usability and added value of our proposed approach we have designed an interactive e-government infrastructure, the architecture of which we will present and discuss in our chapter. Moreover, we will elaborate on the system details, its adaptation capacity and we will discuss its usage benefits for both citizens and public sector bodies.

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INTRODUCTION

A critical factor of success in today's governments is to effectively communicate their messages to citizens and build strong alliances with them by empowering their participation in the decision-making process. With the advent of the web and the technological advancements, governments around the globe have launched ambitious plans for building electronic government (e-government) applications and services. The quest in establishing e-government applications is on the one hand to facilitate public sector regulations reach society in an instant and cost-effective manner and on the other to get around any obstacles imposed by bureaucracy within the governments' interactions with stakeholders (i.e., citizens, public and private bodies). Despite the resources that have been allocated in realizing e-government, still its deployment is confined to the technological aspects of implementing public services and fails to capitalize on the societal factors involved in the determination of information policies via technological means. In other words, in its current form e-government is mainly perceived as a service system to support the activities of governments and lets aside issues dealing with the socio-political impact of those activities.

In this chapter, we try to fill this void by proposing a novel e-government mechanism that captures the societal impact of public sector regulations in an attempt to decipher the public's stance towards governmental decisions. In particular, we propose the exploitation of data mining techniques towards firstly capturing the public's opinions (communicated online) about governmental decisions and secondly analysing the polarity of the mined opinions so that they are considered in subsequent governmental decisions. Specifically, we introduce a method for decomposing citizens' opinions and comments that are posted in online fora and blogs, in order to evaluate how governmental decisions are perceived by the public and thereafter how the public's implicit

feedback should be interpreted by governmental bodies in their subsequent actions. What motivates our study is that up-to-date governmental social web sites are not consistently evaluated in the governmental decision-making process and as such citizens' voices are most of the times heard in a limited audience.

To realize our study objective, we propose a framework that integrates text and data mining methods for modeling the public's opinions and evaluations of the governmental decisions. We then, statistically analyze the mined citizens' feedback in order to derive on the one hand the sentiment orientation of the public opinions and on the other the underlying correlation between mined opinions and the formulation of new governmental decisions on related issues. To demonstrate the functionality of our proposed mechanism, we present as a proof of concept an experiment we carried out in which we mined and automatically organized into polarized clusters citizen opinions published online and discussing governmental regulations. The findings of our experimental study clearly demonstrate that e-government services invoke the citizens' active participation in the decision making process and indicate that by putting together inter-disciplinary methods and tools we can transform e-government from a technological infrastructure to a powerful interactive manifestation of e-inclusion and e-participation.

The remainder of the chapter is organized as follows. We start our discussion with a detailed overview on existing studies addressing the current trends on e-government as well as the encapsulation of data mining applications into available e-government applications. In Section 3, we introduce the utilization of text and data mining techniques for identifying and deciphering the citizen opinions about governmental issues that are communicated online. In particular, we describe how we can exploit the user-generated online content via the use of natural language processing and text mining tools in order to firstly mine user opinions from their posts and

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