Project Results: PERIKLIS - Electronic Democracy

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ABSTRACT

PERIKLIS - Electronic Democracy in the 21st Century is a Greek National project [1][2], funded from EU and Hellenic Government from ESPA funding scheme [3], whose goal is to improve quality of life in the urban environment by increasing opportunities for interaction between citizens and between citizens and public services, through the use of mobile and social network technologies. In this way, the goals of open government and transparency are achieved. The main result of the project is an innovative e-Government platform for public services, using mobile and social network technologies. The platform has been successfully tested in the Marousi municipality and is installation is investigated for other municipalities also. System has been build on interoperable way in order to create a future ‘puzzle’ per Municipality and extend PERIKLIS current platform in more cities and areas, providing an integrated democratic environment for humans cities life.

Keywords
e-government, e-democracy, social networks, e-voting, web services, SOAP API

1. INTRODUCTION

One of the main obstacles that may hinder the success of e-Government is the very low level of citizens’ participation. Until now, most public services using electronic governance as a means of gathering public opinion and encourage participation in political issues, interact with a limited subset of the population; usually people who have the motivation and technological skills.

To encourage participation in public issues from a wider number of citizens, e-Government services should use innovative and widely used means to interact with the public. Indeed, citizens are more likely to want to interact online with government, by using technologies which they are accustomed to use in other aspects of their lives. For example, social networks during the last few years have dramatically increased their popularity, attracting a large number of users, who spend a significant amount of their time each day, in one of the leading social networking services (e.g., Facebook, Twitter).

In addition, one of the most difficult challenges for the e-Government services is how to deal with those people who do not want, or cannot connect to the Internet. Today, mobile phone usage is widespread. Although mobile phones are used primarily for making phone calls and sending text messages, they also have personal computer functions that offer a way to interact with online public services. So, the next logical step is the realization of the idea of a mobile government open to all and allowing citizens and public agencies to interact through the web, using mobile devices, barcodes sent as pictures, text messages and many other simple but powerful mechanisms.

PERIKLIS [1] is a Greek National projects, funded from EU and Hellenic Government from ESPA funding scheme [3], whose goal is to improve quality of life in the urban environment by increasing opportunities for interaction between citizens and between citizens and public services, through the use of mobile and social network technologies. In this way the goals of open government and transparency are achieved.

Various published studies [4] have ranked the following countries as leaders in e-government during 2011 and 2012: Australia; Canada; Denmark; Finland; France; Japan; Republic of Korea; Netherlands; Norway; UK and Northern Ireland; USA; Singapore; Spain; Sweden; Taiwan. PERIKLIS will improve Greece position in this ranking.

PERIKLIS participating partners are the following:
- ICCS/NTUA, www.iccs.gr
- Project on line (POL), www.project-on-line.gr
- Computer Technology Institute (CTI), www.cti.gr
- Municipality of Marousi, www.maroussi.gr

PERIKLIS creates an open, transparent environment through convergence of information and services. A number of important issues exist, it is no secret that Big Data is changing the face of customer analytics, giving organizations new insight into customers' wants and preferences. A similar phenomenon is going on in the realm of politics and e-government [5]. Many world cases like the 2012 U.S. national elections for the Democratic National Committee leveraged Big Data analytics to better understand and predict voter behavior and alliances [6]. PERIKLIS platform’s modules harness the power of social networks, couple them with services for e-government and voting. Also, PERIKLIS platform covers many of the Municipality needs utilizing big data manipulation techniques, statistical analysis and geo-location services. The aim of PERIKLIS is not to 'tell authorities how to do it' but to provide a framework to help authorities develop thinking and planning about the approach that best fits their particular environment and purpose for e-services to their municipality.
The remainder of this work is organized as follows. In Section 2 we present PERIKLIS architecture. Section 3 describes PERIKLIS added value services. PERIKLIS web platform is presented in Section 4. Finally, in Section 5 we conclude the paper.

2. PERIKLIS ARCHITECTURE
The objective of PERIKLIS is to provide a platform of interaction between citizens and public bodies that leverages the popularity of social networks as well as the capabilities of modern smart phones. Users are able to login using their existing social network accounts via their smart phones or tablet devices the platform and perform a variety of actions such as gather the opinion of fellow citizens on a specific matter, report a problem, raise awareness or recruit users to their causes. The functionality of the platform is enhanced by a number of data analytics and location based services that bring added value to the platform.

The basic architecture of the platform PERIKLIS is presented in Figure 1. In the design of PERIKLIS we have followed the principles of Service Oriented Architecture. SOA is an architectural paradigm based on reforming application functions and pieces of information into a “service” that can be accessed through a common interface regardless of the location of the function or of the piece of data. As a result, applications using this paradigm are more adaptable to changes and its components are reusable.

Following the SOA paradigm, PERIKLIS has been designed as a set of loosely coupled services. We have two types of services: the PERIKLIS core services and the PERIKLIS added value services. The main functionality of the platform is implemented by the PERIKLIS Core Services. These services implement functions such as the creation and management of actions and participation information as well as storage and can operate as a standalone entity (i.e. without the added value services described below). Their functionality is exposed through a SOAP API.

In addition to the core services, four added value services have been developed in the context of PERIKLIS. The objective of these components is to enhance the functionality of the platform by providing specialized analysis on top of the user generated data (e.g. data analytics, location based analysis), in order to bring some added value to the end users. As explained before, the platform is highly adaptable and can easily accommodate new services so that it can be used for a variety of e-government applications.

3. ADDED VALUE SERVICES
Intelligent services include: i) Identity Management Service, ii) Data Management, iii) User Location Services, iv) Grade Reliability Assessment Service. Data Management and Grade Reliability Assessment services are design and implemented in a way that permits their execution over cloud computing infrastructures. This is more than necessary considering cases where large amount of input data (“big data”) are provided that require the scalability of the proposed services during their analysis. This for example can be the case when PERIKLIS will serve all the Greece’s Municipalities.

3.1 Identity Management Service
A key challenge in the implementation of PERIKLIS in the context of e-Government is to manage the identity of the parties involved, whether legal or natural persons. Identity management service includes the following procedures:

1. typical user registration and sing-in
2. user authentication through other social networks (Facebook)
3. user authentication through government systems

In particular, user authentication through government systems aims to authenticate users via the platform interface with government certified information systems. This feature is particularly important and increases the reliability of the platform PERIKLIS reducing to the least possible existence of false or malicious users. To realize this functionality PERIKLIS interacts, using web services (SOAP),...
with services offered by the Greek E-Government Social Security Administration (IDIKA [1]). The certification of users is performed using their personal Social Security Number-SSN. The SSN is an important personal element and all Greek citizens are required to have the time of their birth. This service takes as input the SSN (11 numbers) of a person and returns the data entered in the National Register for this SSN and the SSN force.

3.2 Data Management
The data management service analyzes the large volume of data entered by users in the platform, producing useful analytics. This service will be useful to all users (citizens, government employees etc), providing recommendations for users with similar interests, for events or services related to the characteristics of users and other.

In particular PERIKLIS uses social network analysis and event detection methodologies. The former are used in order to identify important entities (users, departments, topics) based on the user behavior, while the latter to detect new events based on the user posts in the PERIKLIS forums. PERIKLIS defines a set of social graphs based on public sector related entities (user, department, topic) that capture the relationships between them, and then on these graphs applies various centrality based metrics [7]. The data processing unit produces the following information: i) users who are the most important, ii) topics with keen interest. Event detection methodology is based on [9] wherein signals are specified for individual words.

3.3 User Location Services
PERIKLIS platform offers location related services, in particular when used through a mobile phone. In particular, users have the option using the PERIKLIS mobile application to publish their location information, which is combined with the data the user is posting in the platform (e.g. the photo of a broken street light). In this way the municipally services can easily interact with the citizens and resolve issues as they arise.

3.4 Grade Reliability Assessment Service
PERIKLIS platform includes a service for assessing the reliability of each user that affects the actions that each user can perform.

4. PERIKLIS PLATFORM
PERIKLIS provides all the above characteristics through a web based environment [2]. The programming of PERIKLIS has used open source tools for development and deployment. Cloud storage facilities and web services SOA interconnections with external services. It is based on a flexible SOA Architecture allowing for the addition of any number of added value services.

Currently, the system is working as a pilot in municipality of ‘Maroussi’ in Athens city and already has been interconnected with municipality services for resolving the posted problems from residents.

Figure 2 shows PERIKLIS platform registration and login forms.

Figure 3 shows the main page of the platform through which a citizen can view latest news, report issues and participate or organize polls and petitions.

Figure 4 shows PERIKLIS platform: report issues page.
Figure 5 PERIKLIS platform: report issues page.

Figure 6 shows a poll showing the main page of a poll.

Figure 7 shows page through which users can change their details and validate themselves using their Social Security Number (SSN) through the Greek E-Government Social Security Administration (IDIKA [1]).

Figure 8 and Figure 9 show the results on data management operations performed on the submitted by the portal’s users data. In particular, 3 graphs are presented that exhibit i) groups of words that relate to each other and probably correspond to a particular issue or event, ii) the most important users, iii) the most important topics of interest.

Figure 8 PERIKLIS platform: data analytics page.

Figure 9 PERIKLIS platform: data analytics page.

PERIKLIS web platform is also available through mobile phones (Figure 10).
5. CONCLUSIONS

PERIKLIS [1][2] is a Greek National project, funded from EU and Hellenic Government from ESPA funding scheme[3], whose goal is to improve quality of life in the urban environment by increasing opportunities for interaction between citizens and between citizens and public services, through the use of mobile and social network technologies. PERIKLIS integrates innovative research methodologies with actual development of a platform that handles all user and Municipalities’ interactions between residents and government acting teams, and the related analytics, leading to the modernization of the public sector. Using this platform in a Municipality, we provide to an end user (resident) the opportunity to participate in democratic activities having only a mobile phone with geolocation attributes. Enhancing people participation with trendy tools like social networks integration in PERIKLIS platform, it increases human participation, their involvement with identity clarification and participation criteria that benefit their activities in the platform. Also functionalities like e-voting and activity level characterization per user, are healthy democratic ways in an easy to use electronic way that PERIKLIS support. In this paper we presented a tool for social democratic functionalities that creates value for better leaving and healthy relationships between government departments and humans needs in city life. Integrating further and extending this platform using open source tools is our aim, that will cover bigger and more Municipalities and in parallel evaluating its services in the whole Greek public sector.

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