Citizens profiles ontology for improving e-government services in Algeria

Hathem KHELIL , Mahmoud Brahimi

Computer science department Laboratory of Informatics and its Applications of M'sila (LIAM)
Mohamed Boudiaf University of M'sila, Algeria.
hathem.khelil@univ-msila.dz , mahmoud.brahimi@univ-msila.dz

Abstract At this time, dealing with e-government is crucial, and the huge advancements made in the field of information and communication technology, particularly during coronavirus epidemic, have forcefully underlined this necessity. The e-government efforts in Algeria, like those in other nations, have started, but critics have criticized them for being disjointed, unproductive, and without a proper knowledge representation, especially in terms of coordination and information exchange. As a result, there is still little citizen involvement, and electronic government services seem ineffective. Furthermore, there are considerable obstacles and problems in assuring the integration and interoperability of various data sources. The purpose of this paper is to propose an ontology around the citizen in order to achieve common understanding among the various government departments and improve service interoperability and delivery because governmental services are intertwined and the citizen serves as the central component in these services.

Keywords: Algeria; e-government; Ontology; Semantic Web Services; citizens

1 Introduction

E-government is an area of interest for many countries around the world. In its simplest definition [1], e-government refers to the application of Information and Communication Technology (ICT) to deliver government services, exchange information, ensure communication and transactions, and integrate various standalone systems and services between government-to-citizens,government-to-business, and government-to-government.

Many governments all over the world have made implementing e-government a top priority and have started to create their own e-government programs based on the various degrees of accessible technologies, infrastructures, and societal demands in their respective contexts [2]. Their goal was to restructure their public administration to make it more proactive, efficient, transparent and customer focused.

The Algerian government has acknowledged these objectives in the context of this global revolution and is continuously working to realize them at the regional and national levels. The Algerian government has been working on a number of plans and strategies to implement an e-government since 2004; the key axes of the Algerian strategy are outlined in [3]. The Ministry of Post and Information Technology in Algeria has been given responsibility for carrying out and overseeing the national ICT plan. In order to improve the state of information and communication technologies in the nation, it started collaborating with a number of foreign organizations.

Despite the state's efforts and initiatives, the Algerian government ended up with governmental entities or public administration (PAs) offering separate and independent e-services without taking user needs into account [4].

Furthermore, many departments or administrations have heterogeneous and dispersed information systems that lack appropriate knowledge representation, making interoperability between their information systems difficult [5].

As a result, these initiatives frequently lead to problems with services that necessitate the involvement of more than one government agency because there are no systems in place to facilitate knowledge sharing and interoperability between them. The latter is defined as the ability of different systems to interact with each other [6]. This ability can be improved by the semantic interoperability which is a level of interoperability that can be accomplished by ontology[7].

Ontology is a formal, clear statement of certain domain knowledge's shared conceptualization [8]. To enrich data and services, the ontology must have common knowledge and semantic [7]. Nonetheless, developing an ontology that reflects a knowledge base necessitates a thorough grasp of e-government services as well as domain specialists [9].

Recently, a number of ontology-based e-government projects can be classified as privacy contributions because they are concerned with the specificities of their countries and the electronic services provided to their citizens. Unfortunately, such contributions based on ontology that concern the peculiarities of the services provided by the Algerian government to their citizens do not exist. To that end, and to encourage the development of e-government projects, we propose in this paper an ontology for Algerian citizens to assist decentralized government institutions in their administrative operations in a cooperative and efficient manner.

In the rest of this paper, the second section introduces a detailed description of our proposed ontology, and finally, in section three, we conclude this contribution and suggest some future works.

2 PROPOSED ONTOLOGY FOR ALGERIAN CITIZENS

This work is part of a project concerning the proposal of a framework for the composition, integration, and interoperability of government services in Algeria.We solely work on developing the citizen ontology, which is the core subject and the first part of this current research.

To develop a citizen's ontology that reflects the majority of information needed in all the departments that may undergo digitization projects in the context of e-government (Personal, educational, health and professional aspects), we adopted METHONTOLOGY approach. In addition, we selected the OWL for the ontology's construction for its greater semantics and logic relation clarity. Furthermore, Protégé 5.5.0 was adopted as an implementation tool since it is supported by METHONTOLOGY and is extensively used due to its platform-independence. Hermit reasoner is used to verify the ontology.

As a result of scanning the personal, educational, professional, and health aspects of the Algerian citizen included in the existing services of the Algerian e-government, we arrive at a citizen ontology comprised of 54 classes, 31 object properties, and 48 data properties.

The main classes in the proposed citizen's ontology (Figure 1) are as follows: Civil, education, job, health, document and properties.

The Civil information class refers to the personal data of citizens.

The education level class represents the citizen's education level; we divided this class into two sub-classes: not-student and student.

The job class depicts the citizen's current occupation; it is further subdivided into the employed and unemployed sub-classes. The employed class indicates

Figure 1: The citizen ontology

whether a citizen works for the government or in the private sector. The unemployed class addressed to the unemployed citizens.

The citizen's health status is shown by the health class , which is divided into two sub-classes: healthy and unhealthy. In order to prevent the patient's information from being duplicated, the unhealthy class contains information about the patient that is taken from the civil information class. All of the information regarding diseases is contained in the disease class.

The document class introduces all the necessary document of the citizen.

Object property serves to link individuals to individuals, it concerns the relationships between citizens classes.

Data properties provides a relation to attach an entity instance to some literal datatype value.

3 CONCLUSION

In this paper, we attempted to provide an overview of the challenges of e-government adoption in Algeria. We discovered that this adoption resulted in the develop-

ment of numerous applications in various departments and agencies, where there is frequently no interoperability between services provided by the same organization. To support the decentralized administrative procedures available to citizens, which is regarded as one of the top priorities of Algerian electronic administration. We developed a specialized ontology to meet the needs of Algerian citizens, which includes civil, health, education, and professional information. The current research is focused on Semantic Web development; we used the OWL for the ontology's development for its greater semantics and logic relation expressiveness. Furthermore, Protégé 5.5.0 was selected as an implementation tool since it is supported by METHONTOLOGY and is extensively utilized because of its platform-independence. We used Hermit reasoner to verify the ontology. Our ontology can be extended to better suit the government and administrative institutions of Algeria by adding new classes, integrating object attributes and data type properties, and adjusting the relationships that exist between them. In addition, we will use this proposal as one of the essential pillars for the foundation of our framework, which is aimed at assembling electronic services and making them interact with one another via Web services integration and composition.

References

[1] A.P. Manoharan et al. (2022), Digital Governance: An Assessment of Performance and Best Practices. Public Organiz Rev (2022). https://doi.org/10.1007/s11115-021-00584-8.

[2] Darmawan, and Dana Indra Sensuse (2014). "The critical success factors study for e-Government implementation". International Journal of Computer Application 89, no. 16 (2014).

[3] D. Idoughi (2013), towords an algerian e-government strategy and achievements, International journal of ebusiness and egovernment studies vol 5, no 1, (2013) ISSN: 2146-0744.

[4] M.S. Benmoussa and B.I. Marhaiaiza, "The Factors Affecting on E-Government Adoption in Algeria: A Proposed Framework", Journal of Advanced Research in Business and Management Studies 10, Issue 1 (2018) 52-64.

[5] S. Maouche and B. Guemide, "Implementing an E- Government in Algeria: Prospects and Constraints, a Comparative-Survey-Based Study", Revue Algerienne des Sciences Juridiques et Politiques Vol :58, NÂ° :05, AnnÃ©e 2021, Page 01-21.

[6] Younten Tshering, Ontology-Based Approach of E-government for Interoperability, International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN : 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429 Volume 9 Issue VII July 2021.

[7] S. Jain and P. Kumar , Semantic web ontologies and e-gouverment: A review, Mody University International Journal of computing and engineering Research, vol.2 Issue 1, 2018, PP. 40-44.

[8] T.R. Gruber, A translation approach to portable ontology specifications . knowl . acquis . 5(2),199 - 220(1993).

[9] A. Alshehab et al, Challenges of applying semantic web approaches on egovernment web services: survey International Journal of Advanced Trends in Computer Science and Engineering, 10(2), March - April 2021, 1216 - 1224.