

E² Participation: Electronically Empowering Citizens for Social Innovation through Agreement Technologies

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ABSTRACT

Following the open government trend and based on its three principles – collaboration, transparency and participation; participation initiatives have been conducted by many governments around the world. Despite the wide range and variety of such initiatives, most of them face a common technical challenge – lack of technical tools to automatically summarize stakeholders' opinions and discussions. Addressing the challenge, this paper introduces a new concept on e-Participation research – Electronic Empowerment (E²) Participation, a new approach to automatically identify collective thinking patterns in e-Participation initiatives. The concept was coined as part of a multi-disciplinary research project aiming at integrating Artificial Intelligence and Software Engineering techniques and tools with Electronic Governance models and principles to design innovative tools for e-Participation. Since our research work is at its early stages, the main contribution of this paper is introducing the E² Participation concept and outlining a framework for its implementation.

Categories and Subject Descriptors

J.1 [Administrative Data Processing]: Government; I.2 [Artificial Intelligence]: Learning; H.3 [Information Storage and Retrieval]: Information Search and Retrieval

General Terms

Algorithms, Design, Human Factors, Languages

Keywords

E-Participation; Electronic Governance; Agreement Technologies; Social Media

1. CONTEXT AND CONCEPT

Most e-Participation initiatives nowadays take place within ad-hoc platforms which provide suitable channels for efficient electronic communication and coordination connecting the involved stakeholders (e.g. citizen-government, business-government, partner-business, etc.). Nevertheless, such platforms do not provide suitable and generic components to model and process emerging collective thinking patterns in communities; although understanding such patterns is a mainstream trend

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dg.o 2013, Jun 17-20 2013, Quebec City, QC, Canada
ACM 978-1-4503-2057-3/13/06.

nowadays in daily life, particularly through the widespread use of social media and their support by mobile technologies. Collective thinking patterns could correspond to ideas, proposals, criticisms or viewpoints, which decision makers can identify and confront based on atomic, individual inputs from citizens and users, such as tweets, Facebook posts, web-based product reviews, etc. Such patterns can take place in different contexts associated with social innovation and change, e.g. crowdfunding initiatives, opinion mining, citizen journalism, cyberactivism, etc.

Electronic Empowerment Participation (E² Participation) captures a radically new perspective on e-Participation, where collective thinking patterns can be identified and contrasted automatically, enhancing the abilities of the different stakeholders to engage them in creative participatory processes. Motivated on the approach originally described in [1], the underlying machinery that makes E² Participation possible is given by agreement technologies [3], a new metaphor that integrates several aspects from database theory, artificial intelligence, multi-agent systems and social infrastructures. The following section introduces an outline of a proposed framework for implementing the concept.

2. E² PARTICIPATION FRAMEWORK

Relying on social media platforms as a generic communication platform, the aim of this research is to provide novel algorithms for performing intelligent aggregation and reasoning from the inputs of individual citizens and users in order to identify collective thinking patterns to assist in particular government-decision- and policy- makers in understanding public opinion. Our research work will rely on three main technologies: 1) *argumentation mechanisms* [4], which will help assess which arguments in online interactions and discussions have stronger grounds; 2) *trust and reputation models* [2], which will be coupled with the argumentation mechanism to help assess the reliability of information and information sources; and (3) *natural language processing*, which will be used in structuring online information by building argumentation graphs which provide the needed bases for argumentation mechanisms.

As a result, the above three technologies will add structure to online information by linking scattered and unorganized information into coherent discussions; noise resulting from redundancy will be reduced through grouping related information together; noise resulting from spam, lies and bias will be reduced by assessing the reliability of information. We contend that the E² Participation paradigm will pave the way for the development of challenging business opportunities both for the public and the private sector, adding value to social media usage for government decision making processes through agreement technologies.

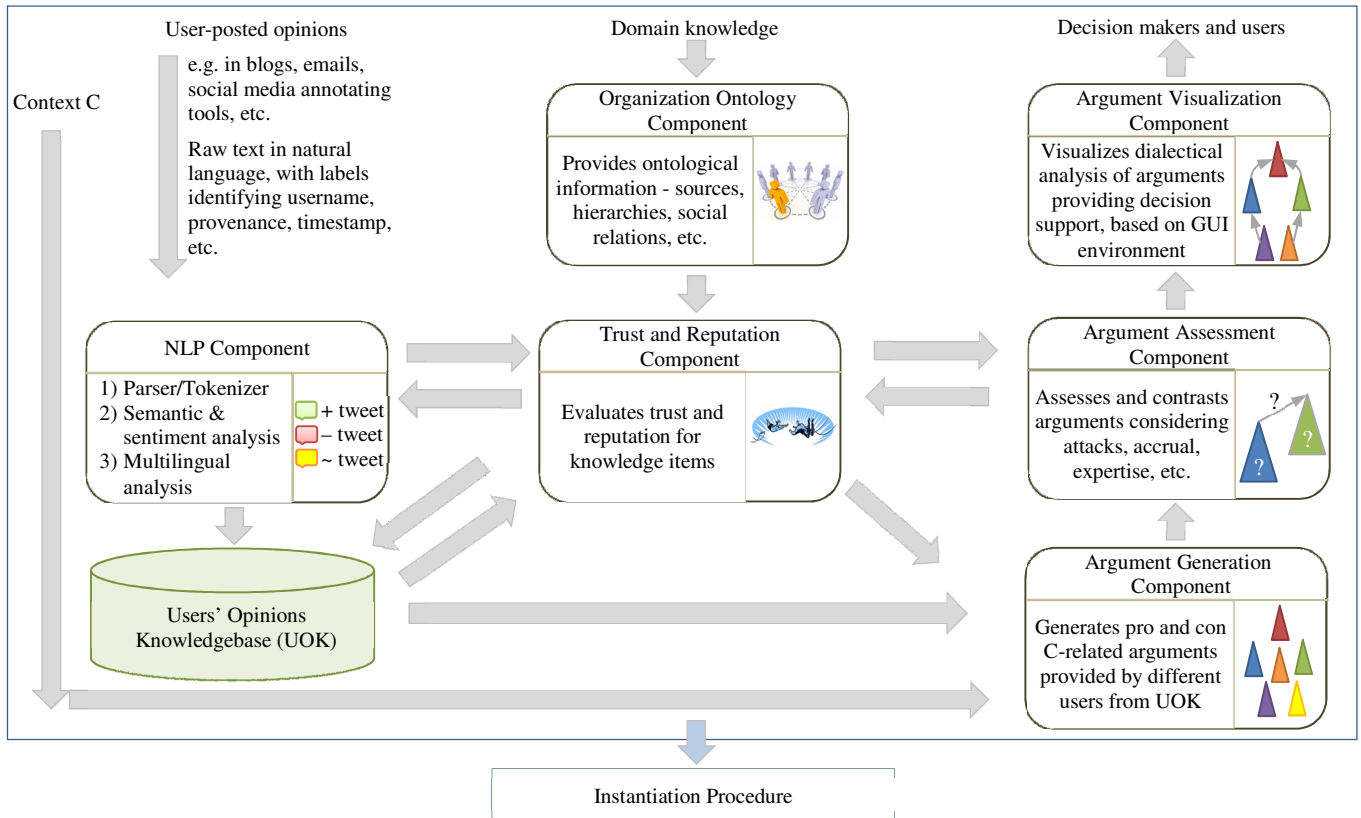


Figure 1. E² Participation Framework

The E² Participation Framework comprises a knowledge base storing users' opinions (UOK) and 6 major software components: 1) *NLP Component* – provides various Natural Language Processing (NLP) tools to extract terms, relations and entities, to parse text and do semantic annotation and semantic analysis; 2) *Argument Generation Component* – given a context C for analyzing opinions, the component generates pro and con arguments related to C based on the opinions stored in UOK; 3) *Organization Ontology Component* – provides an ontology defining domain knowledge, such as information sources, concept hierarchies, social relations, etc.; 4) *Trust and Reputation Component* – implements a trust and reputation system to weight arguments based on provenance and domain knowledge; 5) *Argument Assessment Component* – based on the status assigned to individual arguments, assesses and contrasts arguments considering various criteria, like attacked argument, accrual, user expertise; and 6) *Argument Visualization Component* – based on graphic user interfaces (GUI), the component enables to visualize dialectical analysis of arguments to support and facilitate decision-makers' tasks. In addition, the E² Participation framework includes an *Instantiation Procedure* providing guidelines to instantiate the framework for a given use case.

3. DISCUSSION

As an inter-disciplinary research, this research work aims at three types of contributions. For computer science, the contribution will be the combination of trust and argumentation tools. The combination of computational trust and reputation frameworks

with argumentation systems is still in its infancy, and much research will need to be undertaken to provide a sound theoretical and technical basis for the E² Participation framework. For governance, the contribution will be the provision of enhanced tools for e-Participation. At the intersection of both disciplines, the contribution will be the application of the latest approaches in artificial intelligence and visualization to provide a powerful set of tools to analyze and summarize public opinions supporting public participation in policy- and decision-making processes.

4. REFERENCES

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