Multimedia Documents Adaptation Based on Semantic Multi-Partite Social Context-Aware Networks

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ABSTRACT

Advanced social network applications and technologies offer a wide range of opportunities for experts and developers to exploit efficiently a large amount of services and user-generated content produced through social networking. The mobile user prefers to use mobile devices to ask for relevant services and hope to get replies the sooner possible. The efficient selection of relevant services according to user’s needs and preferences in real time is becoming a challenging task. This article presents an efficient multimedia document adaptation approach. It’s based on various entities of various social networks, such as users, tags and services, with semantic relations between them. Such networks are known as multi-partite and can be used for determining relevant adaptation actions that the user has the fully exploitation of multimedia documents. The author’s goal is to improve the assembly of potential adaptation services and the efficiency and effectiveness of the approach for communities’ inferred social influence from a Twitter and Facebook as virtual semantic social networks environment.

KEYWORDS

Context-Aware, Experiences Sharing, Services Composition, Social Networks, Virtual Community

INTRODUCTION

Nowadays, technologies are getting smarter towards users’ constraints and preferences, finding a way to reach further points where the users’ satisfaction is always needed taking into consideration users profile description and context. As the world is becoming a little village, exchanging information between people is crucial, the adaptation process should satisfy the users searching document priorities by virtue of location, service constraint, service content, etc.

An important issue in multimedia documents’ exchanges and adaptations is the management of large amount of context information generated from several social networks and the complexity of the representation of the underlying social network. Usually, it is represented as a graph, where nodes stand for users and edges for the relation that connects them (Papadopoulos et al., 2012; Truong and al., 2016). However, more complex representations are often needed. Adaptation process should vary according to each profile context; this mechanism requires producing new relationships to generate additional information which is called inference, to determine correspondences between different social concepts known as alignment. Ontologies seem to be the best ways to represent advanced semantic relations among profiles as it has become one of the most important research directions especially with the advent of the Semantic Web. Moreover, they play a crucial role as they share a common

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understanding of the structure and the semantics of information and make the domain hypothesis explicit. Ontologies are at present in the heart of our work. Aiming to establish the semantic relations among multi-partite context-aware social networks and context-aware users’ profiles to offer a unified context quality service to its users and facilitates the sharing of users’ experiences through the use of recommendations and social networking services (e.g. Facebook, LinkedIn, Twitter) for on-the-fly (at runtime) adaptation of multimedia documents.

Recently, several adaptation platforms (Da et al., 2014; Gherari et al., 2014; Yus et al., 2014; Aguilar et al., 2015, Saighi et al., 2017) are intended to support many different services, such as to monitor, to analyze and display information to users. These platforms are based on context modeling and provide the means for identifying specific situations with specific profiles (i.e. services’ descriptions). However, developing an intelligent context-aware mobile application using current platforms is a cumbersome task. The reasons are the following: (i) – they provide several components for each specific service profile; If the user context evolves rapidly and the user mobility introduces a higher degree of heterogeneity and dynamicity, the system may be overloaded, (ii) – they based on various entities of different types that are involved in recommendation of relevant services, such as a user context profile, the tags that describe the media content, and a reference to any external multimedia content, (iii) – the efficient selection of services among a large set of candidates has been rarely addressed in research and (iv) - none of them provide intelligent management of users’ situations, i.e., it is not possible to compute all specific situations for a particular user profile and explores individually, each service description and computes matching distance in order to select the relevant services. They are highly dynamically changing, according to different contexts (user profile, user environment, monitoring, social activities, etc.).

The diversity of social networks, multiplicity of information that characterise the activity of users in social media, and hardware platforms lead to major incompatibility issues. Moreover, multimedia services adaptation guided by user requirements and preferences are not easy to be performed for a large number of heterogenous specific users’ profiles. These profiles are highly dynamically changing according to different contexts, such as the user profile, the environment and social activities. As a consequence, and particularly in the e-health domain, there is a critical need to offer to users a flexible and efficient context-aware system that can quickly adapt multimedia information according to real-time changing situations. We extend our previous proposed work (Alti et al., 2015) in order to exploit multi-party of social profiles, these results in several social networks about an increasing number of efficient services to user, competencies, and skills. In order to explain our work in a practical way, we propose an example which involves assisting patients in smart hospital by other experts’ persons (e.g. doctors; nursing). The multimedia adaptation service be including several supporting multimedia services (video, audio, image, text) that are provided by several service providers. The service availability and fast response time can be considered as important quality attributes that need to be guaranteed while sharing collaborative users’ experiences in selecting quality services. The service adaptation based on the generic profile is less than exploring all the specific possibilities for all specific profiles. For example, a doctor and nursing using both identic smartphone and sharing same multimedia preferences constraints, urgent situations of a patient is identified, alert video notification need to be sent at the same time to a doctor and to a nurse using simultaneously unique adaptation solution. So, when a doctor moving from a consultation room to assist a meeting, if low battery level of his smartphone is identified, the system dynamically changes the colored video contents with black and white video contents.

The contributions of this work focus on proposing: (1) - a novel dynamic semantic context-aware service adaptation mechanism using multi-partite social networks for achieving efficient service
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