

# Pattern-Based Requirements Engineering of New Online Social Networks

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## ABSTRACT

*Online Social Networks (OSNs), such as Facebook and LinkedIn, are now widely used. They count users in the hundreds of millions. This paper surveys popular OSNs in order to identify and present a pattern of recurring requirements, and a model of that pattern in the i-star requirements modelling language. The pattern can serve as a starting point for requirements engineering of new OSNs.*

*Keywords: Conceptual Modeling, Features, Online Social Network, Pattern, Recommendation, Requirements Engineering, Social Network Site, User Profile*

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## INTRODUCTION

Online Social Networks (OSNs) have grown to be popular over the last decade. They are systems that allow users to share content about any subject they wish, with anyone. To become a member, one has to create an account, and establish relationships with other users. OSNs allow then their users to connect online with their friends, communicate with each other, and share content. The most popular social networks, such as Facebook, Twitter, or LinkedIn count hundreds of millions of members.

Considerable research has been carried out about social networks. For instance, Boyd and Ellison wrote a defining essay on Social Network Sites (Ellison et al., 2007); Ellison et al. studied the use of Facebook by college students (Ellison, Steinfield, & Lampe, 2007). The literature mostly focuses on the structure of the networks, their topological characteristics, or on the user activity. Also, several studies explore the privacy and trust issues. Indeed, the social networks have sparked a lot of interest, in part because of the volume of information they gather about their users. The latter give away a considerable amount of information (consciously and unconsciously) through their activity: their profile, their posts, their friends, their browsing activity, etc. This has led to various concerns.

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However, as far as we know, researchers have not explored the patterns of features of the online social networks. What kind of features does a social network have? What are the recurring features that we can find in several OSNs? Does a pattern of features exist that would be shared by online social networks? How important the features of social networks are to users? Not much attention has been invested in Requirements Engineering (RE) for OSNs, either. What should be taken into account when designing an OSN? How should we model the recurring features? Can we define a requirements pattern for the design of OSNs?

We believe that these research questions are valuable because RE is one of the most important phases in the design of any Information System (IS). It is the first stage in the development of an IS, when the purpose of the IS is decided. RE is concerned with the elicitation, evaluation, specification, consolidation, and evolution of the objectives, functionalities, qualities, and constraints a software-based system should meet within some organizational or physical setting (van Lamsweerde, 2008).

In this paper, we propose to model a pattern of OSN features, using an existing RE modeling language, namely *i-star* ( $i^*$ ) (Yu, 1997). More specifically, the goals and the corresponding contributions of this paper are twofold. Firstly, we seek to identify a pattern of features of online social networks. Secondly, we will model these features using an existing requirements engineering language, namely  $i^*$ , and evaluate if it can represent accurately all the features present in the pattern.

In order to address these questions, we apply the following research methodology. Firstly, we select a list of popular social networks, and then propose a list of features. We identify features of various online social networks and compare them across those systems; as opposed to features specific to one particular OSN. Secondly, we analyze this list of features with regard to the selected social networks: are the given features present in the social network? Which form does the feature take? We will see if a pattern emerges from the discussion. We also discuss the implications of our findings for the design of future OSNs; and more specifically, the implications for the RE phase in the design of an OSN. Finally, we apply our modeling pattern to a specific OSN, namely Twitter. If a pattern of features common to several OSNs is found, we will know that one should pay attention to these particular features when designing a social network.

The rest of this paper is structured as follows. First, Related Work is discussed in Section 2, as well as a brief summary of several popular online social networks. Then, we introduce the features we identified of online social networks, and analyze them in relation to the selected online social networks, in Section 3 and Section 4 respectively. In Section 5, we turn to the modeling of the features using an existing RE language, namely *i-star*; and we discuss the results in Section 6. Finally, Section 7 concludes the paper.

## RELATED WORK

### Literature Review

Many authors have studied the topic Online Social Networks (OSN) in the literature. They have explored several aspects of OSN, for instance: the structure of the OSN; the reasons why people use OSNs have been examined; the user activities; the user profiles; the problematic of privacy and trust; etc.

Let us first consider a definition of OSN. Boyd et al. (2007) define social network sites as:

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