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The MIoT paradigm: main features and an “ad hoc” crawler

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Abstract

The Internet of Things (IoT) is currently considered the new frontier of the Internet, and a lot of research results about this topic can be found in the literature. One of the most effective ways to investigate and implement IoT is based on the use of the social network paradigm: Social Internet of Things (SIoT) is an excellent attempt in this direction. In the last years, social network researchers have introduced new paradigms capable of capturing the growing complexity of this scenario. One of the most known of them is Social Internetworking System, which models a scenario comprising several related social networks. In this paper, we investigate the possibility of applying the ideas underlying Social Internetworking System to IoT, and we propose a new paradigm, called MIoT (Multiple Internets of Things), capable of modelling and handling the increasing complexity of this last context. Furthermore, in order to facilitate knowledge extraction and exploitation in presence of a huge number of things, we also propose a crawler specifically designed for an MIoT. Finally, through an experimental campaign, we show that classical crawlers are not adequate for MIoTs, whereas our own is well suited and outperforms all of them in this context.

Keywords: Internet of Things, MIoT paradigm, Social Internetworking System, Cross Nodes, Cross Edges, Crawling Strategies, Cross Node Driven Search

1 Introduction

The Internet of Things can be considered as an evolution of the Internet, based on the pervasive computing concept [9]. In the past, several strategies to implement the IoT paradigm and to guarantee ubiquitous computing have been proposed [24, 66, 16]. One of the most effective of them is based on the use of the social networking paradigm [7, 10, 8]. In this case, IoT is represented as a social network and, thanks to this association, Social Network Analysis-based models can be used to empower IoT. One of the most advanced attempts in this direction is SIoT (Social Internet of Things). In SIoT, things are empowered with social skills, making them more similar to people [7, 10]. In particular, they can be linked by five kinds of relationship, namely: *(i)* parental object relationship; *(ii)* co-location object relationship; *(iii)* co-work object relationship; *(iv)* ownership object relationship; *(v)* social object relationship. If: *(i)* a node is associated with each thing, *(ii)* an edge is associated with

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