The decentralization of Social Media through the blockchain technology

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ABSTRACT

Online Social Networks (OSNs) have become one of the most popular applications of the daily life of users in the worldwide. Today, the number of Social Media users is more than 4 billion, and this trend increases year after year with a high impact on the privacy issue. During the last years, decentralization of social services has been considered as a big opportunity to overcome the main privacy issues in OSNs, and not only (fake news, censorship, etc.). Blockchain technology represents today the most well-known decentralized technique, which has been taken into account to develop the new generation of decentralized social platforms. Blockchain-based Online Social Media (BOSMs) are decentralized Social Media platforms that use the blockchain technology as the underlying technology or as a tool in order to provide rewarding strategies. In this tutorial, we will highlight the BOSMs scenario by presenting their main characteristics and how data could be collected and analysed.

CCS CONCEPTS

• **Networks** → **Social media networks**; **Peer-to-peer networks**; • **Computer systems organization** → **Peer-to-peer architectures**; • **Information systems** → **Social networks**; Incentive schemes; • **Security and privacy** → *Social network security and privacy*.

KEYWORDS

Online Social Networks, Blockchain Technology, Decentralized Online Social Networks

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1 TUTORIAL DESCRIPTION

Since their introduction, Online Social Networks (OSNs) have transformed the way people interact with each other. Lately, a new trend is rising in the development of OSNs, fueled by an increasing interest in blockchain technology and the benefits it can bring to the world of OSNs. Blockchain Online Social Media (BOSMs) [2] are Social Media applications that are supported by the blockchain technology. Thanks to a blockchain, BOSMs either try to enforce the privacy of the users or try to redistribute with their users the economic wealth generated by the platform through a rewarding system. Several BOSMs have been proposed, and they represent an alternative to the current OSNs. Steemit, the first proposal, with more than 1 million users, is the most impactful platform, and the first successful implementation of a BOSM. Its most important contribution concerns the introduction of a rewarding mechanism through a "Proof of Brain" (PoB) strategy. PoB consist of rewarding the effort the users put when creating or evaluating contents on the platform. In practice, this strategy rewards the creator of contents who manage to accrue a large number of positive feebdback from other users, and encourages other users to mindfully give feedback only to the pieces of content which they think are relevant for the platform.

The main motivation of this tutorial is the fact that decentralization techniques have radically changed during the last few years, in particular when the Blockchain technology has been taken into account in many research fields, as the main revolution to overcome several issues concerning the centralization, and they represent today a valid opportunity to redefine the current Social Media systems. In particular, in the scenario of BOSMs, rewarding systems play a crucial role. The study of these systems can be extremely helpful to understand whether the rewarding systems achieve their purpose of discouraging the spread of fake news or, instead, they have the opposite effect or tend to polarize discussion towards certain topics [5].

This topic is relevant in the field of Web Science considering that a BOSM represents the next generation of online social networking services, which are rapidly gaining popularity among users [3, 4]. There are multiple world-scale challenges tackled in these systems: the delivery of social networking and media services which really preserve the privacy of the users, the development of non-invasive rewarding systems, the design of anti fake news information diffusion strategies.

2 TUTORIAL ACTIVITIES

In this tutorial, we highlight the BOSMs scenario by presenting their main characteristics, and how data could be collected and analysed. We provide an overview of the blockchain technology, and how it is used in BOSMs. We show current existing BOSMs, such as Steemit, by focusing on how they work, and how data could be collected and analysed. The technical side of the tutorial is focused on the blockchain Steem, and it cover two parts: an overview of how data could be collected, and the setup of graph analyses. In the first part,

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we build a minimal crawler for the blocks that are published in the blockchain by exploiting the official Python APIs provided by Steem. In the second part of the tutorial, we show how these data can be used for a number of analyses, showing a concrete example by building a graph of transactions through efficient large scale graph libraries, such as Networkit [6] and iGraph [1]. To summarize, the organization of the tutorial will be:

- Introduction of the Blockchain-based Social Media;
- Overview of the Blockchain technology;
- Presentation of the economic and social sides of Blockchain-based Social Media;
- Blockchain-based Social Media analysis: the Steem case study
  - data collection through the official Steem APIs,
  - understanding the block structure,
  - data analysis through large scale graph libraries.

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