Cluster Computing
https://doi.org/10.1007/s10586-021-03492-0

Blockchain for IoV in 6G environment: review solutions and challenges

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Received: 6 June 2021 / Revised: 5 September 2021 / Accepted: 24 November 2021


Abstract

In this era of modern digital technologies, the Internet of Vehicles (IoVs) is omnipresent and can be used for varied purposes. However, these devices have scalability, security, and connection issues. To address the IoV security issues, BC technology is a viable solution. BC offers decentralization, transparency, immutability, and privacy, which can be useful to IoVs. The 5G technologies have not been fully commercialized and the researchers have started exploring the 6G technologies. The 6G technologies can help provide ultra-low latency communication between the devices. It also supports communication in heterogeneous networks like IoVs in various application scenarios such as healthcare, smart city, and traffic management. Motivated from the above discussion, we present a survey on the adoption of BC in IoVs underlying 6G communication. We have also explored various privacy and security concerns in IoVs, which can be perfectly addressed via BC technology. The 6G communication takes care of latency, reliability, and connectivity issues. We have categorized the existing literature based on the taxonomy and presented a comparative study of all the existing state-of-the-art approaches based on their merits and demerits. Finally, we have highlighted some of the open issues and research challenges that opens the doors for beginners who are willing to start work in this amazing area.

Keywords Blockchain · 6G · Internet of vehicles · Vehicular adhoc networks · Unmanned ariel vehicles · Intelligent transportation system

1 Introduction

Over a while, the advancements in information and communication technologies allow Internet of Things (IoT) devices to collect and store data from various sensors and their surrounding environments [1]. The surrounding environments can be either static, dynamic (high mobility), or both. These advancements in technologies upgrade the traditional transportation system to the Intelligent Transportation System (ITS) and increase the demand for autonomous vehicles/Internet of Vehicles (IoV) equipped with sensor devices. As a matter of course, a huge amount of data (i.e., big data) is being provoked by such devices. The main sources of data are satellite networks, near ground Unmanned Aerial Vehicles (UAVs) networks, high altitude platforms, terrestrial networks, vehicular social networks, vehicular sensor networks and ITS.

As per CISCO's prediction, by the year 2030, the count of Internet-connected devices would rise to 1 trillion, which is too high [2]. With the rise in the number of IoT devices, the amount of data generated will also drastically increase. It is predicted by the advent of 2030, the count of

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Published online: 27 January 2022