Chapter 14
Design and Implementation of Visual Blockchain With Merkle Tree

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ABSTRACT

Although our communities are paying extensive attention to the blockchain technology, it is still far away from realistic applications. Thus, this red-hot technology could be understood and employed for visual applications. Authors focus on online videos that collect sufficient user clicks owning to the high demand every day. When people watch the videos of TV drama episodes in an online website, they often need to exactly organise the playlists in ascending or descending order. However, video websites such as YouTube can't provide this service due to multiple reasons. This chapter creates a private blockchain for these video websites and applies Merkle tree to store the sorted videos in the chain. A sorted playlist has been created in the video website. Getting out of the box of video search so as to provide a quick video ranking solution is authors' main task. Sorting results are evaluated by using edit distance.

INTRODUCTION

With virus popularity of the Internet, it has brought much convenience to people in eliminating geographical restrictions and improving efficiency. Internet users have gradually formed a network-based life circle (Li, et al., 2018). The users spent at least one third of their daytime online, we have the observations that in various mainstream online video websites, the users have the following intentions amid watching videos (Wang, et al., 2018). First, they would like to question the authenticity of the video, suspect the falsification; they need to repeat the search for multiple times to get the target video; third, while playing

the current video, if there is not video episode to be played in the playlist or if they desire to go back to the previous episode, they will consume too much time repeating the same operation.

On the other hand, the decentralized ledger, blockchain, was invented by Satoshi Nakamoto which can effectively figure out the public's predicaments related to these existing issues of video search (Aste, Tasca & Matteo, 2017). At present, the research work of online video search mainly focuses on the follows:

- Comprehensive analysis based on preferences, habits, and frequency from the operators who would like to watch online videos. All statistical data is not only obtained from a single video platform, but also aggregated from the cross-platform ones (Zhou, et al., 2018).
- Online video streaming supplies users with the service including sorted advertisements, games, and others; these are results based on the users' behaviors (Hasan, Jha, & Liu, 2018) . Meanwhile, a user who frequently browses online videos will be recommended to watch special videos based on accurate analysis of this user's preferences (Tan, et al., 2018).
- As the Internet covers these growing fields, online video platforms are not only limited in a PC system, they have been already transferred to mobile device systems; the statistics of energy consumption are calculated by using the changes (Zhang, et al., 2018).

In this paper, we will present the related work and our design. Our experiments and resultant analysis as well as the discussions will be followed. Our conclusion and future work will be remarked at the end of this paper.

RELATED WORK

Nowadays, YouTube for video indexing is mainly divided into two parts, recall and sorting. As shown in Figure 1, the first green block represents the recall algorithm, which can help the recommendation system to filter hundreds of videos from millions of video resources. Additionally, other recall sources can be added except the recall algorithm used with deep learning; these resources will be transferred to the next part (Wang, et al., 2015). Probably due to the large amount of computation, it is impossible and hardly inevitable to use all features of the recall algorithm; thus, the recall algorithm only takes use of users behavior and scene characteristics (Sedhain, et al., 2015). The ranking algorithm takes advantage of more features, calculates a score for each candidate video, and ranks the scores from high to low. In this way, dozens of objects will be filtered from hundreds of videos (Davidson, et al. 2010). The offline indicator and the online AB test were applied to evaluate the algorithm, AB test was set as the main evaluation index.

The research outcomes based on blockchain show it is mainly concentrated on the following two directions:

- The development of cryptocurrency platform depends on blockchain generates such a forum to enlarge the influence of this cryptocurrency and eventually escalate the real value of this cryptocurrency (Kugler, 2018) .
- A variety of applications related to blockchain are developed, the ranges of these applications are widely employed in game, finance, auction, and bidding etc. (Rosa & Rothenberg, 2018).

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