

## ABSTRACT

In recent years, online social networks (OSNs) have become increasingly popular due to the rapid development of mobile applications and the explosive growth in online interaction. With the growth and accessibility of technology and internet, the ease of posting and sharing photos on social networking services (SNSs) has increased exponentially. The privacy of online photos is often protected carefully by security mechanisms. However, these mechanisms will lose effectiveness when someone spreads the photos to other platforms the illegal disclosure of user's private data can cause damaging consequences and even threaten the safety of users' life. In recent years, there are some research works to address this privacy issue, yet they do not always focus on providing the normal social network services for users, such as data sharing, data retrieval and data access services. Therefore, it is a challenge to ensure the security of sensitive data while providing efficient and privacy-preserving social network services for users. In this paper, we propose PhotoChain, a BlockChain-based secure photo sharing framework that provides powerful dissemination control for cross-social network photo sharing. Combined BlockChain, Gaussian Blur for Face Masking, PreHash Algorithm for Photo integrity verification and Access Control, Mechanism can achieve secure data sharing, data retrieving, and data accessing with fairness and without worrying about potential damage to users' interest. In contrast to security mechanisms running separately in centralized servers that do not trust each other, our framework achieves consistent consensus on photo dissemination control through carefully designed smart contract-based protocols. Considering the possible privacy conflicts between owners and subsequent re-posters in cross social network photo sharing, we design a dynamic privacy policy generation algorithm that maximizes the flexibility of re-posters without violating formers' privacy. Moreover, PhotoChain also provides robust photo ownership identification mechanisms to avoid illegal reprinting. Finally, this project implements a prototype of the framework and deploy it to a locally simulated social network. The extensive experiments and security analysis demonstrate the security, efficacy and efficiency of our proposed framework.