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**RESEARCH ARTICLE**

# A Survey on Privacy Preserving by Protecting the Images in Social Media using Quantum Cryptography and Steganography

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## ABSTRACT

Social media are becoming the best carrier of information exchange in our lives. In this computer era, it's become crazy to share one's photos and experiences on social media. The images that are uploading on social media are saving by someone and abuse those photos by creating fake ids or in some other way. Once photos are shared on social media, the possibilities of abuses are endless, no one cannot stop someone to take images from social media and abuses it. Privacy is the fundamental human right; however, there is a need to minimize the disclosure of personal data, especially images on the social media such as Facebook, Instagram, Twitter, and WhatsApp. This paper mainly focuses on analyzing how to protect the images that are sharing on social media and providing the privacy by reducing the abuses of the images that are uploading on social media.

**Key words:** Cryptanalysis, image theft, privacy, quantum computing, security, social media

## INTRODUCTION

These days we are using the computers and the internet everywhere, and the people are communicating through social media due to distance and other forms of limitations in communication. Even though our lives are becoming more convenient with the use of the social media, there are many negatives also. These days abuse of images that are taken from social media, especially Facebook, WhatsApp comes to light and the complaints about the abuse of the images are increasing day by day. Some incidents are very worrying the ordinary people, so there is a need to protect the images that are uploading on social media. Our intention is to provide the privacy about the abuse of the images that are uploading on social media.

## RELATED WORK

The privacy issues in mobile networks were addressed at Ajami *et al*.[1] The authors explain about the location and mobile-based applications. The proposed approaches improve the performance in terms of flexibility, protection, and user anonymity and dependency. The enhancement of the privacy on social media was proposed at Parris and Henderson.[2] The author used two methods called statisticulated and obfuscated social network routing to improve the performance. Retrieving the information from online social networks using multiagent system was proposed at Abdulrahman *et al*.[3] In this paper, online social retrieval algorithm used to speed up the extraction procedure for information retrieval.

To detect the frauds on online K-core, clustering algorithm was proposed at Lin *et al*.[4] In this paper, auction fraud algorithm is used to identify the risks for each account. The online users disclose more information than face-to-face communication.[5] There are privacy problems for the social media such as Facebook was discussed at Raji *et al*.[6] The authors discussed that all the friends list can share information due to loopholes in the privacy on social media.

## METHODOLOGY

To solve the privacy and security issues on the social media, we are using these technologies:

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### Quantum cryptography

Quantum cryptography is a novel approach in the field of cryptography. The origins of the quantum cryptography are from the work of Weisner.[7] Crypto means "secret" and graphy means "writing." The first use of cryptography uses non-standard hieroglyphics. Julius Caeser used the cryptographic techniques in the 1st century B.C itself. There are various cryptographic techniques,[8] one of which is the quantum cryptography. Quantum cryptography is using in sharing secret keys, secure communication.

The best way to keep the image secure on social media is to use of the quantum cryptography. In 1970, S. J. Weisner designed a theoretical bank note which was impossible to duplicate using the laws of quantum mechanics. In 1984, Bennett and Brassard[9] used Weisner's idea to develop quantum mechanics based cryptosystem. In 2003, a crew led by Yuan *et al*.[10] transmitted a quantum crypted key over 100 km of fiber-optic cable.

#### *No-cloning theorem*

Theorem 1: It is impossible to create a copy of an arbitrary unknown state.

The clone[11] term is first coined by W. K Wootters and W. H Zurek in their paper "A single quantum cannot be cloned." By invoking the no-cloning theorem at the time of copying the images from the social media, it is impossible to make the perfect copies. The no-cloning theorem working is given below.

$$\varphi(|a>+|b>)=(|a>+|b>)*(|a>+|b>)$$
$$\varphi(|a>)+\varphi(|b>)=|(a>*|a>)+(|b>*|b>)$$
$$\varphi(|a>+|b>)!=\varphi(|a>)+\varphi(|b>)$$

This paper mainly focuses on providing the privacy when the personal images are going to steal on the social media network.

### Smoothing and steganography

The meaning of noise is "unwanted signal." Noise means introducing the errors. Images are corrupted by changing their intensity values. The noise makes the picture to look worse. There are two types of noises.

1. Additive noise: A random value is added to each pixel in the image
2. White noise: The value at a specific point is independent to any other point in the image.

The term "steganography"[12] was coined by Johhannes Trithemius in 1499 in his book "Steganographia." Using steganography, we can transmit the data which internally contain some hidden data.

Image steganography is a process of hiding the secret message in the cover image which produces a stego image. The cover image (original image) and the stego image are almost similar. At the receiver side, the hidden image in the stego image can be extracted with or without stego key.

To provide the privacy for the images on the social media, quantum cryptography, especially no-cloning theorem, will help to prevent the exact copy of the images. Before saving the uploaded images, we are interpreting the noise to the bits in the digital image. Using these two techniques, the image will be worse. It is impractical to do morphing on these images.

## CONCLUSION

In the present era, we are seeing the news that are related to the morphing of images because of this there is no security for personal life and even the families also suffering by abuse of images. Using quantum cryptography, secure communication is possible by sending the secret messages after the bits are encrypted. Quantum cryptography takes advantage of coupling the bits with no-cloning principle. This paper mainly focuses on protecting the privacy of the users those who are interested on sharing their personal images on the social media.

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