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Image Security by Using Artificial Neural Networks

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ABSTRACT

Concern for one's own safety has been universal for quite some time. The possibility of a security breach in a private area is now one that everyone wants to eradicate. When a breach in the conventional security system is detected, alarms are sounded. However, a significant improvement in security can be achieved by the use of image processing in conjunction with deep learning via convolution neural networks for picture identification and classification. This is because it is able to extract intricate details from photographs with the use of sophisticated and accurate face and body detection algorithms. Transitions in machine learning, especially deep learning, are occurring at a rapid pace. There would be significant strides made in every area of science and technology if this kind of technology were used to improve upon present systems and models. It's the same with computerised visual perception. This study intends to do the same by demonstrating how these two may be combined and put to use in the realm of security to accomplish far more than was previously thought possible.

Keywords –Image procurement, Image segmentation, compression, decompression, neural networks

Introduction

Neural network [1] is used to refer to artificial neural network [2], while has been used to refer to biological neural network [3]. The biological neural network is a network of biological neurons, which is in relation with nervous system. The artificial neural network is composed of artificial neurons, which is the simulation of biological neural network. According to the learning ability, artificial neural network has been used in artificial intelligence [4]. For example, it is used to guide the robot to play chess, it is used in pattern recognition [5,6], such as pattern classification or object recognition, it is used in function approximation [7], such as time series prediction or modeling, and it is also used in data processing [8,9], such as filtering, clustering, blind signal separation and compression. The proposed multimedia content authentication scheme is shown in Fig. 6. Here, the media data, original authentication code and key are used to feed a neural network, which produces a secret parameter. Compared with media data, the secret parameter is of small size. Then, the secret parameter and the key are stored or transmitted in a secure way, while the media data are distributed freely. During distribution, media data may be tampered maliciously. In authentication, the received media data, secret parameter and key are used to feed the same neural network, which produces the computed authentication code. By comparing the original authentication code and the computed one, the authentication result is produced. That is, if there is only slight difference between them, then the multimedia data are not tampered, otherwise, they are tampered. To authenticate multimedia data successfully, two conditions are required. Firstly, the secret parameter and key are correct. Secondly, the received media data are same to or not very different from the original media data

Existing Work

As e-commerce and financial dealings have moved online, protecting user information has become more crucial than ever. Information is protected across all platforms and applications thanks to data security measures including encryption, hashing, tokenization, and key management. The security of photos during network transmission or when stored in the cloud, however, has received very little attention.

Disadvantages:
Previous studies lacked efficient algorithms for image compression,
and current systems made the encryption and decryption of images a cumbersome procedure.

Proposed Work

This project encrypts and decrypts photos using an artificial neural network, and the author also uses an artificial neural network to minimise the size of the images so they may be transferred more quickly across the network. After being trained on a dataset of photos, a model used for Autoencoder and Decoder can produce an output image that is worse in quality than the input image but is also less in file size and thus transfers more quickly over a

network.

We are encrypting images by training a neural network on the CIFAR dataset; once the model is ready, we apply it to an input image; the result is a pixelated mess that no human can decipher; and during decryption, we use the same method in reverse.

Advantages:

When compared to prior work, the compression results from our proposed method are superior. We also make it simple to store, retrieve, and send images in the cloud by encrypting them in a way that is indecipherable to cloud service providers and other unauthorised parties.

Conclusion

Work In this paper, some existing research work in neural network based content protection is firstly introduced, including neural network's properties suitable for content protection and some content protection schemes based on neural network. Then, a multimedia content authentication scheme is proposed, which makes use of neural network's learning ability and one-way property to detect malicious tampering on multimedia content. The performance evaluation shows the scheme's practicality. Furthermore, some open issues in this 14 research field are presented. Finally, some conclusions are drawn..

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