

Blind Image Splicing Detection using Hybrid Deep Learning and Quantum

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Abstract

The rapid advancement of digital image editing technologies has increased the risk of image manipulation, particularly image splicing, in which regions from different images are combined to create a visually deceptive composite. Detecting such manipulations without access to the original or reference image, known as blind image splicing detection, is therefore an important research problem in digital forensics. This study proposes a hybrid detection framework that integrates deep learning techniques with quantum computing principles to improve the identification of spliced regions and enhance classification performance. The proposed approach utilizes deep neural networks to automatically learn discriminative spatial and semantic features from input images, while quantum-inspired or quantum machine learning components are incorporated to process learned representations and distinguish authentic images from manipulated ones. The hybrid architecture aims to exploit the feature-learning capability of deep networks together with the potential advantages of quantum-based computational representations. The system is evaluated using suitable benchmark image-splicing datasets and performance is assessed using metrics such as accuracy, precision, recall, F1-score, and area under the ROC curve. Particular attention is given to robustness against variations in image content, compression, resizing, and different splicing techniques. The study is expected to contribute to the development of intelligent and automated image-forensics systems capable of identifying sophisticated image manipulations. The proposed framework may have applications in digital forensics, journalism, cybersecurity, legal investigations, and verification of digital media.

Keywords: Image Splicing, Image Forensics, Deep Learning, Quantum Machine Learning, Hybrid Model, Image Manipulation Detection, Digital Forensics, Convolutional Neural Network, Feature Extraction, Cybersecurity.