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Topic of Research: **Source Authentication of Web-Content in Cyberspace**

Findings

Online Social Media (OSM) platforms like WhatsApp, Facebook, and Twitter have revolutionized digital communication by enabling users to create\, disseminate and interact with multimedia content. While OSM facilitates global connectivity and societal engagement, it has also become a epicenter of misinformation and disinformation, leading to severe consequences such as child abduction, mob lynching to name a few. Platforms like WhatsApp have reported challenges in tracing origin of such content, citing privacy concerns and technological limitations.

To address these issues, a robust digital watermarking methodology has been proposed for source authentication in OSM. Digital watermarking embeds imperceptible watermarks into host signals like images, videos, text, or audio ensuring source authentication, verifiability, and robustness against signal processing assaults like cropping, scaling, frames dropping, frames swapping, and quantization.

In the perspective of images, the study adopts a two-phase methodology. In the first phase, various watermarking techniques such as DWT, SLT, and SWT are compared for imperceptibility and robustness using metrics like PSNR and BER. SLT emerged as an optimal technique. In the second phase, multiple copies of Hamming encoded watermark are embedded into the host image using SLT, enhancing the systems resistance to assaults while maintaining acceptable imperceptibility.

Concerning videos, the methodology involves in splitting the host video into frames and selecting the first three highest entropy frames for embedding. These frames are embedded

with hamming encoded watermarks, significantly enhancing robustness. A comparative analysis of DWT and SLT techniques revealed SLT as superior for maintaining video quality under various signal processing assaults.

In the context of audio, the proposed approach combines DWT and SLT techniques. The host audio signal is resampled to accommodate two copies of the BCH encoded watermarks to enhance the robustness against audio-specific assaults. This method demonstrates improved performance in terms of BER, SNR, and NC compared to other existing literature.

This methodology provides an effective solution to authenticate the source in OSM. It has broad implications for academics, software developers, and forensic practitioners. Future research could integrate advanced technologies such as machine learning, block chain, and optimization techniques to further enhanced the source authentication.

Keywords:
Online Social Media
Digital Watermarking
Source Authentication
Discrete Wavelet Transform
Slantlet Transform