International Journal of Distributed Artificial Intelligence
Volume 14 • Issue 1

Encrypted Information Transmission by Enhanced Steganography and Image Transformation

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ABSTRACT

A deep neural network is used to develop a covert communication and textual data extraction strategy based on steganography and picture compression. The original input textual image and cover image are both pre-processed before the covert text-based pictures are separated and implanted into the least significant bit of the cover object picture element using spatial steganography. Following that, stego-images are compressed and transformed (by using Leh transformation) to provide a higher-quality image while also saving storage space at the sender's end. After that, the stego-image will be transmitted to the receiver over a communication link. At the receiver's end, steganography and compression are then reversed. This work contains a plethora of issues, making it an intriguing subject to pursue. The most crucial component of this task is choosing the right steganography and picture compression technology. The proposed technology, which combines picture steganography with compression and transformation, delivers higher peak signal-to-noise efficiency.

KEYWORDS

Detection, Extraction, Image, Steganography, Text

1. INTRODUCTION

Steganography gets its name from a combination of two Greek words: 'steganos,' which means "covered," and "graphia," which means "writing.". Steganography took numerous forms, including embedding a message in a stamp, null cypher, and morse code, among others. Before digitization, individuals used a few significant steganography techniques. The amount of data being shared via the internet from one area to another is increasing at an exponential rate, far beyond even the most optimistic predictions. As a result, the need for cooperation information will expand in tandem with the need for data protection. Steganography is incredibly significant in the conveyance of encrypted

DOI: 10.4018/IJDAI.297110

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information. Steganography is a technique for hiding information (Dan, Grois & Ofer, 2013) within the ordinary transmission. The changes in the secrete message carrier (Stego) is insignificant and is often not noticeable by the nicked eyes, thus this make the interception of the message often difficult by intruder (Napoleon et al., 2012).

The use of electronic communication and digitalization to encrypt a message and then hide it in electronic content is known as modern steganography (Cherian & Sullivan, 2019). The two most critical aspects of any contemporary steganographic system (Sah & Jha, 2018) appear to be encoding and decoding mechanisms. The stego image was created using an embed procedure. The steganographic image can also be fed into an image compression algorithm, which yields a condensed stego image (Kaur, Kuldeep & Kaur, 2020) that can be easily transmitted over a network. With such a narrow range of coded language, the compression of stego pictures is regulated using restrictive code and technology, demanding a trade-off between compression ratios and mistake rate. Compression technology has become more beneficial as online storage has become more popular. Information compression is an important aspect of computer technology because it lowers the costs of data transmission and storage via the internet. The goal of compression is to reduce the number of bits required to describe information, lowering transmission speeds (Babu & Alamelu, 2009).With information reduction, it will be almost impossible to install technology like streaming content. Compression techniques (Yang et al., 2019) is sometimes known as source encoding. Compressing (Kanagaraj & Muneeswaran, 2020) is a technique for reducing the volume of one or more items to make them more manageable. Information compression's primary goal is to remove duplication in data stored or communicated over a network, resulting in lower resource consumption and higher information density. The two most common forms of information compression algorithms are lossless and lossy compression, as shown in Figure 1. After such a layered procedure, including insertion, a stego-image would have been sent to the opposite spectrum over the secure communication channel. The calculation result indicates that the recommended technique outperforms a standard process in terms of performance indicators such as peak signal-to-noise ratio and structural similarity index-based measurements (Pandey et al., 2021).

Figure 1. Classification of Compression Techniques