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A Two Fold Secure Cover Synthesis Based Data Hiding Approach by Generating Sequences

Anandaprova Majumder[1] · Sumana Kundu[1] · Karam Kumar Sahoo[2] · Suvamoy Changder[2]

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Abstract

Data hiding refers to the practice of concealing confidential information within seemingly innocent data with an objective to ensure the presence of hidden communication is not easily detected by unauthorized individuals. The traditional technique involves modifying innocent-looking cover media files for embedding the secret message. However, this approach is vulnerable to various statistical attacks that can potentially uncover the hidden data. As a result, alternative methods are explored such as cover selection and cover synthesis, which do not involve modification in original media files and provide better security. The proposed method in the paper involves two main steps: location mapping and cover synthesis. In first step, secret message bits are mapped onto a reference digital media file. This mapping associates specific positions within the media file with the secret message bits. In second step, mapped positions are concealed by synthesizing a model based on the longest common subsequence finding problem. This step aims to hide the mapped positions in a way that extracting the secret message requires knowledge of both the mapping and the synthesized model. The approach claims to provide better privacy protection compared to prior steganography techniques. Additionally, it claims to achieve a 100% accuracy rate in both embedding and extraction processes. It offers a highly resistant covert communication solution and surpasses the existing hiding techniques in terms of security with an aim to address the increasing need for secure communication in the digitized teaching–learning process, especially considering the widespread sharing of study materials over the web.

Keywords Data hiding · Cover synthesis · Sequence generation · Location mapping · Security and privacy protection · Privacy attacks

✉ Anandaprova Majumder
anandaprova.majumder@bcrec.ac.in

Sumana Kundu
sumana.kundu@yahoo.co.in

Karam Kumar Sahoo
karamsahoo@gmail.com

Suvamoy Changder
suvamoy@cse.nitdgp.ac.in

[1] Department of CSE, Dr. B.C. Roy Engineering College, Durgapur, India

[2] Department of CSE, National Institute of Technology, Durgapur, India

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