Multimedia Tools and Applications
https://doi.org/10.1007/s11042-023-14681-x

An improved location mapping and cover synthesis based data hiding by model SSSP problem generation

Suvamoy Changder[1] · Anandaprova Majumder[2] · Sumana Kundu[2]

Received: 7 December 2021 / Revised: 10 June 2022 / Accepted: 3 February 2023

Abstract

Steganography is the art and science of hiding the secret message in a clandestine communication. Though steganography is an ancient process of data hiding, the methods are mostly cover modification based and they can't resist different statistical steganalysis attacks. So modern no-modification based steganography models have become hot topics for research. More over during this pandemic era teaching learning process is hugely digitized and significant amount of study materials are shared through the web. Considering the advantages of above mentioned scopes, in this paper we have proposed a two-fold secured cover synthesis technique with an intention of generating a simple cost effective method for transmission of low payload secret messages. The secret message bits are mapped in a digital file in the first fold. In the next fold mapped positions are hidden by synthesizing a model teaching-learning problem like finding the Single Source Shortest Path (SSSP) problem between a source and a destination vertex of a digraph. So to extract the message intruders need both the folds even if the existence of any communication is suspected and hence better security is achieved. We have tested and verified this novel algorithm in terms of various parameters and found satisfactory results in every case along with 100% accuracy in embedding success rate and extraction accuracy.

Keywords Cover synthesis · Location mapping · Graphs · Security and privacy protection · Steganography · No modification based data hiding · SSSP problem

✉ Suvamoy Changder
suvamoy@cse.nitdgp.ac.in

Anandaprova Majumder
anandaprova.majumder@bcrec.ac.in

Sumana Kundu
sumana.kundu@yahoo.co.in

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

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

Published online: 21 February 2023