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Inherited Steganography for Digital Media

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ABSTRACT:

We propose a novel approach for steganography using a reversible texture synthesis. A texture synthesis process resamples a smaller texture image, which synthesizes a new texture image with a similar local appearance and an arbitrary size. We weave the texture synthesis process into steganography to conceal secret messages. In contrast to using an existing cover image to hide messages, our algorithm conceals the source texture image and embeds secret messages through the process of texture synthesis. This allows us to extract the secret messages and source texture from a stego synthetic texture. Our approach offers three distinct advantages.

First, our scheme offers the embedding capacity that is proportional to the size of the stego texture image. Second, a steganalytic algorithm is not likely to defeat our steganographic approach. Third, the reversible capability inherited from our scheme provides functionality, which allows recovery of the source texture. Experimental results have verified that our proposed algorithm can provide various numbers of embedding capacities, produce a visually plausible texture images, and recover the source texture.

INTRODUCTION:

In the last decade many advances have been made in the area of digital media, and much concern has arisen regarding steganography for digital media. Steganography is a singular method of information hiding techniques. It embeds messages into a host medium in order to conceal secret messages so as not to arouse suspicion by an eavesdropper.

A typical steganographic application includes covert communications between two parties whose existence is unknown to a possible attacker and whose success depends on detecting the existence of this communication. In general, the host medium used in steganography includes meaningful digital media such as digital image, text, audio, video, 3D model, etc. A large number of image steganographic algorithms have been investigated with the increasing popularity and use of digital images. Most image steganographic algorithms adopt an existing image as a cover medium. The expense of embedding secret messages into this cover image is the image distortion encountered in the stego image. This leads to two drawbacks. First, since the size of the cover image is fixed, the more secret messages which are embedded allow for more image distortion.

Consequently, a compromise must be reached between the embedding capacity and the image quality which results in the limited capacity provided in any specific cover image. Recall that image steganalysis is an approach used to detect secret messages hidden in the stego image. A stego image contains some distortion, and regardless of how minute it is, this will interfere with the natural features of the cover image. This leads to the second drawback because it is still possible that an image steganalytic algorithm can defeat the image steganography and thus reveal that a hidden message is being conveyed in a stego image.In this paper, we propose a novel approach for steganography using reversible texture synthesis. A texture synthesis process re-samples a small texture image drawn by an artist or captured in a photograph in order to synthesize a new texture image with a similar local appearance and arbitrary size.

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We weave the texture synthesis process into steganography concealing secret messages as well as the source texture. In particular, in contrast to using an existing cover image to hide messages, our algorithm conceals the source texture image and embeds secret messages through the process of texture synthesis. This allows us to extract the secret messages and the source texture from a stego synthetic texture. To the best of our knowledge, steganography taking advantage of the reversibility has ever been presented within the literature of texture synthesis. Our approach offers three advantages. First, since the texture synthesis can synthesize an arbitrary size of texture images, the embedding capacity which our scheme offers is proportional to the size of the stego texture image. Secondly, a steganalytic algorithm is not likely to defeat this steganographic approach since the stego texture image is composed of a source texture rather than by modifying the existing image contents.

Third, the reversible capability inherited from our scheme provides functionality to recover the source texture. Since the recovered source texture is exactly the same as the original source texture, it can be employed to proceed onto the second round of secret messages for steganography if needed. Experimental results have verified that our proposed algorithm can provide various numbers of embedding capacities, produce visually plausible texture images, and recover the source texture. Theoretical analysis indicates that there is an insignificant probability of breaking down our steganographic approach, and the scheme can resist an RS steganalysis attack.

EXISTING SYSTEM:

- Most image steganographic algorithms adopt an existing image as a cover medium. The expense of embedding secret messages into this cover image is the image distortion encountered in the stego image.
- The most recent work has focused on texture synthesis by example, in which a source texture image is re-sampled using either pixel-based or patch-based algorithms to produce a new synthesized texture image with similar local appearance and arbitrary size.
- Otori and Kuriyama pioneered the work of combining data coding with pixel-based texture synthesis. Secret messages to be concealed are encoded into colored dotted patterns and they are directly painted on a blank image.

DISADVANTAGES OF EXISTING SYSTEM

- Two Drawbacks of Existing system are:
- First, since the size of the cover image is fixed, the more secret messages which are embedded allow for more image distortion. Consequently, a compromise must be reached between the embedding capacity and the image quality which results in the limited capacity provided in any specific cover image. Recall that image steganalysis is an approach used to detect secret messages hidden in the stego image.
- A stego image contains some distortion, and regardless of how minute it is, this will interfere with the natural features of the cover image. This leads to the second drawback because it is still possible that an image steganalytic algorithm can defeat the image steganography and thus reveal that a hidden message is being conveyed in a stego image.

PROPOSED SYSTEM:

- In this paper, we propose a novel approach for steganography using reversible texture synthesis. A texture synthesis process re-samples a small texture image drawn by an artist or captured in a photograph in order to synthesize a new texture image with a similar local appearance and arbitrary size.
- We weave the texture synthesis process into steganography concealing secret messages as well as the source texture. In particular, in contrast to using an existing cover image to hide messages, our algorithm conceals the source texture image and embeds secret messages through the process of texture synthesis.

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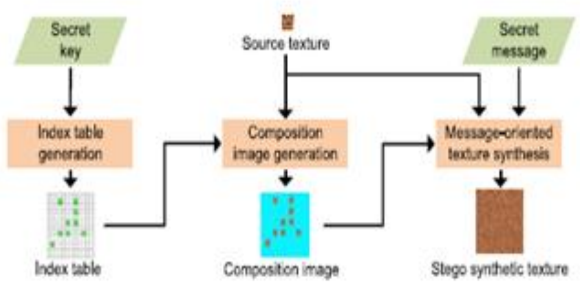
This allows us to extract the secret messages and the source texture from a stego synthetic texture.

- ❖ The three fundamental differences between our proposed message-oriented texture synthesis and the conventional patchbased texture synthesis are described in following: The first difference is the shape of the overlapped area. During the conventional synthesis process, an L-shape overlapped area is normally used to determine the similarity of every candidate patch. In contrast, the shape of the overlapped area in our algorithm varies because we have pasted source patches into the workbench. Consequently, our algorithm needs to provide more flexibility in order to cope with a number of variable shapes formed by the overlapped area.

ADVANTAGES OF PROPOSED SYSTEM:

- ❖ Our approach offers three advantages.
- ❖ First, since the texture synthesis can synthesize an arbitrary size of texture images, the embedding capacity which our scheme offers is proportional to the size of the stego texture image.
- ❖ Secondly, a steganalytic algorithm is not likely to defeat this steganographic approach since the stego texture image is composed of a source texture rather than by modifying the existing image contents.
- ❖ Third, the reversible capability inherited from our scheme provides functionality to recover the source texture. Since the recovered source texture is exactly the same as the original source texture, it can be employed to proceed onto the second round of secret messages for steganography if needed.

SYSTEM ARCHITECTURE:



IMPLEMENTATION MODULE:

- ❖ Message Embedding Procedure
- ❖ Index Table Generation Process:
- ❖ Patch Composition Process:
- ❖ Message-Oriented Texture Synthesis Process:
- ❖ Source Texture Recovery, Message Extraction, and Message Authentication Procedure

MODULE DESCRIPTION:

Message Embedding Procedure

In this module we will illustrate the message embedding procedure. It shows the three processes of our message embedding procedure. We will detail each process in the following modules.

Index Table Generation Process:

The first process is the index table generation where we produce an index table to record the location of the source patch set SP in the synthetic texture. The index table allows us to access the synthetic texture and retrieve the source texture completely.

Patch Composition Process:

The second process of our algorithm is to paste the source patches into a workbench to produce a composition image. First, we establish a blank image as our workbench where the size of the workbench is equal to the synthetic texture. By referring to the source patch IDs stored in the index table, we then paste the source patches into the workbench. During the pasting process, if no overlapping of the source patches is encountered, we paste the source patches directly into the workbench.

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However, if pasting locations cause the source patches to overlap each other, we employ the image quilting technique to reduce the visual artifact on the overlapped area.

Message-Oriented Texture Synthesis Process:

We have now generated an index table and a composition image, and have pasted source patches directly into the workbench. We will embed our secret message via the message-oriented texture synthesis to produce the final stego synthetic texture.The embedding capacity is one concern of the data embedding scheme. It summarizes the equations we described to analyze the embedding capacity our algorithm can offer. The embedding capacity our algorithm can offer is related to the capacity in bits that can be concealed at each patch (BPP, bit per patch), and to the number of embeddable patches in the stego synthetic texture (EPn).

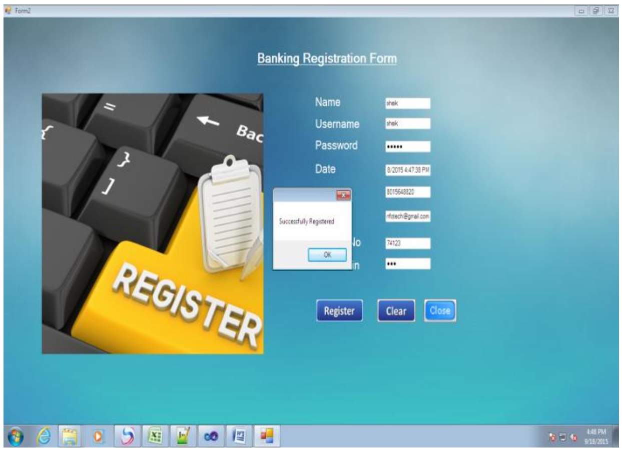
Source Texture Recovery, Message Extraction, and Message Authentication Procedure

The message extracting for the receiver side involves generating the index table, retrieving the source texture, performing the texture synthesis, and extracting and authenticating the secret message concealed in the stego synthetic texture. The extracting procedure contains four steps. Given the secret key held in the receiver side, the same index table as the embedding procedure can be generated. The next step is the source texture recovery. Each kernel region with the size of Kw × Kh and its corresponding order with respect to the size of Sw×Sh source texture can be retrieved by referring to the index table with the dimensions Tpw×Tph. We can then arrange kernel blocks based on their order, thus retrieving the recovered source texture which will be exactly the same as the source texture.

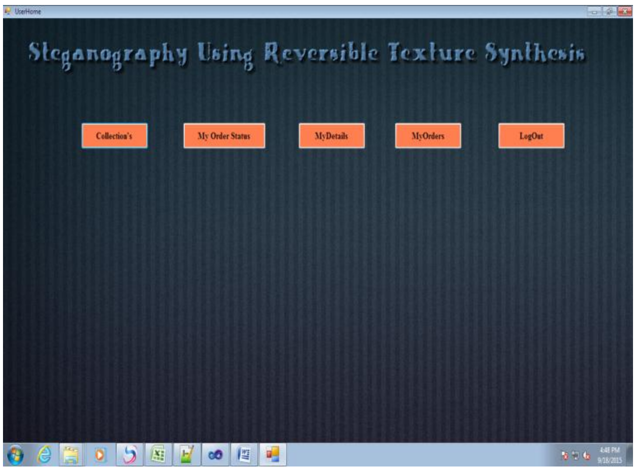
SCREEN SHOTS

Login:

User Registration:



User Home:



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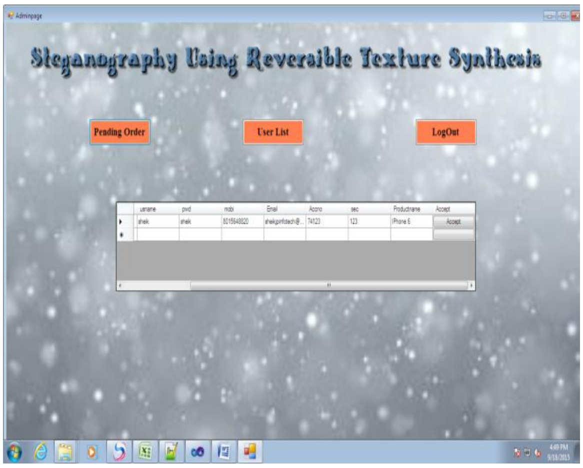
Admin login:

Admin Home:



CONCLUSION:

This paper proposes a reversible steganographic algorithm using texture synthesis. Given an original source texture, our scheme can produce a large stego synthetic texture concealing secret messages. To the best of our knowledge, we are the first that can exquisitely weave the steganography into a conventional patch-based texture synthesis. Our method is novel and provides reversibility to retrieve the original source texture from the stego synthetic textures, making possible a second round of texture synthesis if needed.With the two techniques we have introduced, our algorithm can produce visually plausible stego synthetic textures even if the secret messages consisting of bit “0” or “1” have an uneven appearance of probabilities. The presented algorithm is secure and robust against an RS steganalysis attack. We believe our proposed scheme offers substantial benefits and provides an opportunity to extend steganographic applications. One possible future study is to expand our scheme to support other kinds of texture synthesis approaches to improve the image quality of the synthetic textures. Another possible study would be to combine other steganography approaches to increase the embedding capacities.

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