SURVEY ON REVERSIBLE TEXTURE SYNTHESIS FOR DATA SECURITY

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ABSTRACT

This dissertation work proposes Reversible Texture Synthesis an approach for data security. It uses the concept of patch which represents an image block of source texture where its size is user specified. A texture synthesis process resamples a smaller texture image, which synthesizes a new texture image with a similar appearance and arbitrary size. The texture synthesis process is weaved into steganography to hide secret messages. In contrast to using an existing cover image to hide messages, the algorithm conceals the source texture image and embeds secret messages using the process of texture synthesis. This allows to extract the secret messages and source texture from a stego synthetic texture. The approach offers some advantages. First, the scheme offers the embedding capacity that is proportional to the size of the stego texture image. Second, the reversible capability inherited from this scheme provides functionality, which allows recovery of the source texture.

Keyword : - *Data embedding, patch, reversible, steganography, texture synthesis, stego synthetic texture.*

1. INTRODUCTION

Steganography [2] is practice of concealing a file, message, image or video within another file, message, image, or video. The steganographic application includes not openly acknowledged or displayed communication between two parties whose existence is unknown to possible attacker and whose success depends on detecting the existence of this communication [3]. Many of the image steganographic algorithms adopt an existing image as cover medium. The embedding of secret messages into the cover image can lead to image distortion in the stego image. This paper proposes Reversible Texture Synthesis an approach for data security. It uses the concept of patch which represents an image block of source texture where its size is user specified. A texture synthesis process resamples a smaller texture image, which synthesizes a new texture image with a similar appearance and arbitrary size. The texture synthesis process is weaved into steganography to hide secret messages. In contrast to using an existing cover image to hide messages, the algorithm conceals the source texture image and embeds secret messages using the process of texture synthesis. This allows to extract the secret messages and source texture from a stego synthetic texture. The approach offers some advantages. First, the scheme offers the embedding capacity that is proportional to the size of the stego texture image. Second, the reversible capability inherited from this scheme provides functionality, which allows recovery of the source texture.

1.1 Problem Statement

Reversible texture synthesis for data security uses the concept of steganography using reversible texture synthesis. The secret data is hidden into the texture image at sender side, it is done by generating patches from source texture and index table and composite image is generated, message is embedded and correct data can be recovered from the cover image with no change at receiver side. Major part of system will include Texture synthesis, message embedding and source texture recovery, message extraction and message authentication. The system is to be developed which will be easily embed into the different application where security is main concern.

1.2 Existing System

Using an existing cover image to hide messages, the algorithm conceals the source texture image and embeds secret messages through the process of texture synthesis.

A typical steganographic application includes communications between two parties whose existence is unknown to a possible attacker and whose success depends on the existence of this communication

Many of the image steganographic algorithms uses an existing image as a cover medium. The expense of embedding secret messages into the cover image is the image distortion encountered in the stego image.

There is no significant visual difference exists between the two stego synthetic textures and the pure synthetic texture.

1.3 Proposed System

- Proposed system uses an algorithm that can provide various numbers of embedding capacities, produces reasonable texture images and recover the source texture.
- The proposed system uses an image reversible data hiding algorithm which can recover the cover image without any distortion from stego image after the hidden data have been extracted.
- The proposed system uses the concept of patch is used. Patch is image block of source texture where its size is user specified. Patch size is denoted by its width and height.
- The proposed system uses the concept of kernel block, which formed by subdividing the source texture into a number of non-overlapping kernel block each of which has size of kernel width and kernel height.
- The shape of overlapped area in proposed algorithm varies because we have pasted source patches into workbench.
- The proposed algorithm selects “appropriate” patches by taking into consideration of secret messages.

2. LITERATURE SURVEY

Cohen *et al*. and Xu *et al*. [4], [5] uses the patch-based approach. Patch-based algorithms paste patches from a source texture instead of pixel to form the synthesized texture.

Advantage:

- This approach improves the image quality of pixel-based synthetic textures as texture structures inside the patches are maintained.

Disadvantage:

- Since patches are pasted with a small overlapped region during the synthetic process, one needs to make an effort to ensure that the patches agree with their neighbors.

Liang *et al*. [6] proposed the patch-based sampling and used the feathering approach for the overlapped areas of adjacent patches.

Advantage:

- The patch-based sampling algorithm is fast and it makes high-quality texture synthesis.
- The patch-based sampling algorithm works well for a wide variety of textures ranging from regular to stochastic.

Efros and Freeman [7] proposed a patch stitching approach called "image quilting for texture synthesis."

Advantage:

- Quilting is new, fast, yet very simple texture synthesis algorithm which produces good results for a wide range of textures.
- A dynamic programming technique is used to disclose the minimum error path through the overlapped region.

Ni *et al.* [8] introduces an image reversible data hiding algorithm which can recover the cover image without any distortion from the stego image after the hidden data have been extracted.

Advantages:

- Recover source texture without any distortion.

Ni et al. [9] proposed a general framework of current state of the art for reversible image data hiding.

3. PROPOSED SYSTEM ARCHITECTURE

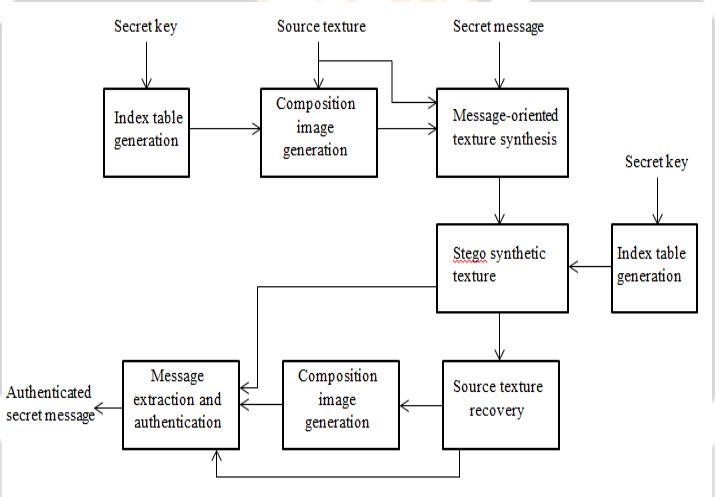

Fig -1: System Overview

3.1 Select Texture and Generate Patch Module

- Select the texture which is to be used as cover medium.
- Here the concept of patch is used. Patch is image block of source texture where its size is user specified. Patch size is denoted by its width and height.
- Then the concept of kernel block is used, which formed by subdividing the source texture into a number of non-overlapping kernel block each of which has size of kernel width and kernel height.
- Divide all the prediction errors into *L* clusters. The source patch is formed by expanding the kernel block with the depth at each side to produce a source patch.

3.2 Message Embedding Module

- The index table generation is carried out first where we produce an index table to record the location of source patch. The index table allows us to access the synthetic texture and retrieve the source texture completely. This reversible embedding style reveals one of the major benefits. The index table has the

initial values of -1 for each entry, that shows the table is blank. We then assign values after distributing the source patch ID in the synthetic texture.

- In patch composition process we paste the source patches into the workbench to produce composite image.
- After generation of index table and composition image and after pasting source patches into workbench, we will embed the secret message via message oriented texture synthesis to produce stego synthetic texture.

3.3 Capacity Determination Module

- Maximum capacity in bits/patch is calculated.
- Calculate number of embeddable patches which is difference between the number of patches in the synthetic texture and number of source patches subdivided from source texture.
- Calculate total embedding capacity which is product of maximum capacity in bits/patch and number of embeddable patches.

3.4 Source Texture Recovery, Message extraction, and Message Authentication

- Generate the index table, given the secret key held in receiver side. The same index table as the embedding procedure can be generated.
- Recover the source texture. Source texture can be recovered or retrieved by referring the index table, then we arrange the blocks based on the order. Hence, the recovered texture will be same as the source texture.
- Generate the composite image, by pasting source patches into the workbench by referring the index table.
- Extract message by constructing candidate list and then perform match authentication step.

4. CONCLUSION

This paper proposes the Reversible texture synthesis for data security. The source texture is given and the scheme produces the stego synthetic texture hiding the secret message. The patch based concept is used instead of pixel based approach. Provides the reversible approach to recover source texture and secret message from stego synthetic texture. In this given the source texture and then kernel blocks and source texture is generated. Index table is generated which stores the starting location of each patch. After it index table is generated, composite image is generated and then secret message is embedded into it. Reverse procedure is carried out to recover source texture and secret message.

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