

## A new visual cryptography scheme for STS based access structures

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### Abstract

Visual Cryptography Scheme (VCS) for general access structure was developed by Ateniese, Blundo, Santis and Stinson in 1996 for black and white image and subsequently different schemes have been developed. In this paper, we propose a new model for Steiner Triple Systems (STS) based access structures by using “stacking” i.e. “superimposition” and “machine operation” which are mathematically equivalent to “OR” and “XOR” respectively. The concept of qualified set is extended. The technique to construct the VCS is developed for the model. The structure of the VCS is analysed. The contrast of the reconstructed secret image (SI) under the two operations is studied. Finally we introduce STS based  $(3, n)$ -Visual Threshold Scheme (VTS) and derive the ratio of its pixel expansion and the number of qualified sets.

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*Keywords* : Visual cryptographic scheme, visual threshold scheme, secret sharing, secret image, balanced incomplete block designs (BIBD), Steiner triple systems, access structure.

### 1. Introduction

A visual cryptography scheme for black and white image was introduced by Naor and Shamir [5] in 1994 which can reconstruct the secret image by the human visual system. This can be used by anyone

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