**Title:** Visual cryptography tool for colorful images

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Visual cryptography is a type of encryption that hides information in images in such a way that the human eye can perform the decryption if given the correct key. This research involved reviewing the various visual cryptography schemes and creating a software tool that allows a user to hide a secret message inside two innocent images. While there are many techniques for performing visual cryptography, there are only a few software tools available for use. The Holt Visual Cryptography Tool allows a user to securely hide information in two cover images, and it can reveal the secret message when provided two encoded images.

The visual cryptography tool initially implemented an extended visual cryptography scheme for images with strictly black and white pixels. Then, the functionality was increased with the ability to process grayscale images. The current product uses a combination of extended visual cryptography, pixel expansion, and Floyd-Steinberg dithering to encrypt and decrypt color images. Tests for this product are qualitatively analyzed based on the following items:

* Is the secret image detected in the encoded images?
* How much was the meaning of the cover image impacted by the encryption process?
* After decrypting the encoded images, is it easy for the human eye to distinguish the secret?

The tests show the visual cryptography tool created does work as intended. In other words, given a secret message or image and two innocent cover images, the tool will create two encoded images that have the same meaning as the cover image. Also, if the tool is given two encoded images, the software will decrypt and reveal the secret in a new image file. The Holt Visual Cryptography Tool allows a user with no background knowledge of cryptography or software engineering to encrypt secret messages in two color images and decrypt colorful encoded images.