A 2 out of 3 Visual Multiple Secret Sharing Method using Generalized Random Grids

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Abstract. Visual secret sharing by using generalized random grids is a novel approach for generating non-expansible shares by artfully utilizing various random variables. Stacking the shares together, secret image can be revealed. This paper proposes a 2 out of 3 visual multiple secret sharing method using generalized random grids. Three secret images (A, B, C) are used for generating three non-expansible shares (U, V, W). The secret revealing process is a kind of circle-style decoding: stacking U and V together, A can be revealed; stacking U and W together, B can be revealed; stacking V and W together, C can be revealed. The quality of stacking results can be adjusted by users for various applications.

Keywords: Visual secret sharing, generalized random grids, random grids

References

[1]   M. Naor and A. Shamir, "Visual Cryptography," in *Proceedings of Advances in Cryptology – Eurocrypt 94*, Springer, Berlin, pp. 1-12, 1995.

[2]   C.C. Chang and R.J. Hwang, "Hiding a Picture in Two Pictures," *Optical Engineering*, Vol. 40, No. 3, pp. 342-351, 2001.

[3]   C.N. Yang, "New Visual Secret Sharing Schemes using Probabilistic Method," *Pattern Recognition Letters*, Vol. 25, No. 4, pp. 481-494, 2004.

[4]   Y.F. Chen, Y.K. Chan, C.C. Huang, M.H. Tsai, Y.P. Chu, "A Multiple-level Visual Secret-sharing Scheme without Image Size Expansion," *Information Sciences*, Vol. 177, No. 21, pp. 4696-4710, 2007.

[5]   S.J. Lin, S.K. Chen, J.C. Lin, "Flip Visual Cryptography (FVC) with Perfect Security, Conditionally Optimal Contrast, and No Expansion," *Journal of Visual Communication and Image Representation*, Vol. 21, pp. 900-916, 2010.

[6]   O. Kafri and E. Keren, "Encryption of Pictures and Shapes by Random Grids," *Optics Letters*, Vol. 12, pp. 377-379, 1987.

[7]   S.J. Shyu, "Image Encryption by Random Grids," *Pattern Recognition*, Vol. 40, pp. 1014-1031, 2007.

[8]   S.J. Shyu, "Image Encryption by Multiple Random Grids," *Pattern Recognition*, Vol. 42, pp. 1582-1596, 2009.

[9]   S.K. Chen, "Friendly Progressive Visual Secret Sharing using Generalized Random Grids," *Optical Engineering*, Vol. 48, No. 11, pp. 117001.1-117001.7, 2009.

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