**CONCLUSION:**

In this paper, we proposed a visual secret sharing scheme for QR code applications, which makes improvement mainly on two aspects: higher security and more flexible access structures. The security weakness of previous work is solved in our paper. In addition, we extended the access structure from (n, n) to (k, n) by further investigating the error correction mechanism of QR codes. Two division approaches are provided, effectively improving the sharing efficiency of (k, n) method. Therefore, the computational cost of our work is much smaller than that of the previous studies which can also achieve (k, n) sharing method. However, our paper introduces only two feasible partitioning algorithms. According to super graph theory, there may be a deeper relation among those k-participant subsets. Finding this specific relationship and designing an optimal partitioning method remains open problems.