

## ABSTRACT

The use of QR Code is becoming increasingly popular and is driven by its data storage capacity higher than a conventional horizontal barcode, fast code reading and it does not require any special scan reader so that the majority smart-phone devices nowadays are capable reading them. Based on the development of camera technology in latest smart-phone devices, Teraura and Sakurai proposed method for hiding an additional data into a fine subcell structure of a monochrome QR Code. Since in the case 3x3 subcells configuration the cover data is placed at the outer subcells and utilized a single center subcell to store one bit of embedded data and , a general QR Code reader that detects a cell of a symbol from its center pixel has difficulty to extract the cover data of a 3x3 subcells QR Code. This study proposes two alternative methodologies: compatibility mode that accommodate different approaches in recognizing a cell color and extended mode that reduce the compatibility level which only accommodate a general cell color detection method. The subcell selection is kept secret by applying pseudorandom to randomize the bit data position in each cell. Experimental results show that both proposed methods are 97% compatible to be read by a general QR Code reader. Compatible mode, uses 4 subcells to store 4 bits additional data and has 51% data density ratio. Whereas in extended mode, it uses 8 subcells to store 8 bit additional data and has has a higher 92% of data density ratio. With a bigger data density ratio, a 3x3 subcells in compatible and extended mode respectively has embedded data capacity 4 times and 8 times higher than the previous method.

**Keywords:** QR Code, Information Hiding, 3x3 SubCells QR Code