# Abstract

Watermarking as one technique for copyright protection is actually divided into two categories based on tagging the watermark which is visible and invisible. Visible watermarking is watermark which is directly embedded in the digital image and can be seen by naked eye, for example, on the broadcast of television there will be company logo usually at the top corner of the television picture. However, it has a basic weakness where user can easily erase the logo. Conversely, invisible watermarking is not visible to the naked eye because the embedding process is more complex to make irresponsible user thinking that the digital images can be copied and distributed without any problems from the maker of digital image. With the existence of this invisible watermark, digital image maker can claim that they are the true owner of the digital image.

Technology is evolving everyday, and invisible watermarking also have a weakness which is the digital image can be processed and manipulated by irresponsible parties so that the inserted watermark is damaged or cannot be verified. Therefore it is necessary to have a robust watermark which has resistant to image processing and also have high invisibility without affecting the quality of digital images.

In this study, invisible and robust watermarking and are used for image protection. For implementing them we use a method of Randomly Sequence Pulse Positioned Modulated Code (RSPPMC). This method is based on the JPEG image format that divides the image into 8x8 pixels and then performed the transformation of Discrete Cosine Transform (DCT). The main advantage of this transformation is that it can eliminate the redundancy between adjacent pixels. This will allow the coefficients with low frequency can be neglected without causing any visual distortion in the image which will be transformed back to the spatial domain (Image domain).

RSPPMC method is strong enough against Low Pass Filter attack. The quality of watermarked image is good (watermarked PSNR > 30 dB). Image quality with edge detection and without edge detection actually is the same. Edge detection only used as pointer position, so it is not having much influence on the quality of watermarked image.

**Keywords**: *DCT, RSPPMC, invisible watermarking,Citra digital.*