## ABSTRACT

Image processing in the medical field has many application uses including telediagnosis, teleconferencing between doctors, distant learning from medical personnel and exchanging medical images between doctors, specialists, and radiologists. Medical images contain information about a person's medical data that should not be known by unauthorized persons. Therefore, a watermarking process is carried out on medical images. Watermarking is the insertion of information into an image to protect ownership without damaging the image quality. Watermarking aims to label ownership or copyright protection on digital images.

In this final project, designed watermarking method based on Dual Tree Complex Wavelet Transform (DTCWT), Singular Value Decomposition (SVD), and Affine Scale-Invariant Feature Transform (ASIFT). Arnold Transform is applied to the watermark image to change the pixel coordinates to change the layout of the image. The medical image watermarking process is divided into two stages, namely insertion and extraction. At the insertion stage, the scrambled watermark image is then inserted into the host image by applying DTCWT and SVD to produce a watermarked medical image. In the extraction stage, the watermarked medical image is carried out by applying ASIFT and reconstruction using Arnold Transform, it will produce an extracted watermark image.

The purpose of the watermarking scheme based on the DTCWT, SVD, Arnold Transform, and ASIFT methods is to be able to secure and protect medical images from various noise additions, both general noise and geometric noise. The results of this study, the system can produce PSNR values greater than 30 dB, NC values close to 1, SSIM values close to 1, and BER values less than 0.1 for each modality tested.

**Keywords :** Medical image, Watermarking, DTCWT, SVD, Arnold Transformation, ASIFT.