

## ABSTRACT

Over time, the development of technology has been revolutionized our life to become easier in accessing various digital data that spread in a virtual world such as music, video, and picture. Unfortunately, this can cause criminality effect, for instance, duplication and manipulation toward certain data illegally. Therefore, in order to prevent it, needed a certain solution to protect the copyright of data. The one solution is by using watermarking.

In this study audio watermarking techniques were performed using Compressive Sampling (CS) Orthogonal Matching Pursuit (OMP) algorithm, arnold transform, with Stationary Wavelet Transform (SWT) and Singular Value Decomposition (SVD) approaches. Watermark data in the form of images will be processed by Compressive Sampling (CS) technique and randomization of images using arnold transform technique. The watermark data that has been processed will be inserted into the audio host data. After that, an attack on an audio host that has been inserted with a watermark and optimized using the Particle Swarm Optimization (PSO) technique is expected to improve the quality of existing watermarking techniques and be resistant to attacks.

The results with audio watermarking techniques and methods are able in meeting criteria of having imperceptibility, adequate capacity, robustness, and security in protecting watermark data and they can be proven by BER 0.0004, SNR > 20 dB and PSNR > 50 dB.

**Keywords:** Stationary Wavelet Transform (SWT), Singular Value Decoposition (SVD), Compressive Sampling - Orthogonal Matching Pursuit (CS-OMP), *arnold transform*, Particle Swarm Optimization (PSO).