

## ABSTRACT

The increase of frequency in audio data piracy makes the urgency to conduct a research about watermarking is getting higher. Watermarking is one of the preventive method to deal with the audio data piracy by the internet users who harm all the related parties.

In this Final Task, the research was conducted to analyse the watermarking results by using Discrete Wavelet Transform (DWT), Singular Value Decomposition (SVD), Quantization Index Modulation (QIM), and Coarse to Fine Search (CFS). In the designed system, the first step to be conducted is to perform watermark image processing with CFS method and reshape. Furthermore, in embedding process, the system performs the watermarking process based on DWT and SVD. The result of watermark image processing is embedded into the audio host using QIM method afterwards. Lastly, the watermark extraction is done to separate the host audio from the watermark image.

This research was conducted by using an image with 40×40 pixels in .bmp format as the watermark and five audio data of bass, drum, guitar, piano, and vocal in .wav format as the hosts. According to the conducted test of the system, it is proven that the guitar audio has the best performance out of five other audio data used as research objects by applying input parameters of DWT with the level of 5 and quantization bit of 5 based on the parameters value which are used as references with SNR value of 57.7067 dB, ODG value of -0.3052, and capacity value of 22,050 bit per second.

**Keywords:** audio watermarking, watermark, Discrete Wavelet Transform, Singular Value Decomposition, Quantization Index Modulation, Coarse to Fine Search.