

ABSTRACT

The development of information technology that has been progressing rapidly impact on human life such as assist in obtaining and presenting data and information that previously analogue form, can now be obtained and presented in digital form. Presentation of data and information in digital form has advantages, but also has drawbacks such as copyright violations.

The problem of copyright infringement on digital data / information as in audio can be overcome by the use of watermark insertion technique or so-called audio watermarking. Audio watermarking has been widely used with several methods one of them Discrete Wavelet Transform (DWT). However, there is still little DWT development that can provide 2 values of performance parameters such as imperceptibility and robustness high simultaneously. Therefore, an additional mechanism is required that is optimization on 2 parameters performansi. The optimization can use a genetic algorithm, which is a solution-based optimization method based on genetic principles such as selection, crossover, and mutation. The genetic algorithm will evaluate the watermarking parameters in which it is the chromosome that will go through the genetic process by generating a solution that is the best watermarking parameter value to obtain the optimum imperceptibility and robustness.

In this study, the authors will optimize using genetic algorithm on a DWT-based audio watermarking system by adding the Fuzzy C-Means (FCM) Clustering method. FCM functions in selecting the audio frame to be inserted watermark based on the degree of fuzzy membership of each audio frame. The results show that the watermarking system built without optimization is sufficient to survive against attacks such as LPF, noise, and mp3 compression, without damaging the audio quality of watermarked discharge with ODG values > -1 , SNR > 30 dB and BER < 0.4 . For resistance to stereo to mono and linear speed change, the system has a resistance with BER value is 0. By optimizing using genetic algorithm, system resistance to attack increases as BER 0.32 value decreases to 0.17 in LPF attack.

Keywords : *Audio watermarking, Genetic Algorithm, Discrete Wavelet Transform, Fuzzy C-Means Clustering*