ABSTRACT

With the expansion of digital multimedia into quantum computing and quantum networks, copyright protection of digital multimedia in quantum networks is becoming a significant issue. As an important security technology, quantum watermark is the perfect solution, which embeds copyright information into the host signal. This work presents the Least Significant Qubit (LSB) based on audio watermarking which uses the significant qubit to determine the position of the qubit for embedding.

In this final project embedding the watermark bit directly on the LSB of the amplitude of the host signal has a security problem, which makes the watermark signal vulnerable to attack or forge by illegal third parties. it can effectively improve watermark robustness and security for quantum audio copyright protection. The parameters used to measure the system are made using BER (Bit Error Rate), SNR (Signal-to-Noise Ratio), ODG (Objective Difference Grade), and Capacity. And the type of attack uses Noise-X, Noise-Z, and CNOT. This is expected to be a solution for audio watermarking security.

This final project research was tested using test parameters in the form of BER, SNR, and time. The results of extraction without attack show that the system produces the best audio watermark quality as seen from the BER value of 0. The BER value will be better when the noise probability is small than when the noise probability is large. SNR values at quantization bits 7,8, and 9 are 16.3990, 22.4910, and 28.4878. Meanwhile, the quantization time will be longer when the quantization bit is large. The best BER, SNR, and time values were obtained after being given a CNOT attack.

Keywords : Audio Watermarking, Least Significant Bit (LSB), Audio Quantum