

## ABSTRACT

Current developments of technology in the world is very fast, can't be denied that human beings can't be separated from technology advances every day. Without realizing it anyway, a lot of tools and computer software that the unconscious plays an important role in helping human activity. One technology that is being developed at this time is technology in the field of signal processing. Signal processing is a technique to study and develop manipulating methods, and analyzing the signal. Signal processing can also be divided into several groups, one of that is the audio signal processing.

In this final project, the research conducted by dropping a golf ball to hit the ceramic tile that has been installed and recorded the sound that is generated using the microphone on the phone. This application works with Average Energy and ZCR (Zero Crossing Rate) feature extraction and using the KNN (K-Nearest Neighbor) classification which used to compare the test result value of feature extraction that captured by microphone with a trainer sound which has been previously saved.

With this final project produced an audio signal processing application that can determine whether the ceramic tiles that have been installed is already needs to be replaced or still fit for use after using Average Energy with 61.67% accuracy at 40 cm altitude and ZCR (Zero Crossing Rate) with 95% accuracy at 50 cm altitude using cropping threshold value 0.1 and KNN (K-Nearest Neighbor) classification with  $k=1$  for Average Energy and  $k=9$  for ZCR (Zero Crossing Rate).

*Keywords : audio signal processing, Average Energy, ZCR, KNN*