

ABSTRACT

The need for LTE 4G mobile services in modern times continues to grow rapidly. In addition to the impact of profit from the business side, it turns out that the technology has a negative impact. Researchers from China's ministry of industry and technology has done research on the impact of 4G signal on the human brain which found changes in brain activity. Activities that occur in the brain can be recorded by Electroencephalograph or EEG which is an electrical activity recording device on brain signals due to ion fluctuations in brain neurons. There are 5 types of human brain signals namely alpha, beta, theta, delta, and gamma which have their respective frequency ranges.

This final project aims to determine whether there is a change in brain activity before exposure and after exposure to LTE wave. It can be determine by looking at human brain wave form from alpha signal with frequency range (8 - 14) Hz and gamma signal with frequency range (32 - 64) Hz.

The feature extraction used is discrete wavelet transform or DWT with the use of wavelet daubechies and using PCA to compress data. The classification system used is the backpropagation method. The results showed that based on alpha signal testing 62.85% of people who were exposed to LTE were detected as brain signals did not experience changes in brain activity, whereas testing based on gamma signal showed 68.57% of people did not experience changes in brain activity.

Keywords: *Electroencephalography, Brainwave, 4G, LTE, Backpropagation, Wavelet, PCA*