

## **ABSTRACT**

Music is a sound of reflected note where the frequencies are fixed. Human frequently enjoy music by listen to it and then play it. However, human has a limited sense of voice. Not everyone can listen to the voice of a note and then play it exactly. Therefore, the writer has made an application to display guitar chord from the sound of guitar record, so the user of this application can know the formed chord of the record when it's being listened.

Chord is a series of tones arranged in a regular basis from a ladder could represent a tone and the tone ladder. Tone frequency on chord also represent essentially. For example, tone frequency A=440 Hz so the frequency of tone A is also equal to multiples, are 110 Hz, 220 Hz, etc. This is same for other tone. In this Final Assignment, the system will take the basic tone of the guitar sound recordings in the form of an existing file. After that, the signal will be processed with Harmonic Product Spectrum Algorithm where we can divide the input signal into segments by applying a Hanning Window, where the window size and hop size are given the appropriate input. For every window, we take advantage of short time fourier transform to convert the input signal from the time domain to the frequency domain. After input in the frequency domain and then Harmonic Product Spectrum applied to every window.

HPS involves two steps : downsampling and multiplication. For downsample, spectrum downsample twice in every window with : first, downsample the origin spectrum to be two windows and the twice to be three windows. After that, multiplied by three together and find the same frequency with the highest. This frequency is basic frequency from those window.

This study was conducted to determine the accuracy of Harmonic Product Spectrum of tones and chords based on the frequency. The level of accuracy is determined from the expected correct chords and chord appears that no one is expected to appear at the time of displacement chord. To produce many possible accuracy, window designed in several different segmentation. From the design, the accuracy of the system results is 70% to 85% with total accuracy of all data is at 75.68%. To change the value of the FFT, if the value is greater than  $10 * F_s$  with  $F_s$  value of 44100 Hz affect the system's accuracy in identifying chord with a total accuracy of all data 45.6%.

**Keywords :** chord, Harmonic Product Spectrum, frequency