ABSTRACT

There have been many developments in medical devices that have been transformed into sophisticated and practical tools. One of the most basic diagnostics for medical personnel is a stethoscope. A stethoscope is a tool for diagnosing a disease that serves to perform the auscultation process. Auscultation is a process of examining a patient by listening to sounds in his body which can be sounds of the heart, lungs or intestines. From the auscultation process, it can be seen that the sound in the patient's body is normal or abnormal.

Analysis with the STFT algorithm (Short-time Fourier transform) is later expected to be formed in such a way and can diagnose abnormalities in the heart. Then the software in the application is programmed with digital signal processing by converting the STFT to an image and then it will be programmed with the CNN (Convolution Neural Network) classification method with the matlab Alexnet Image processing tool.

This research proposes STFT method and deep learning CNN (Convolutional Neural Network) Alexnet architecture. This analysis step is an analysis using a short-time Fourier transform and then image data is obtained from STFT in the form of a signal plot image, continued to the process of classifying normal and abnormal heart sound image data using the CNN (Convolutional Neural Network) method. From the CNN (Convolutional Neural Network) classification test, it was found that the level of accuracy from this testing process used CNN Alexnet Architecture with the best learning rate and Iteration/Epoch Amount of 0.00001 and the number of iterations 70. so that the accuracy the heart sounds was 91.07%. For the classification of normal and abnormal heart sounds using 56 heart sound data. Precision was found for normal class 88.46%, recall was found 92% and for f1 scores 90.2%.

Keywords: Smartphone, Stethoscope, STFT, CNN, Heart Sounds, Signal, Image, Spectogram, Alexnet