

I. INTRODUCTION

The mortality rate for valvular heart disease (VHD) was high in the cardiovascular disorder group. The disease is caused by damage to the heart valves, which consist of the aortic, pulmonary, mitral, and tricuspid valves, which help prevent backflow of blood. Causes of VHD include blood clots, heart failure, stroke, and sudden cardiac death. Currently medical practitioners perform the initial procedure using a stethoscope [3].

A stethoscope is an acoustic device used to listen to the internal sounds of the human body and works on the principle of transmission from the chest piece through an air-filled tube to the ear. In an electronic stethoscope, the pressure waves generated from the diaphragm are transferred to a sound-sensing device, usually a microphone, which in turn generates a signal that is used to analyze the condition of the heart. However, this stethoscope has the disadvantage of inherent noise due to lung sounds and ambient sources, the presence of these sounds making diagnosis difficult [3].

Phonocardiogram (PCG) is a graphical representation of the mechanical activity of the heart, which provides valuable information for the diagnosis of VHD, congestive heart failure, and anatomic defects. The function of the PCG is the same as a stethoscope, the difference is that the results of the data from the PCG are in the form of signal data from heart sounds that can be processed so that the results of the diagnosis are more precise [5]. With the development of technology and utilizing the field of machine learning, the signal is processed in 3 stages, namely denoising, feature extraction, and classification. Denoising is the stage where this stage will process the obtained signal and then remove the noise in the signal and convert the signal data into discrete data. Feature extraction is the stage of extracting information or features that are used as parameters or input values to distinguish objects from one another at the classification stage. Classification is the stage for the final result in the form of accuracy for detection. In this paper we will focus on the denoising stage. For denoising the author will analyze several denoising methods including Discrete Wavelet Transform (DWT), Short Term Fourier Transform (STFT), and Low-Pass Filter.