

ABSTRACT

In the process of industrial production, the maintenance of production machinery is very important. Maintenance of machinery conditions in industry requires speed and ease, one of the methods is the analysis of vibration. Machine vibration causes the machine emitted sound pattern, wherein the engine sound mixes with the sound of the other machines. The change of machine vibration will cause the change of emitted sound machine pattern.

In this final project, a system for monitoring and detection of fault of the machines is designed with the separation of sound signals from many sources on the machines. Some motor sounds are recorded simultaneously through microphone array (multiple microphones arranged). Each microphone receives sound signals from some of the motors, so that the output of each microphone signal is mixed signal. Separation of mixed signals is done by using Blind Source Separation (BSS) with Independent Component Analysis (ICA) method and FastICA algorithm. In previous study, using the natural gradient algorithm, but the application still has some drawbacks.

To separate mixed signals, using ICA method with the approach of Time Domain ICA (TDICA), the approach of Frequency Domain ICA (FDICA), combination of both gradually (Multistage ICA-MSICA), and FastICA. The result in this final project by using FastICA algorithm obtained a better system performance, characterized by the high SNR value.

Keywords: ICA, FastICA, sound signal, fault detection.