

Abstract

Sound is one of medium that is widely used by today's technology. Most of sound is a combination of various signals. One of the processing that can be done is a digital signal processing, which is signal separation. The mixed sound that recorded can be processed into separated sound signals. One of the problem examples is cocktail party problem which there are conditions of many people talking simultaneously in a room and one of them tried to follow a topic that being discussed.

This final project was discussed those issues. The method that used was Blind Signal Separation (BSS), which is a way to separate mixed signal into a number of mixed signal without having the information about these mixed signals. While the algorithm method that used was FastICA, developed by Aapo Hyvarinen and Erkki Oja. This method was selected because there are not much final project that discussed this method in IT Telkom. The aim of this final project was to know about the BSS method performance so we can see whether it can used or not in the real world. The audio data that used was actual data, which is result of own recording, and dummy data that derived from simulation mixing process. Both of quality these results are compared. The experiment done in 2 way, which are simulation and real. Simulation experiment used dummy signal which recorded separately and then mixed and added the mixed coefficients then separated by FastICA. Whereas real experiment used real data which recorded simultaneously then separated. The result from the system was mixed recording sound can be separated to each sounds. This final project analyzed the results whether influenced by several factors, ie number of sensors used, the sensors distance to the sources, and recording duration. For separated results from simulation, MSE value is $1.57E-05$ and SNR value is 37.0907 dB which is excellent. And number of sensor did not influence quality of results. But when the sensors are at the same place ($\alpha=0.5$) system could not separate mixed signals. The grafik from computation time to duration is exponentially, when α approach 0.4, the difference of computation time was getting smaller. And the recording duration influenced computation time linearly with gradient value 0.428. The results of MOS for mixed data simulation with α combination was 4.5 which is almost excellent and with 1 to 6 second durations was 1.8 which is quite bad. Whereas for real mixed data with 1 to 6 second durations is 2.7 which is almost fair.

Keywords : *separating signals, Blind Signal Separation (BSS), FastICA, real mixing, simulation mixing, distance, number of sensors, duration.*