Contribution ID: **55** Type: **Poster**

Gamma-Ultrasound Signal Separation Using Autoencoder

Monday 27 June 2022 17:10 (1 minute)

Recently, research on Gamma-Ultrasound(γ-US) probe has been conducted. The Gamma-Ultrasound(γ-US) probe is a dual modality probe that can obtain anatomical structure and molecular information. In this system, the ultrasonic and the gamma signals can be obtained in one readout channel by summing the both signals. In the previous studies, The combined signal was separated by using FIR filter. In order to use the FIR filter, a frequency difference is required between ultrasonic and gamma-ray signals. For this reason, there is a problem in that the frequency band of the ultrasonic signal and the gamma-ray signal is limited.
Here, we propose a new separation method to solve this problem by using deep learning autoencoder model. The proposed method can discriminate gamma and ultrasonic signals regardless of frequency bands. In this study, the signal separation performance in the FIR and Autoencoder models was compared by changing the gamma signal length.
As a result of the study, As the width of the gamma signal narrowed, the peak voltage of the gamma signal decreased dramatically.(47.44%) On the other hands, the Autoencoder method showed similar performance to the original signal regardless of the signal length, and only a 0.17% decrease occurred. These results show that the proposed method has better performance regardless of frequency. Through this Autoencoder method, it is expected that the Gamma-Ultrasound probe can be applied to various fields.

Primary author: CHOI, Kyung-Seok (KoreaUniversity)

Co-authors: KIM, Chanho (Department of Bioengineering, Korea University, Seoul, South Korea); KIM, Semin (Department of Bioengineering, Korea University, Seoul, South Korea); Prof. YEOM, Jung-Yeol (Department of Bioengineering, Korea University, Seoul, South Korea)

Presenter: CHOI, Kyung-Seok (KoreaUniversity)

Session Classification: Poster