**Oral PO-9** *(09:50 - 10:00)*

## The performance enhancement of RF field inhomogeneity correction based on the optimal homomorphic filtering using minimal power spectrum change

[1]조익환, [2]송인찬, [3]오정수, [1]정동석

[1]인하대학교 전자공학과, [2]서울대학교병원 진단방사선과,

[3]서울대학교 대학원 협동과정의용생체공학전공

**목적 :** RF field inhomogeneity is the variability of tissue intensity level with respect to image location or vascular structure. The intensity variability is the major deterrent of the performance decline of automatic segmentation methods based on image pixel absolute intensity. Homomorphic filtering-based correction is used as the most common method of several proposed ones because it is very simple and powerful. Homomorphic filtering consists of the procedure of dividing illumination and reflectance parts of image, and low-pass filtering. By designing a proper low-pass filter, RF field inhomogeneity may be accurately corrected. In this paper, we proposed method to enhance the performance of homomorphic filtering-based correction using minimal power spectrum change.

**대상 및 방법 :** MR images were captured with a 1.5T MR unit using the quadrature head coil. Contiguous transverse dual T2 and PD-weighted images were obtained using the FSE sequence. We used a simple homomorphic filtering-based correction. Low-pass filter used in homomorphic filter is implemented with finite impulse response (FIR) filter and the FIR filter has three parameters of cut-off frequency, filter size and filter power. In our simulation, filter size and filter power was fixed. Optimal cut-off frequency is estimated according to minimal value of power spectrum change for low and high frequency parts. In step 1, power spectrum change for each frequency level was calculated by roughly decreasing cut-off frequency from high to low frequency in order to obtain candidate frequency level for optimal cut-off frequency. In step 2, optimal cut-off frequency was calculated by applying same method in step 1 with fine searching frequency level. We visually evaluated the results of RF inhomogeneity correction method based on homomorphic filtering in brain MR images. In addition we evaluated the results by applying intensity-based segmentation.

**결과 :** Our results showed the performance of RF inhomogeneity correction method based on homomorphic filtering is visually enhanced by applying optimal cut-off frequency using minimal power spectrum change. And brain tissue segmentation results using k-means clustering method showed the proposed method effectively corrected RF field inhomogeneity.

**결론 :** RF inhomogeneity correction method using optimal homomorphic filtering is effective in intensity-based tissue segmentation.