Redefining MRI:
From Image to Insight

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인공지능의료영상 (AI for Medical Imaging & Applications 1)

SY03-2

AI in Longitudinal MRI Analysis

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Longitudinal MRI analysis uses images acquired from the same patient at multiple time points to quantify anatomical changes, monitor disease progression, or assess treatment response. Unlike cross-sectional analysis, it must reliably detect subtle temporal changes while accounting for challenges such as image misalignment, variations in acquisition protocols, irregular follow-up intervals, and missing scans. This lecture provides an overview of AI research in longitudinal MRI analysis, covering the evolution from conventional image registration and change-quantification methods to deep learning approaches. The lecture will also discuss current limitations, including limited longitudinal datasets, temporal and selection biases, scanner variability, model interpretability, and the need for rigorous external validation.

Keywords: *Longitudinal image analysis, registration, segmentation, quantification*