Deep learning models for efficient electromagnetic neuromodulation

情報科学研究科

〇教授　ラシド　イサム

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研究概要 Electromagnetic neuromodulation is a clinical procedure that is used for characterization and diagnosis of several neurophysiological disorders. The procedure starts with anatomical imaging such as MRI and then intensive segmentation process is applied to label all different head tissues. Finally, a simulation study is used to specify the parameters of electromagnetic stimulation based on the target brain region and clinical procedure. This process usually takes several hours of medical experts to be processed correctly as the segmentation of all head tissues including the non-brain tissues is challenging. In this project, we have developed an efficient yet fast method for the automatic generation of head model in few minutes using new deep learning models. This will help in automation of this complicated clinical procedure and shorten of required time, efforts and cost. Furthermore, we have extended the deep learning models such that it can automatically estimate the potential brain stimulation effect without conducting electromagnetic simulation study.
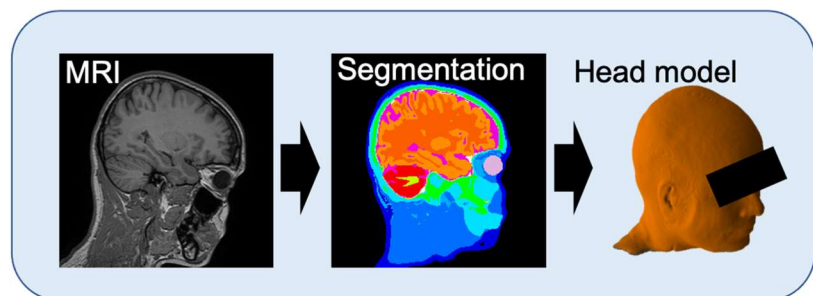
アピールポイント This research can be useful for several clinical applications such as treatments of depression and rehabilitations especially for brain stroke patients. It can lead to significant reduction of time required for the whole procedure and effectively reduce the efforts of medical experts.