New method for image reconstruction in electrical impedance tomography

February 27 2023

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Recently, a team led by Prof. DU Jiangfeng from the Key Laboratory of Microscale Magnetic Resonance of Chinese Academy of Sciences

(CAS) developed a new method for deep electrical impedance tomography reconstruction without training, which paved a new way for applying electrical impedance tomography technology in determining lesion tissue specificity. This work was published in *IEEE Transactions on Pattern Analysis and Machine Intelligence*.

Obtaining low damage, high resolution and dynamic functional images have always been one of the core objectives of medical imaging research. Electrical impedance tomography has attracted much attention due to its advantages such as non-invasive, non-destructive and non-radiation. In particular, it has played an important role in the treatment of patients with acute respiratory distress syndrome caused by coronavirus. However, the reconstruction of high-quality image remains a challenge in electrical impedance tomography.

Prof. DU Jiangfeng's team have conducted a series of research on the method of extracting prior information in image reconstruction using neural network. Former neural networks are usually task-specific and rely heavily on a large amount of data, which is difficult to obtain in medical practice. In their recent work, the team combined deep image prior (DIP) with electrical impedance tomography to execute high-quality image reconstruction without training data.

The results showed that not only can this method complete multiple tasks using only one model, it can also be adapted to new tasks without training, exhibiting great potential in practical application.

This research established a new paradigm for image reconstruction in electrical impedance tomography, which provides crucial theoretical support for the application of electrical impedance tomography in the diagnosis of diseases like brain injury, stroke, emphysema and breast cancer and is of great value to the development of medical imaging technology.

More information: Dong Liu et al, DeepEIT: Deep Image Prior Enabled Electrical Impedance Tomography, *IEEE Transactions on Pattern Analysis and Machine Intelligence* (2023). DOI: 10.1109/TPAMI.2023.3240565