

From Data to Modelling: Exploration At the Whole Brain Scale with Possible Clinical Applications

Abstract

Professor Jianfeng Feng will first present some of his recent results on tackling brain disorders with the aim to establish nonlinear association, prediction, subtype, and spatio-temporal pattern analysing for data ranging from genetic, MRI imaging and phenotypes.

With the aid of AI algorithms (usually developed by Professor Feng and his research team), the analysing above is usually carried out at the whole brain scale (data-driven approach) to avoid possible bias. Possible clinical applications are mentioned. A digital twin brain (DTB) platform including the whole brain for human (86 B neurons), monkey and zebrafish (100,000 neurons) is established to simulate the activity both in the resting-state and in action.

The activity of the DTB at voxel level shows a correlation coefficient of 0.9 with its biological counterpart in the resting state. The research team also test the DTB in actions including visual and auditory tasks. Finally, Professor Feng and his team are working on developing the DTB platform for brain-machine interfaces (DBS for example) and applications in other brain disorders.