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Singapore scientists develop high-precision tissue analysis AI tool to support drug discovery, diagnosis

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New AI software tool called BANKSY can automatically recognises the cell types present in a tissue enabling researchers to accelerate their research



A team of scientists from A*STAR's Genome Institute of Singapore (GIS) and Bioinformatics Institute (BII) has developed a new AI software tool called "BANKSY" that automatically recognises the cell types present in a tissue, such as muscle cells, nerve cells and fat cells. Going a step beyond conventional AI tools which can group cells together into clusters if they contain similar molecules, BANKSY also considers how similar the cells' surroundings in the tissue are.

With BANKSY, researchers would be able to improve their understanding of tissue processes in diverse diseases quicker and more accurately, which can support the development of more effective diagnostics and treatments for cancer, neurological disorders and other diseases.

BANKSY is adept at identifying subtly distinct cell groups in spatial molecular profiles generated from tissue samples. Moreover, BANKSY addresses the distinct but related problem of demarcating functionally distinct anatomical regions in tissue sections. For instance, it can distinguish layered structures in the human forebrain.

BANKSY can help biologists interpret and extract insights from the latest Spatial Omics technologies. Spatial molecular profiling (Spatial Omics) technologies are powerful microscopes that allow scientists to study tissues in great detail, by revealing the exact locations of individual biological molecules in cells, as well as the arrangement of cells in tissues. This helps them understand how cells come together in tissues to perform their normal physiological functions, or in diseased conditions. This understanding is essential for more accurate diagnosis and tailored treatment of patients, as well as the discovery of new drugs.