



nTracer2: A Cloud-based Visualization, Annotation, and Analysis of Petabyte-scale Multispectral 3D Images

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Software

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OVERVIEW

Cloud-based platform for scalable analysis of petabyte-scale 3D multispectral images

- Enables fast, accessible petabyte-scale image analysis
- Useful for digital pathology, brain imaging, spatial transcriptomics, lab research

BACKGROUND

High-throughput microscope technologies have revolutionized biomedical research by generating massive multispectral 3D image datasets. Historically, analyzing and annotating these data has been a significant challenge due to their sheer volume, requiring powerful computing resources typically unavailable outside specialized facilities. Traditional image analysis methods are not adequately scalable, often resulting in inefficient processing times and limited accessibility. This constraint hampers the pace of research and discovery in disciplines like neuroscience and pathology, where rapid and detailed image analysis is critical. Thus, an enhanced method is needed to facilitate the scalable and efficient processing of these datasets without the bottleneck of limited computational infrastructure.

INNOVATION

Researchers have created the nTracer2 platform to address existing challenges by providing a cloud-based solution for the visualization, annotation, and analysis of petabyte-scale multispectral 3D images. Through the introduction of a novel Scalable Image Storage Format (SISF), nTracer2 allows for fast random access to images stored on high-performance computing systems. This innovation ensures that even users operating from standard laptops can effectively manage and analyze extensive biomedical datasets. The technological advances of nTracer2 significantly enhance data accessibility and processing speeds, making it a powerful tool for centralized data management. Potential real-world applications include digital pathology, where rapid and detailed image analysis is crucial, spatial transcriptomics for mapping cellular components, brain imaging for neuroscience research, and various lab-based research activities.