Spatial Reconstruction Micro-module

Overview

Specifically, the EfficientNet module can efficiently extract features, the Swin Transformer module captures long-range dependencies, and spatial-channel attention mechanisms can adaptively emphasize critical spectral features. The spatial reconstruction of single-cell RNA sequencing (scRNA-seq) data into spatial transcriptomics (ST) is a rapidly evolving field that addresses the significant challenge of aligning gene expression profiles to their spatial origins within tissues. This task is complicated by the inherent. This chapter addresses the need to design non-linear methods that circumvent Godunov's theorem for solving hyperbolic partial differential equations. After providing some background on classical polynomial interpolation theory, we examine modern, non-linear polynomial interpolation methods. Our core innovation lies in a dual-reconstruction pipeline that creates a real-time feedback loop between data capture.

Article Content

SELF-Former: multi-scale gene filtration transformer for single-cell ...

A novel aspect of SELF-Former is the introduction of a gene filtration module, which significantly enhances the spatial reconstruction task by selecting genes that are crucial for accurate

SLFRM: A Novel Signature Local Feature Reconstruction Module for ...

In this paper, a novel Signature Local Feature Reconstruction Module (SLFRM) is proposed to assign weights to feature maps for capturing and emphasizing micro differences between different

A Deep Learning Model for Spectral Reconstruction of

Specifically, the EfficientNet module can efficiently extract features, the Swin Transformer module captures long-range dependencies, and spatial

3D reconstruction of spatial expression

With the proliferation of spatial transcriptomics technologies, we anticipate that the availability of 3D spatial reconstructions will spark the extension of downstream analysis such as ...

Context-Guided Spatial Feature Reconstruction for Efficient Semantic ...

In this paper, we present CGRSeg, an efficient yet competitive segmentation framework based on context-guided spatial feature reconstruction. A Rectangular Self-Calibration Module is

MONTAGE AS SPATIAL RECONSTRUCTION OPERATION

As an architecture exploration, further discussion will define this form of design editing process as operations of spatial reconstruction. With a montage approach, the study focuses on its narrative and

XGRIDS-XGRIDS-3D Reconstruction-Spatial Computing-Handheld

XGRIDS provides high-precision 3D reconstruction, real-world 3D rendering, real-time modeling, Lixel handheld LiDAR, and 3D Gaussian splatter reconstruction.

A unified framework for morphological and intra-particle pores ...

This study presents a high-fidelity digital reconstruction framework for calcareous sand particles, which enables large-scale stochastic generation of particle morphologies and intra-particle

Spatial Reconstruction of Oligo and Single Cells by De Novo

Spatial reconstruction and spatial marker gene detection of mouse olfactory bulb spatial transcriptomic dataset with D-CE, novoSpaRC, CSOmap, PCA, t-SNE, and UMAP.

MuST: multiple-modality structure transformation for single-cell ...

To combine both modalities, we add them by element to get a joint representation. In information fusion, we employ an MLP for encoding including a structure module (72, 72) for most of

Tissue module discovery in single-cell-resolution spatial ...

Multiple tools (e.g., SEDR and SpaGCN) have been developed to analyze ST datasets and have discovered tissue modules with coherent spatial gene expression; in these studies, tissue

[2405.06228] Context-Guided Spatial Feature Reconstruction for ...

Semantic segmentation is an important task for numerous applications but it is still quite challenging to achieve advanced performance with limited computational costs. In this paper, we

A Deep Learning Model for Spectral Reconstruction of Arrayed Micro ...

In this work, we present ESTspecNet, a deep learning framework that integrates EfficientNet, the Swin Transformer, and spatial-channel attention mechanisms to improve spectral

Spatial and Frequency-Based Feature Reconstruction for

Specifically, we introduce the Spatial and Frequency Domain Co-learning (SFDC), a three-branch module, that adaptively exploits the spatial and frequency characteristics of

Neural 3D Object Reconstruction with

Small Unmanned Aerial Vehicles exhibit immense potential for navigating indoor and hard-to-reach areas, yet their significant constraints in payload and autonomy have largely prevented

Motion compensated micro-CT reconstruction for in-situ analysis of ...

In our work however, we consider a dynamic non-rigid deformation of the sample''s micro-structure. An estimate of this local deformation could serve as a priori knowledge to compensate for

Spatial weight matrix in dimensionality reduction reconstruction for ...

Thus, in this study, we proposed a spatial weight matrix (SWM) with a dimensionality reduction for image reconstruction. The three-layer SWM contains the invariable information of the system, which

Spatial Reconstruction of Single Enterocytes Uncovers

A broadly applicable single-cell spatial transcriptomics approach reveals broad regional and functional heterogeneity of small intestinal enterocytes.

High-resolution spatially resolved proteomics of complex

Based on the trained model that establishes the link between parallel-flow projections and transferred spatial patterns, we can then reconstruct the

Decoding the tumor microenvironment with spatial technologies

Leveraging the power of spatial technologies and integrating them with AI and multi-tiered datasets offer unprecedented insights into the cellular architecture of the TME, paving the way

Tumour evolution and microenvironment interactions in 2D and 3D space

Visium spatial transcriptomics, single-nucleus RNA sequencing and co-detection by indexing are used to identify distinct spatial microregions in tumours and their microenvironment

Spatiotemporal omics for biology and medicine: Cell

This review summarizes how various spatial omics (transcriptomics, genomics, proteomics, epigenomics, translatomics, metabolomics, etc.)

Scalable spatial transcriptomics through computational array reconstruction

Spatial reconstruction through dimensionality reduction We started by asking if we could computationally reconstruct spatial locations in spatial transcriptomics using diffusion-based proxim-ity data.

Remote sensing image Super-resolution reconstruction by fusing multi ...

To address the challenges in reconstructing high-frequency details in remote sensing images, this paper proposes a GAN-based improved remote sensing super-resolution (SR)

Superresolution structured illumination microscopy reconstruction ...

To address this problem, the blind-SIM reconstruction algorithm was proposed, which does not require estimating illumination pattern parameters and can improve reconstruction robustness.

Spatial Reconstruction Methods | Springer Nature Link

The simplest extension is the component-by-component approach, in which the scalar reconstruction scheme is applied to each component of the vector of unknowns, typically the conserved variables.

SPACEL: deep learning-based characterization of

Spatial transcriptomics (ST) technologies detect transcript distribution in space. Here, authors present a deep learning based method SPACEL for cell

Uncovering an Organ''s Molecular Architecture at ...

To accurately reflect organ architecture, spatially resolved transcriptomics aims to provide spatial and expression information at the single cellular level for higher-order reconstruction.

Improved reconstruction of single-cell developmental potential with ...

CytoTRACE 2 is an interpretable deep learning framework that leverages single-cell RNA sequencing data to predict absolute developmental potential across datasets.

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