Vox-Insight: Visualization Tool for Multimodal Medical Imaging Data

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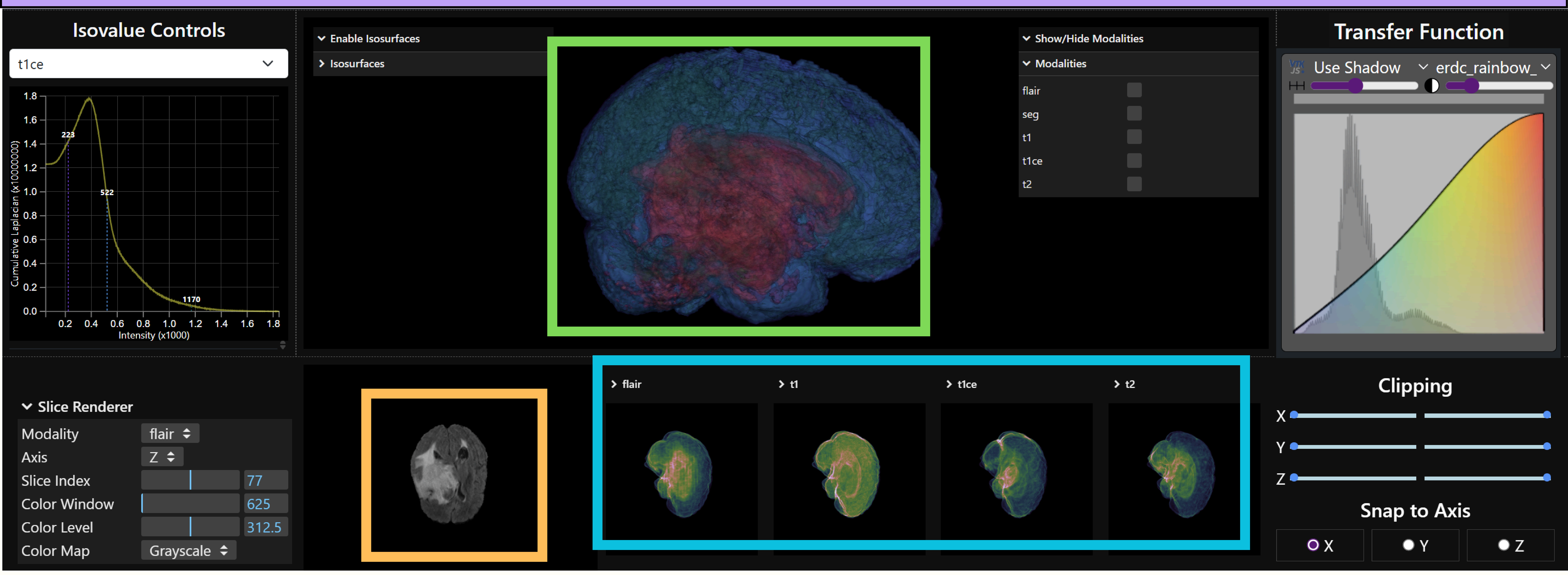


How to steer users to the most informative modalities?

How to best render the data such that the tumor is a prominent feature?

How to drill down on the features found through 3D exploration?

2D Overview

Guidance towards tumor-highlighting modalities

3D Exploration

Mesh+Volume rendering with auto-coloring

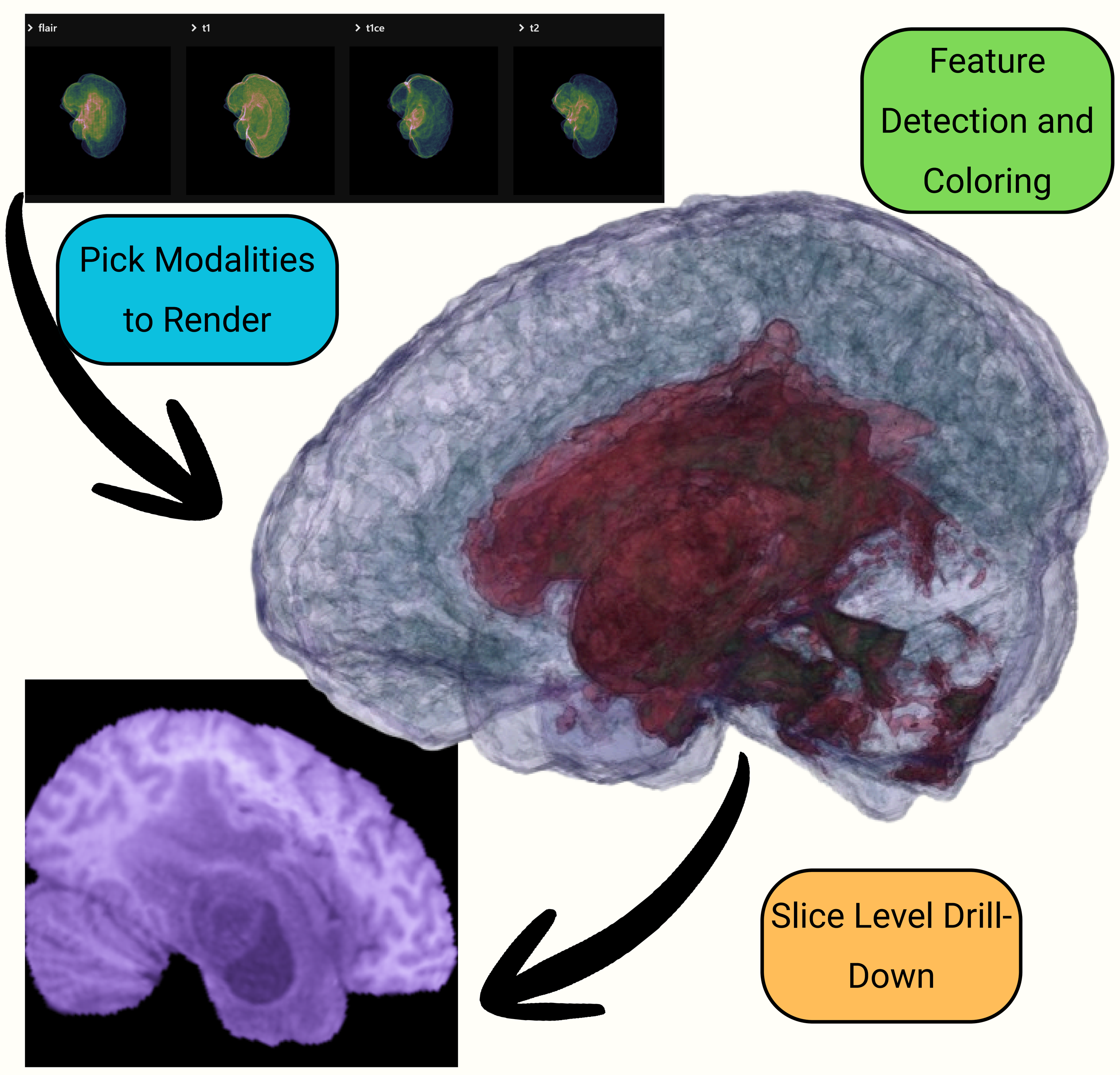
2D Analysis

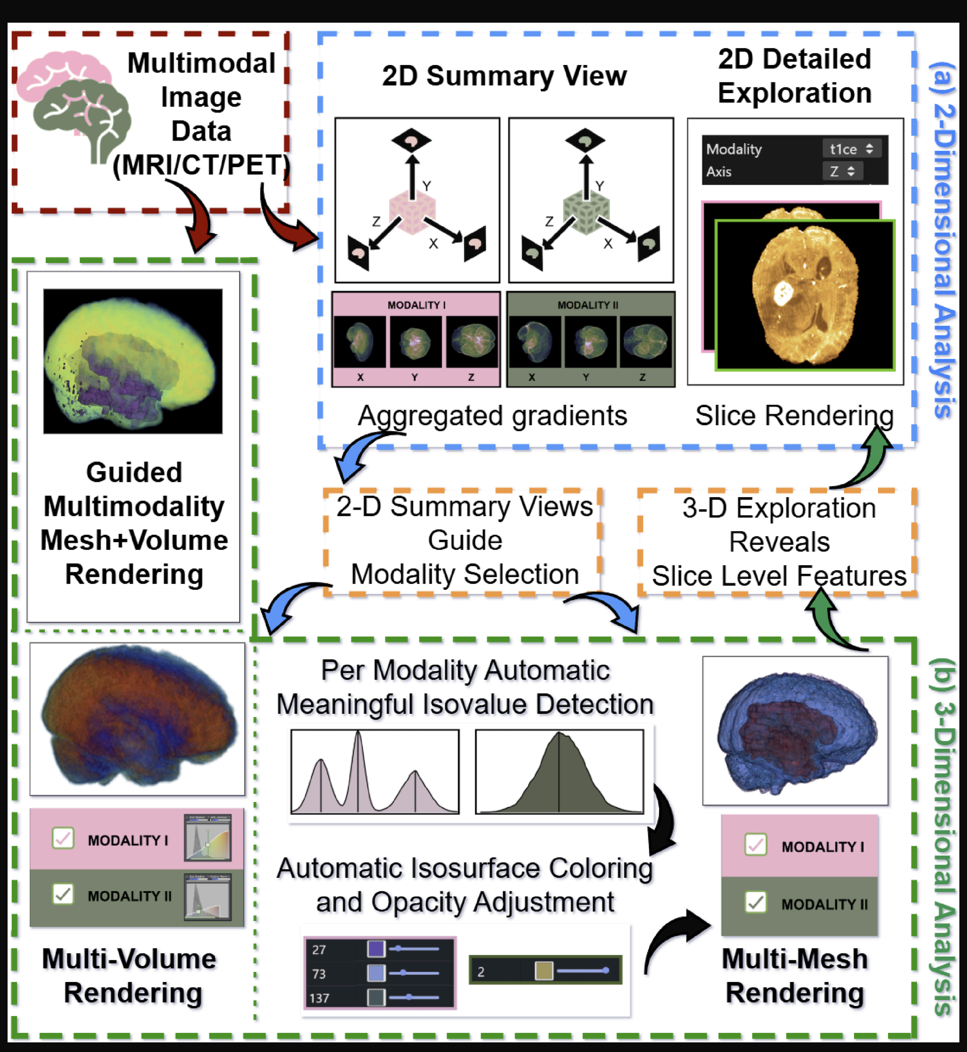
Detailed Analysis for slice-level features

Visualization of **aggregated gradients** calculated across every modality can help the user find the exact modalities the tumor must appear most clearly in.

For each modality, we **extract meshes** from **candidate isovalues**, set **color/opacity**, and use a per-modality **2D transfer function** for volume rendering.

Per-modality slice rendering along axial/coronal/sagittal planes, allowing for a even more fine grained analysis of features observed in 3D.





Main Findings

- MRI modalities complement each other, together they give a fuller picture.
- Automatic opacity determination for mesh coloring clarifies co-registered multi-mesh views.
- 3D shows global structure while 2D slices reveal fine detail for annotation.

Limitation and Future Work

- Lacks a structured evaluation: plan formal user/expert studies for usabilty
- Improve isosurface extraction(robustness and speed).
- Automate per-modality transfer-function design.

Takeaways

- Isolated single modality analysis is not enough to develop a meaningful understanding of medical image and requires simulatenous multimodal visualization.

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