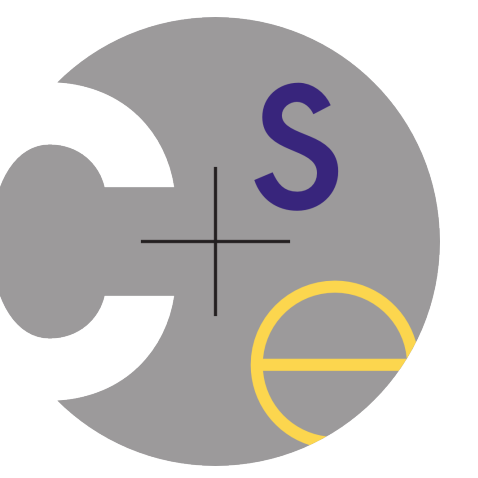


# Immersive Data Visualization with Virtual Reality



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## Problem

- Overcome the limitations of traditional 2D displays by using a head mounted display
- Explore methods for interacting with data in virtual reality

## Motivation

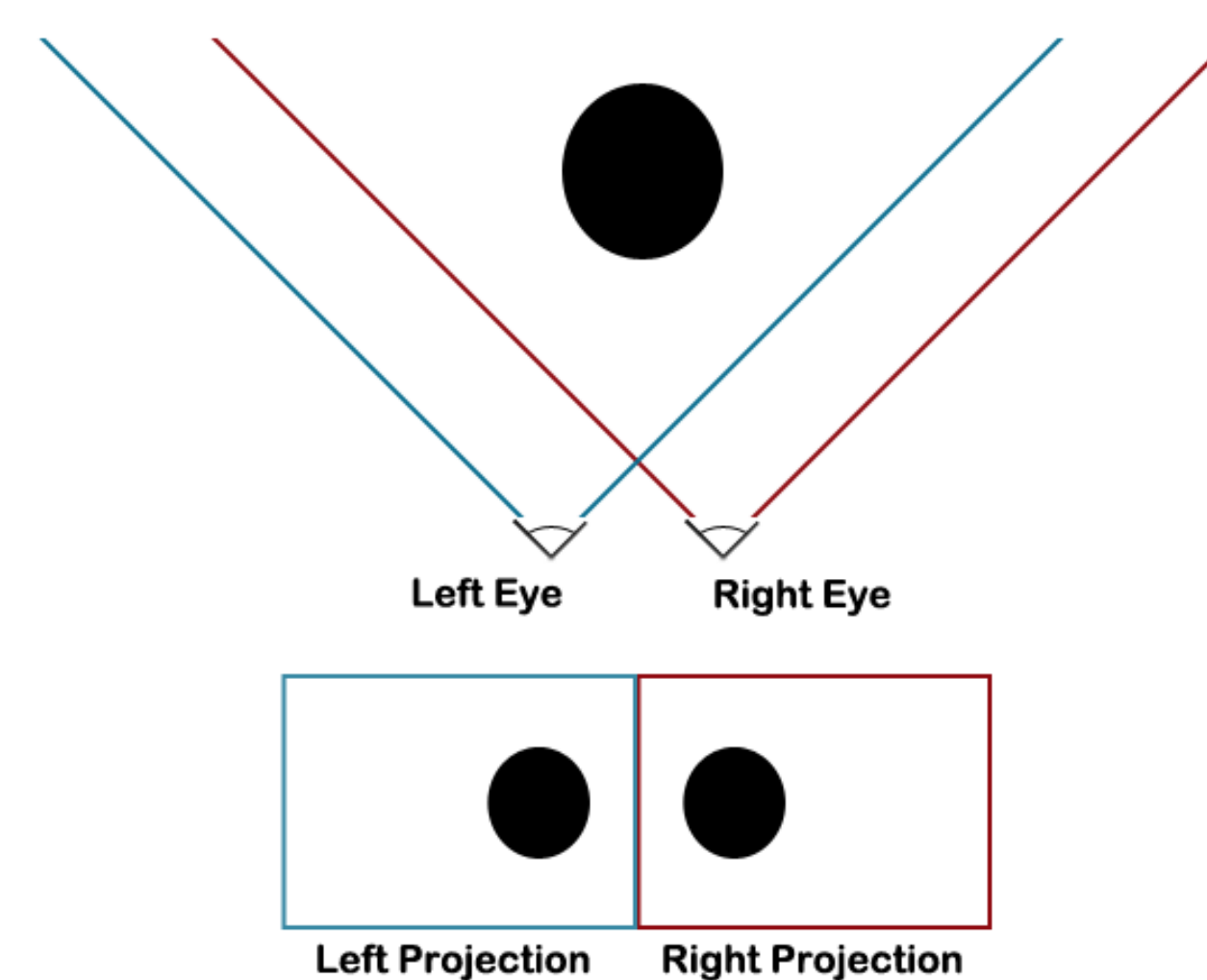
- 2D displays have limited screen real estate and usually require panning and zooming to display large datasets
- 3D visualizations displayed on a 2D screen loses vital cues of depth and parallax
- Head mounted displays are beginning to appear in the consumer market and relatively little research has been conducted to explore and evaluate data visualization in VR



Oculus Rift DK2

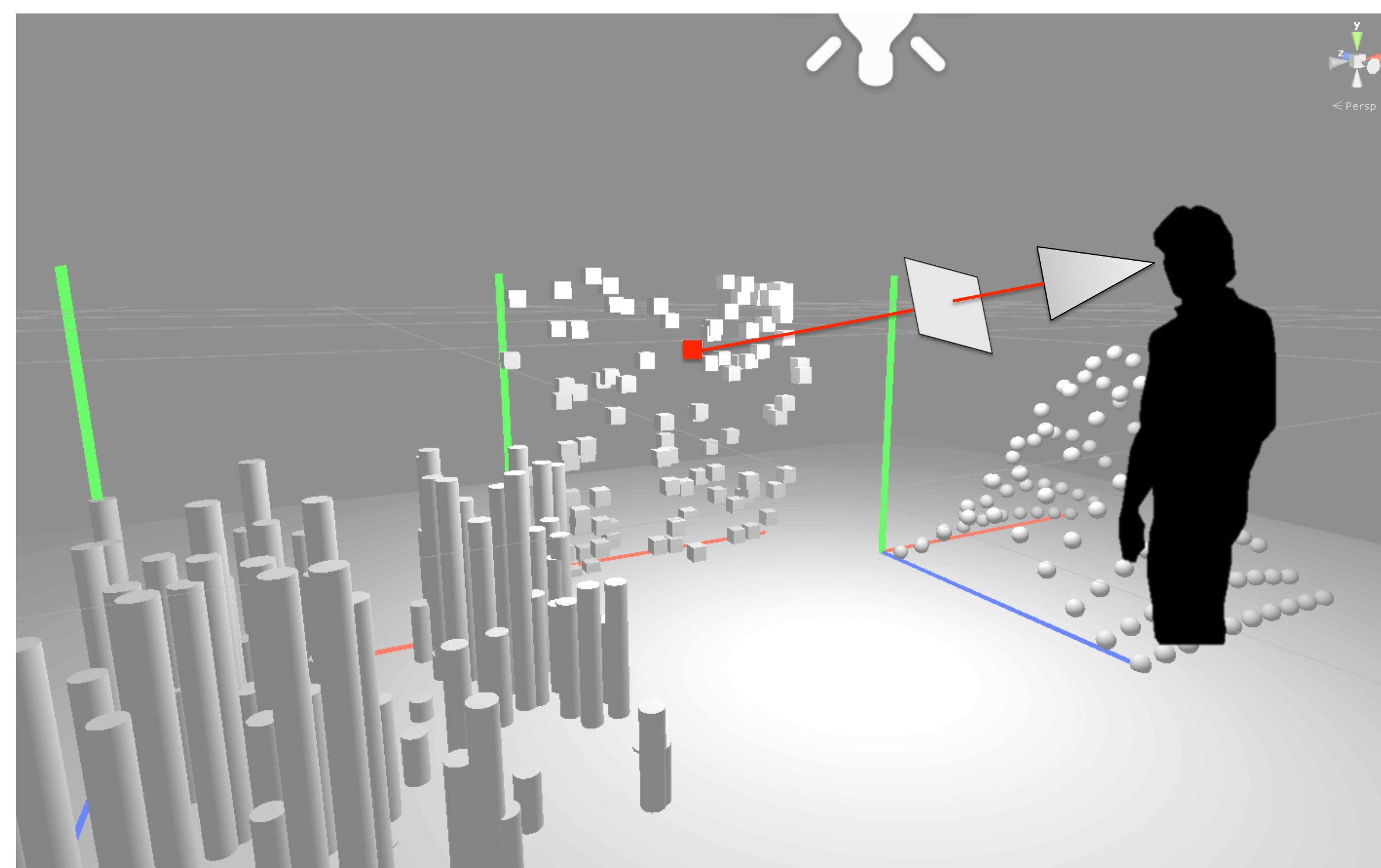
## Approach

### Stereoscopy and Head Tracking



- Two virtual cameras.
- Apply world scale
- Remove lens distortion
- Libraries: Oculus SDK & vr.js [3]

### Brushing and Linking with Ray Casting

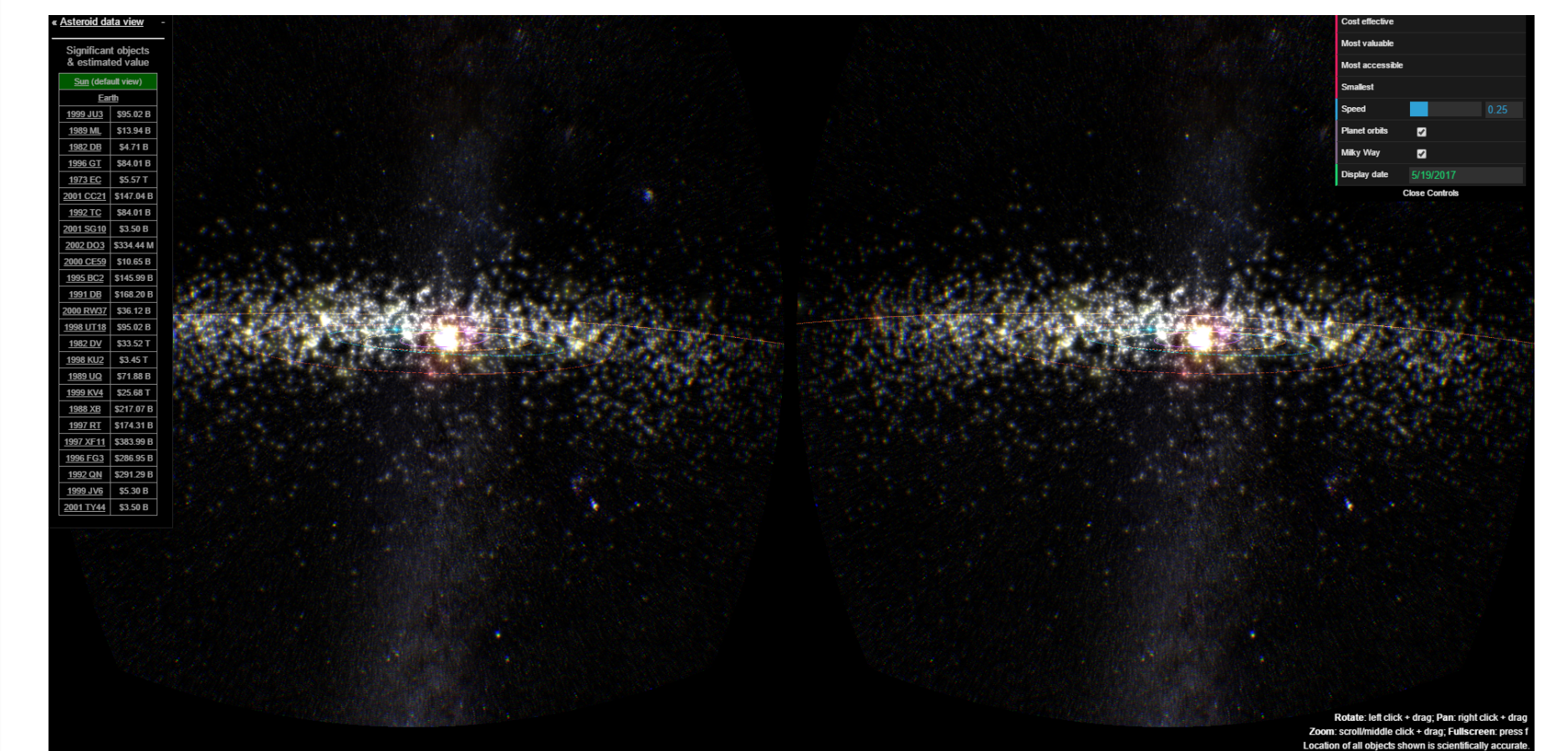


#### Selection

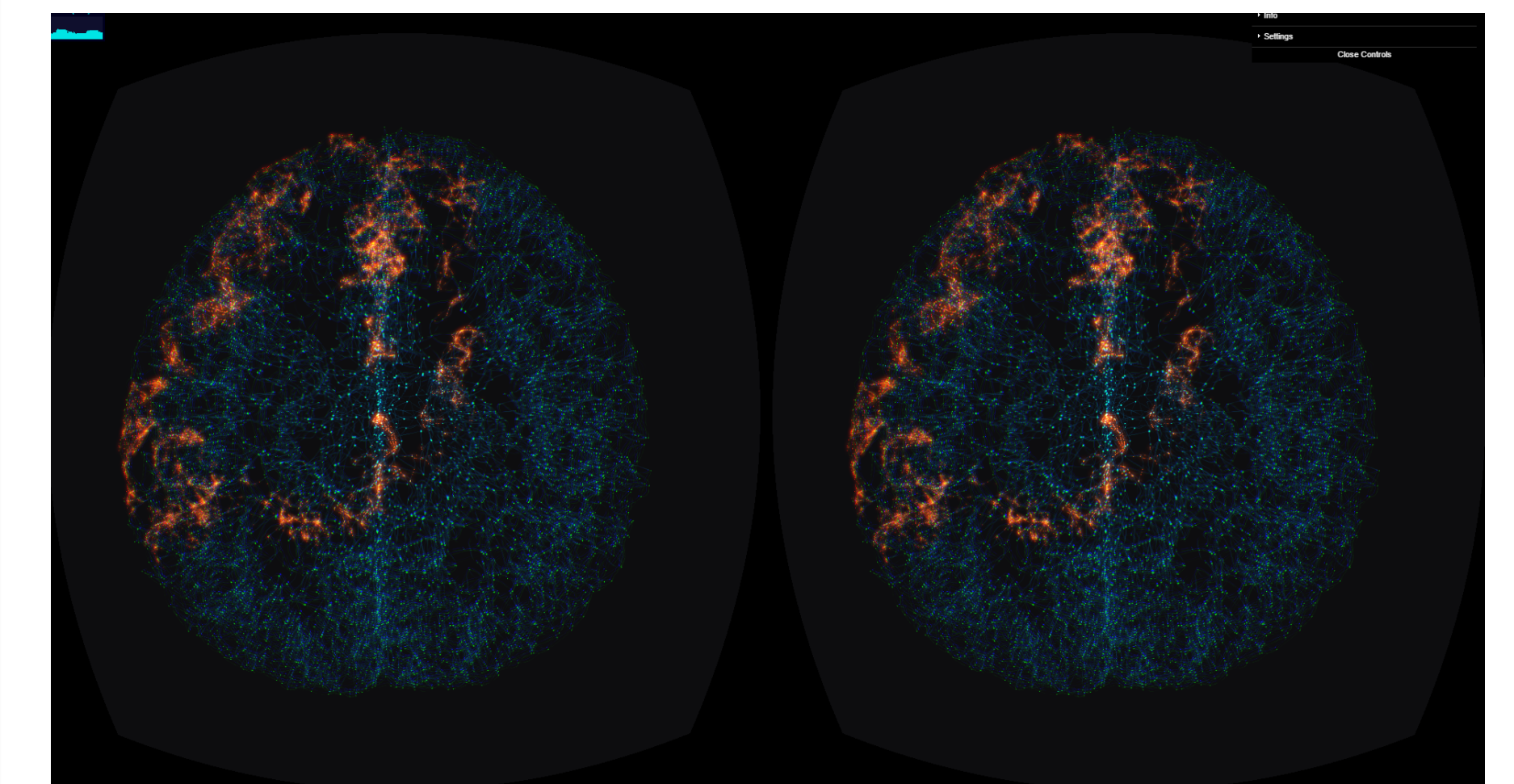
Use external device to indicate the beginning & end of selection. Gaze at objects to select.

Corresponding data points in other projections highlighted

## Results



AsterankVR [1]



NeuralNetworkVR [2]

## Future Work

- Perform more formal tests to determine cognitive benefits (if any) of VR
- Explore more natural forms of interaction with 3D data such as using a Leap motion for finger tracking
- Evaluate equivalent of data-ink ratio in the context of VR