Trinity

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Visualization tool for hyperdimensional data.

Trinity provides a 3D scatter plot with automatic 2D projections of feature/factor data typically derived from neural inspired systems such as deep learning neural networks and biological neuronal firings. The primary visual view is through its *Hyperspace* view which presents a 3D scatter plot of the current hyperdimensions and allows the user to instantly shift, slide or select which indices within the hyperspace to use for the scatterplot. The 2D permutations of 3D view are automatically projected as 2D plots within the same view on to the sides of a 3D plotting cube.

The 3D scene is interactive. The user can pan, rotate and zoom either the 3D camera or the points themselves. The scatter points are interactive allowing the user to select individual points to bring up the associated data/imagery with that feature. Help documentation is provided as a PDF that is packaged with the source.

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Trinity supports the following keyboard controls

Application

Event	KeyCode	Description
Fullscreen Mode	ALT+ENTER	Switches the entire application between Fullscreen (undecorated) and Windowed mode. Default is Windowed.
Shutdown	CONTROL + SHIFT + C	Terminates the application including closing any open data sockets.

Hyperspace 3D Camera

Event	KeyCode	Description
Reset View (Animated)	CONTROL + 0, CONTROL + NUMPAD0	Animates 3D Camera back to default orientation
Reset View (Instant)	CONTROL + SHIFT + 0, CONTROL + SHIFT + NUMPAD0	Instantly sets 3D Camera to default orientation
Zoom In	W, SHIFT + W, CONTROL + W	Zooms 3D Camera forward (positive) on the Z axis. Shift increases the rate of change by an order of magnitude. Control decreases the rate of change by an order of magnitude
Zoom Out	S, SHIFT + S, CONTROL + S	Zooms 3D Camera backward (negative) on the Z axis. Shift increases the rate of change by an order of magnitude. Control decreases the rate of change by an order of magnitude
Pan Left	A, SHIFT + A, CONTROL + A	Pans the 3D Camera left (negative) on the X axis. Shift increases the rate of change by an order of magnitude. Control decreases the rate of change by an order of magnitude
Pan Right	D, SHIFT + D, CONTROL + D	Pans the 3D Camera right (positive) on the X axis. Shift increases the rate of change by an order of magnitude. Control decreases the rate of change by an order of magnitude
Rotate Roll Negative	CONTROL + 1, CONTROL + NUMPAD1	Rotates the 3D Camera negatively around the Z axis.
Rotate Roll Positive	CONTROL + 3, CONTROL + NUMPAD3	Rotates the 3D Camera positively around the Z axis.
Rotate Pitch Negative	CONTROL + 4, CONTROL + NUMPAD4	Rotates the 3D Camera negatively around the X axis.
Rotate Pitch Positive	CONTROL + 6, CONTROL + NUMPAD6	Rotates the 3D Camera positively around the X axis.

Event	KeyCode	Description
Rotate Yaw Negative	CONTROL + 7, CONTROL + NUMPAD7	Rotates the 3D Camera negatively around the Y axis.
Rotate Yaw Positively	CONTROL + 9, CONTROL + NUMPAD9	Rotates the 3D Camera Positively around the Y axis.

Hyperspace Data

Event	KeyCode	Description
Slide Dimension Indices Forward	Period (“.”)	Instantly shifts the x, y and z factor indices forward by 1. Redraws scene automatically. If any of the indices would exceed the maximum amount of available dimensions (feature vector) then no change is made.
Slide Dimension Indices Backward	Comma (“,”)	Instantly shifts the x, y and z factor indices backward by 1. Redraws scene automatically. If any of the indices would be less than 0 then no change is made.
Debug Artifacts	Slash (“/”)	Enables/Disables various visual nodes and labels useful for debugging data and renderings. Default is disabled.
Decrease Scatter Buffer	“T”	Decreases scatter buff variable by 0.1. This decreases the range used for coordinate transformations. This has the effect of increasing the amount of space on screen the data takes up. Ignored when auto-scaling is enabled.
Increase Scatter Buffer	“Y”	Increases scatter buff scale variable by 0.1. This increases the range used for coordinate transformations. This has the effect of decreasing the amount of space on screen the data takes up. Ignored when auto-scaling is enabled.
Decrease Point Scale	“U”	Decreases point scale variable by 0.1. This decreases a scalar value applied directly to the data prior to coordinate transformations. This has the effect of decreasing the amount of space on screen the data takes up.
Increase Point Scale	“I”	Increases point scale variable by 0.1. This increases a scalar value applied directly to the data prior to coordinate transformations. This has the effect of increasing the amount of space on screen the data takes up.

Event	KeyCode	Description
Decrease Point Size	"O"	Decreases the pointSize3D and pointSize2D variables by 5 pixels. This has the effect of decreasing the size of 3D tetrahedra in the scatter plot and the radius of 2D points in 2D projections.
Increase Point Size	"P"	Increases the pointSize3D and pointSize2D variables by 5 pixels. This has the effect of increasing the size of 3D tetrahedra in the scatter plot and the radius of 2D points in 2D projections.
Blow out Cube Walls	CONTROL + OPEN-BRACKET ("[")	Animates the 2D projections out and away from the center of the scene to allow better viewing of the 3D scatter data.
Contract in Cube Walls	CONTROL + CLOSE-BRACKET ("]")	Animates the 2D projections back to the default locations of the cube so that 2D Projections are aligned with the 3D scatter data.