Data Visualization in Augmented and Virtual Reality

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Technological advancements, such as virtual and augmented reality, allow for immersive and interactive experiences in three-dimensional (3D) space that can support complex data visualizations. Virtual reality (VR), usually viewed through a head-mounted display, is a 3D computer-generated environment where observers can navigate and interact with objects. Similarly, augmented reality (AR) has many of the same functions as VR; however, observers view the physical world through a transparent lens with 3D graphics imposed on the scene.

These displays can generate stereoscopic 3D graphs that can express variables along the x -, y-, and z-axis. Traditionally, 2D images of 3D graphs are used to visualize data, but these graphs often have a fixed view that can cause data points to obscure others and lead to misinterpretation of relationships between the variables. In VR and AR, observers are able to move and change their view to see the full shape and distribution of the data. Although rotatable 2D graphs exist, these lack the stereoscopic depth information that can help observers more accurately appreciate data across the z-axis.

The navigability of 3D stereoscopic space can support the effective interpretation of big data; normally, the sheer number of individual values makes it hard to create meaningful visualizations. VR and AR can allow observers to perceive big data in a larger space to improve detection of relationships and clusters, not easily seen otherwise². Individual data points can also be engaged within the graph to provide additional information to find trends. Not only could these viewing experiences support research, but the novelty and increased interactability with the data could help engage the public and support knowledge dissemination.

References

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