Automated Visualization 3D Visualization of Cell Behavior

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Biologists often take sequential 2D images at different heights to study biological structures. Last year, one of us wrote software that creates a 3D rendering from these images. This year, we made major improvements to the software. Previously, users had to manually trace outlines of cells and other structures that they wanted in the 3D visualization. This process was extremely time consuming and impractical for analyzing multiple samples. Why waste time drawing when you can be finding new things? This year, we added an AI component which leverages Cellpose 2.0 to automatically outline cells, streamlining the process from taking images to studying a 3D visualization. Our software also filters Cellpose outlines to isolate specific cells of interest to the users. This significantly improved the clarity of our visualizations, allowing the scientists to focus on the most important cells. We also developed an algorithm that identifies outlines of the same cell across height and time and colors them appropriately for easier study. Moreover, we added many features. For example, users can convert simple wireframe models into meshes, which give a clearer view of a structure's shape. Furthermore, users can turn on and off specific colors to hide certain cells that are obstructing the user's view with the click of a button, and users can now render two different structures side by side for comparison. Our software provides biologists an easy, automated way to study biological structures in 3D that they captured with 2D images at different heights.

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