Measuring Mesh Distances in the Context of Additive Manufacturing

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For this project, we develop an objective way to measure the differences between two meshes, as quality control for the SPEE3D cold-spray additive manufacturing process. Our tool effectively measures the three elements crucial in additive manufacturing: overbuilding, underbuilding and surface deviation. The core of our tool relies on the cloud to mesh (c2m) distances computed by the open-source mesh processing software CloudCompare. We then apply statistical measures to the c2m distances to estimate the above factors. Our tool also provides visualisation of distances for manually checking the meshes. As a test case, we apply our tool to a range of different meshes and find our statistical measures give better results compared to manual inspection.