OBJECT STABILITY ANALYSIS AND RETROFIT DESIGN: SCULPTURE CONSERVATION

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ABSTRACT

In the field of fine art, the aesthetic feelings sometimes come from an unusual or surprising reconstruction abstracted from its natural counterpart. Many sculptures were created in an imbalanced form with an illusion of dynamism and movement, sometimes way off their balanced stance. However, most of these sculptures require being mounted on heavy bases when displayed and surrounded by supporting material during shipping and storage to reduce toppling risks. From a conservation perspective, extra external force at the mounting point increases the risk of potential damage to the structure and also requires significantly extra material. With computer vision technology, sculptures can be scanned and reconstructed into 3D models so the risk can be precisely calculated. We propose a series of methods to analyze the stability of the sculptures by indicating the potential falling direction and maximum tolerance angle. The methods also suggest simple retrofit design to support the sculpture while reducing supporting material, installation time, and harmful mounting points. In this paper, we demonstrate the process of improving the stability on several sculptures as well as validations of output values.