

Título: **Temporally Coherent Sculpture Of Composite Objects.**

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Resumo:

We address the problem of sculpting and deforming shapes composed of small, randomly placed objects. Objets may be tightly packed - such as pebbles, pills, seeds and grains, or be sparsely distributed with an overarching shape - such as flocks of birds or schools of fish. Virtual sculpture has rapidly become a standard in the entertainment industry, as evidenced by the extensive use of software such as ZBrush. Composites, though, are still usually created in a static way by individually placing each object or by sculpting a support surface and procedurally populating the final shape, which raises problems for the generalisation of evolving shapes with visual continuity of the components. Large amounts of geometrical data are generated that must be maintained and processed, both by the CPU and by the GPU. Whenever the shape is stretched, pressed or deformed, one has to define how these compositing objects should turn, displace or disappear inside the volume, as well as how new instances should become visible to the outside. It is difficult to rely on a physical system to perform that task in real time. The system we suggest can be constructed upon any uniform mesh- based representation that can be deformed and whose connectivity can be updated by operations such as edge splits, collapses, and flips. We introduce the notion of CompEls as composing elements used to populate the mesh, with aperiodic distribution. These can be automatically updated under deformation. The idea is to sculpt the shape as if it were filled with little objects, without handling the complexity of manipulating volumetric objects. For this purpose, we suggest exploiting the properties of the uniform sampling of the surface with distances between vertices greatly exceeding the CompEls distances. Both the surface and the CompEls are immersed into deformation fields, such that the update of the uniform sampling can be used to track the

movement of the CompEls, to identify those which should disappear inside the shape, and empty areas where further CompEls should be generated. This system uses GPU optimisations to efficiently perform the rendering of individual components. To our knowledge, no previous sculpting system allows the user to simultaneously see and sculpt agglomerates such a fast and reliable fashion.

Banca:

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