A packing is an arrangement of geometric elements within a container region in the plane. Elements are united to communicate the overall container shape, but each is large enough to be appreciated individually. Creating a packing is challenging since an artist should arrange compatible elements so that their boundaries interlock with each other. This thesis presents three packing methods that create element compatibilities using shape deformation. The first method, FLOWPAK, deforms elements to flow along a vector field interpolated from user-supplied strokes, giving a sense of visual flow to the final composition. The second method, RepulsionPak, utilizes repulsion forces to pack elements, each represented as a mass-spring system, allowing them to deform to achieve a better fit with their neighbours and the container. The last method, AnimationPak, creates animated packings by arranging animated two-dimensional elements inside a static container. We represent animated elements in a three-dimensional spacetime domain, and view the animated packing problem as a three-dimensional packing in that domain. Finally, we propose statistical methods for measuring the evenness of 2D element distributions, which provide quantitative means of evaluating and comparing packing algorithms.

computer graphics

non-photorealistic rendering

graphic design

packing

physical simulation

element arrangement