Metaballs

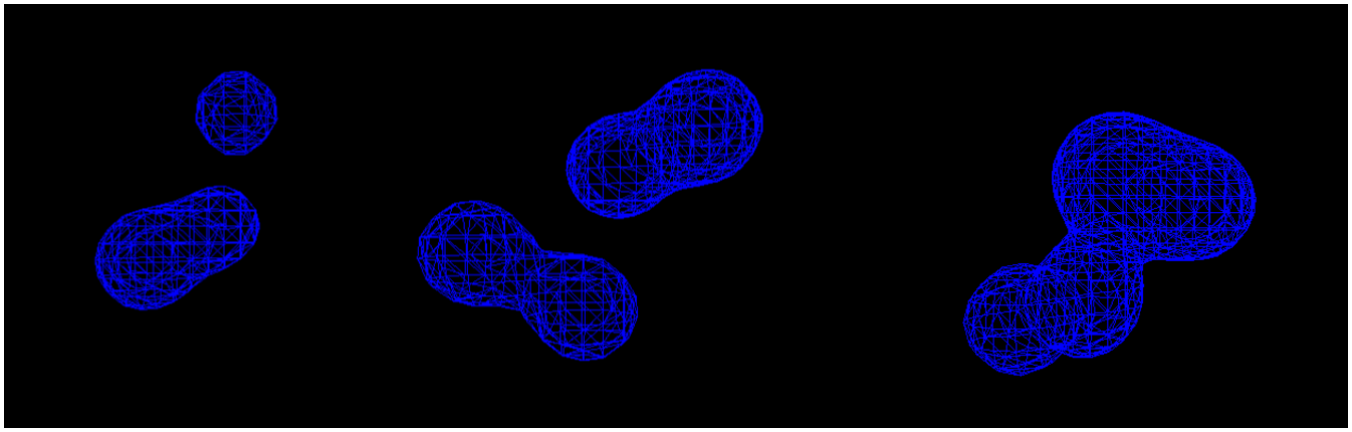
A metaball is an isosurface that divides a nD space into two sets. The volume enclosed by a metaball or a group of metaballs is determined by a threshold, i.e.,

$$\sum_i \text{metaball}_i(x, y, z) \leq \text{threshold}$$

Functions defining metaballs should have finite support (it should go to zero at a maximum radius) and should be smooth. A example of such a function is

$$f(x, y, z) = q / ((x - x_0)^2 + (y - y_0)^2 + (z - z_0)^2)$$

i.e., the electric field of a point charge. The Marching Cubes Algorithm is often used to generate a triangle mesh that approximates the resulting isosurface. A detailed description of the Marching Cubes algorithm can be found here: http://paulbourke.net/geometry/polygonise/



Implementation: https://github.com/rohan-sawhney/metaballs