Complexity & Theoretical Issues for Progressive Meshes

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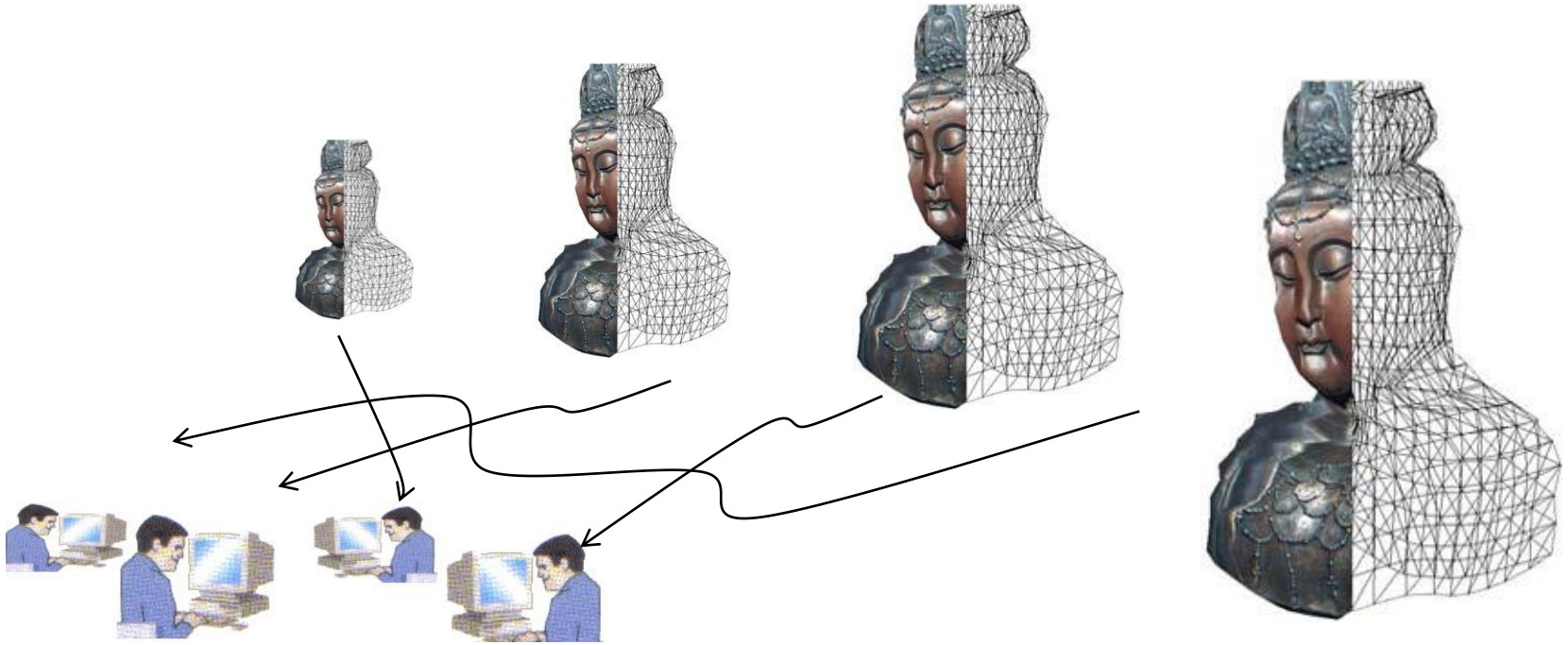

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Complexity of Updating Costs after each step

- The Priority Queue used to store costs associated with simplification can be stored using a Min Heap data structure.
- Constant cost to extract the Minimum from a Heap.
- Cost to insert a New Element into a Heap is O(log n) if n is the total number of element.
- Thus each step during simplification has O(log n) complexity.

E_{dist}

- Tries to keep simplified mesh surface close to the surface of the original mesh.

- This term gets bigger the farther the simplified mesh vertices are from the original surface.

E_{spring}

- This term tries to create Balanced Triangles, rather than long thin triangles.
- The best case is when triangles are equilateral.
- If we consider all triangles with a given area A, say; then the sum of the squares of the 3 sides is minimized when the triangle has all sides equal.