Digital Sculpting
(Hand without worrying)

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If you're new to the world of digital sculpting,
Sculptris is the ideal ground on which to get started.

You surely know what traditional sculpting is: The sculptor takes a lump of putty or clay and shapes it with his hands and/or sculpting tools. You know the kind of tools used for sculpting, right? You surely do.

For more than few years, conceptual design has been done mostly in digital form. Long gone are the days when marker pens or pencils (and erasers) were the only tools on the designers' desks.

In the movie making process this is an certain part of progress as it allows faster changes and experimentation. This ultimately leads to final products where creativity doesn't play second time to time constraints and tough schedules. Art is the winner on the day.

The digital age has over time also enabled our sculptors to access a tool set that gives them yet another modern material - a digital sculpting 'material' - every bit as dynamic and flexible as a lump of clay, but infinitely customizable and in endless supply.

Digital sculpture draws upon recent advances in data acquisition techniques, computer visualization, and rapid prototyping technologies. It utilizes the unique virtual space of the computer to pre-visualize form, to enable extraordinarily sophisticated formal innovations, to design at heretofore unmanageable scales with technical accuracy, and to produce objects impossible to create with the human hand. It opens a floodgate of questions regarding the use and future use of a technology that is predicated upon a "rapid response" to the needs of a culture. Before addressing the larger question of "how to become a better tool user," let me address the convergence of technologies behind what I am calling "digital sculpture."

At the beginning of every project, the collectibles team consult each other on what method to use - traditional sculpting, model making or digital sculpting. Each project is unique and each method has its advantages.

Now with digital sculpting, the artist forgoes his "physical" sculpting and tools to use a computer and create a "virtual model" with it. You must have heard about 3d modeling — you can see digital 3d models everywhere: in movies, in computer games, on digital artwork, on posters, in advertisements… Often it's difficult to tell if the object or person was a real one or is it only a virtual creation.

Now one can create such a 3-dimensional model and then "print" it, using one of many 3-d printing services. Or maybe create a mold and produce copies of it. It doesn't really matter – the clue is that a virtual creation is turned into a physical, tangible object. In our case: a miniature. That's what digital sculpting of miniatures is all about.

I bet you see the difference: "Traditional sculpting" creates a physical object from the beginning, and "digital sculpting" creates a virtual model first, which is given a physical form in the next step. And what are the consequences of this difference?

Digital sculpting can use many benefits of working on a virtual object, many that we know from image editing software – like "undo", "copy-paste", easy texturing, etc. When a sculptor makes a mistake, he can press "undo" and correct his mistake easily. When he wants to create another arm, sword, head, etc. – he can use "copy/paste" and modify the newly created copy. He can also "stamp" textures onto surfaces of his models. There are many other options in popular 3-d modeling software, but I only wanted to give you a quick insight into the choice of tools the sculptor may use in his digital sculpting.

In this article, we're mainly touching on digital sculpting.

The digital software platform is called ZBrush. This time number of sculptors who have been embracing this technology for a long time and it helps us take our collectibles further.

It allows sculptors to try different facial expressions, poses, costumes, textures or weapons. You can make a copy in a couple of seconds instead of having to start from scratch or having to change your original.

As the movie making process for a project like The Hobbit movies involves digital visual effects, digital models are created of all creatures and characters. These are based on the conceptual designs, makeup tests, costume fittings etc that are part of pre-production.

Having access to these models allows the sculptors to get incredibly close to the final character on screen and can use an actual model of an actor's face, of a weapon or piece of armour and scale it down to 1/6 scale for the collectible model.

But the work doesn't end there. Just like a traditional model or sculpture), the manufacturing process needs to be at the very centre of many considerations.

A concept sketch is always created at the beginning of a project and traditionally, the end result was often very close to this sketch. The ZBrush technology allows the sculptor to re-pose and change a statue and try different things to see what will look best.

The final look of a collectible is the result of a long collaborative process. It involves several of the artists who were involved in creating the original character, as well as model makers, mold makers and art directors.

Digital sculpting is still a relatively new method, but it has become very popular in the few years it has been around. Sculpting can often introduce details to meshes that would otherwise have been difficult or impossible to create

using traditional 3D modeling techniques. This makes it preferable for achieving photorealistic and hyper realistic results, though, many stylized results are achieved as well. The geometry used in digital sculpting programs to represent the model can vary; each offers different benefits and limitations. The majority of digital sculpting tools on the market use mesh-based geometry, in which an object is represented by an interconnected surface mesh of polygons that can be pushed and pulled around. This is somewhat similar to the physical process of beating copper plates to sculpt a scene in relief. Other digital sculpting tools use voxel-based geometry, in which the volume of the object is the basic element. Material can be added and removed, much like sculpting in clay. Still other tools make use of more than one basic geometry representation.

A benefit of mesh-based programs is that they support sculpting at multiple resolutions on a single model. Areas of the model that are finely detailed can have very small polygons while other areas can have larger polygons. In many mesh-based programs, the mesh can be edited at different levels of detail, and the changes at one level will propagate to higher and lower levels of model detail. A limitation of mesh-based sculpting is the fixed topology of the mesh; the specific arrangement of the polygons can limit the ways in which detail can be added or manipulated.

Sculpting is primarily used in high poly organic modeling (the creation of 3D models which consist mainly of curves or irregular surfaces, as opposed to hard surface modeling).

It can create the source meshes for low poly game models used in video games. In conjunction with other 3D modeling and texturing techniques and Displacement and Normal mapping, it can greatly enhance the appearance of game meshes often to the point of photorealism. Some sculpting programs like Zbrush offer ways to integrate their workflows with traditional 3D modeling and rendering programs. Conversely, 3D modeling applications like 3ds Max are now incorporating sculpting capability as well, though these are usually less advanced than tools found in sculpting-specific applications.

High poly sculpts are also extensively used in CG artwork for movies, industrial design, art, photorealistic illustrations, and for prototyping in 3D printing. All of these new concepts and systems depend on the computer for its ability to translate quantifiable data into visual information. Using systems that are becoming increasingly accessible to the non-technologist by virtue of improved graphical interfaces and hardware, artists can now move with impunity (if not total freedom) in a domain heretofore dominated by computer scientists and engineers. While it would be a mistake to suggest that a lay individual can move easily into high end rapid prototyping, with ever

improving GUI's and the ubiquity of learning tools for 3D digital media, it can be argued that "digital sculpture" has come of age. What about the rest of the culture?

Future individuals and communities may be distinguished by their ability to meet the challenge of form-making with methods that are quick and responsive--that meet the need for objects, abstract forms, or environments as they arise. New technologies that utilize transparent interfaces, reduce technological restraints, and encourage interactive design processes and customized products have the potential for changing our 3D environment and making it more user responsive. Design and production by users-for users in real time, of course, depends on models of design, manufacturing, distribution, and consumerism that are only just beginning to take shape.

As with any new technology, the real challenge will be to not fetishize the machines or their products as ends in themselves, but to focus on the quality of the activities enabled by the technology. No one would dispute our status as consummate tool designers and makers. The challenge is for all of us to become better tool users.

So is digital sculpting a completely different kind of art/craft, or is it only a different tool for sculptors to use. If it wasn't for progress and innovations we might be still sculpting our miniatures in clay or chiselling them from stone. But now we have many kinds of putties, all with different properties. We have modern casting facilities, we have precise sculpting tools. So maybe digital sculpting is the next step on the same path? Some will move on, some will stay with the techniques they're more familiar with.

To produce high-quality work, content developers working in 3D face not only technological and aesthetic challenges. They must cultivate an understanding of the traditional techniques of sculpting, composition, and painting. Working with a computer doesn't exempt you from these considerations. Rather, it gives you a more powerful and flexible set of tools with which to master age-old artistic skills.

Because it both mimics and extends the traditional sculpting process, volume modeling provides a direct path toward this goal. Working on the computer lets you reach an aesthetically pleasing threshold so quickly that your only option for growth.

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