Sketchfab: 3D Content Available To All

Rachel Thomas - 26119480
May 12, 2019
Cognitive Science 190, UC Berkeley

Overview

Sketchfab.com is a website where users can upload 3D models, and allow other users to view and download these models. There are also various interface elements that let users edit their uploaded models, and allow viewers to inspect the model to see how it was made. The organization system that Sketchfab uses to sort the models is indicative of the needs it anticipates users will have. In my case study I will examine why Sketchfab uses these different sorting methods for the 3D models, and delve into why and how its interface is aimed at certain uses and not others.

What is being organized?

In this case study, the resources being organized by Sketchfab are 3D models. 3D models are digital files that store representations of three-dimensional objects, often called "wireframes" or "meshes". These objects are simply data holding collections of vertices connected together by edges and faces, with materials stored on the surface. Materials are applied onto the surface of a mesh using UV coordinates, which are coordinate schemes that translate the object's three-dimensional x,y,z coordinates into u,v coordinates on a 2D plane, so that 2D images can be mapped onto the surface of the mesh. There are other attributes that 3D models can possess but these ones listed are the most relevant ones to this case study.

With Sketchfab, users can upload 3D models they've made in 3D programs (like Maya, Blender, Sketchup, Rhino, AutoCAD, etc) through a variety of methods. Sketchfab produces and distributes uploader add-on software for the majority of 3D modeling programs. The process is fairly seamless - for example, with the Substance Painter addon, a user can simply click the button that says "send to Sketchfab". A dialog appears into which they enter their project title, meta tags (which determine what categories they will be divided into) and other information, and then they can click "publish model" to finalize the process. In a matter of seconds, the model is then available for other users to access online.

Once a model is published, a creator can also edit the settings of their model and add post-processing effects like vignetting, color grading, bloom, and camera controls to further adjust the overall look and feel of how their model is presented. In addition, they can set up their model to be available for VR viewing.

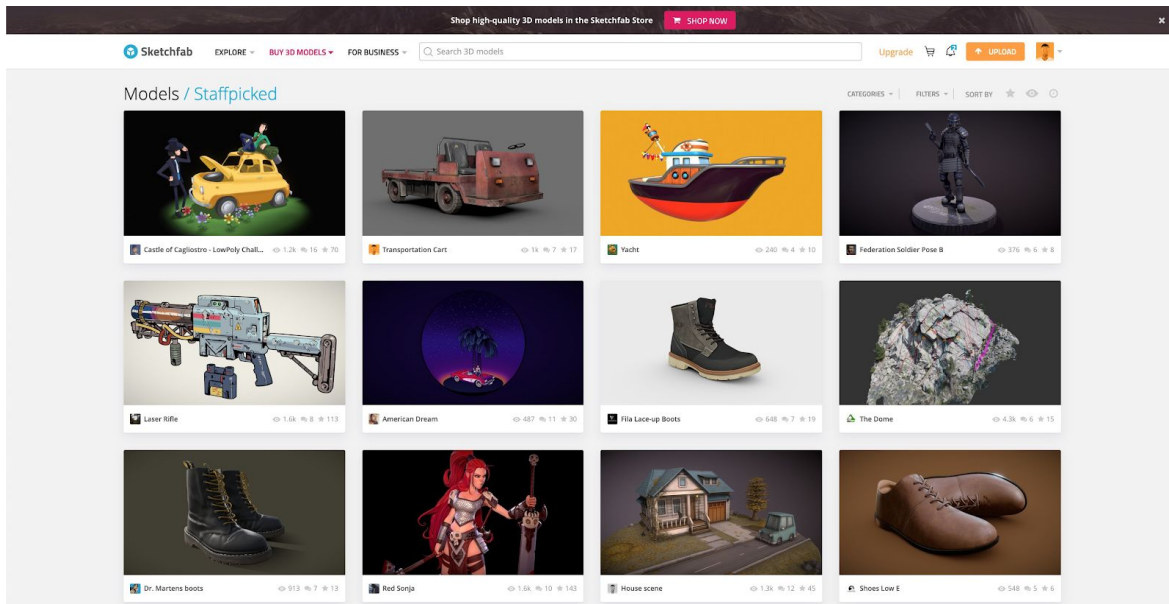The sketchfab homepage is a grid structure showcasing various 3D models:

Figure 1: Sketchfab Homepage

Users can click "explore" to choose from a variety of categories of 3D models to narrow their search, or simply browse through categories like "staff picked" or "popular".

Once a user has selected a 3D model, they can view it in the browser using Sketchfab's built-in 3D model viewer. This provides an interface for users to interact directly with the model itself, through clicking and dragging to change the camera position. The interface for viewing a 3D model is something similar to what is seen in Youtube, Vimeo or other media-sharing websites, with a viewer on the left and related content on the right:
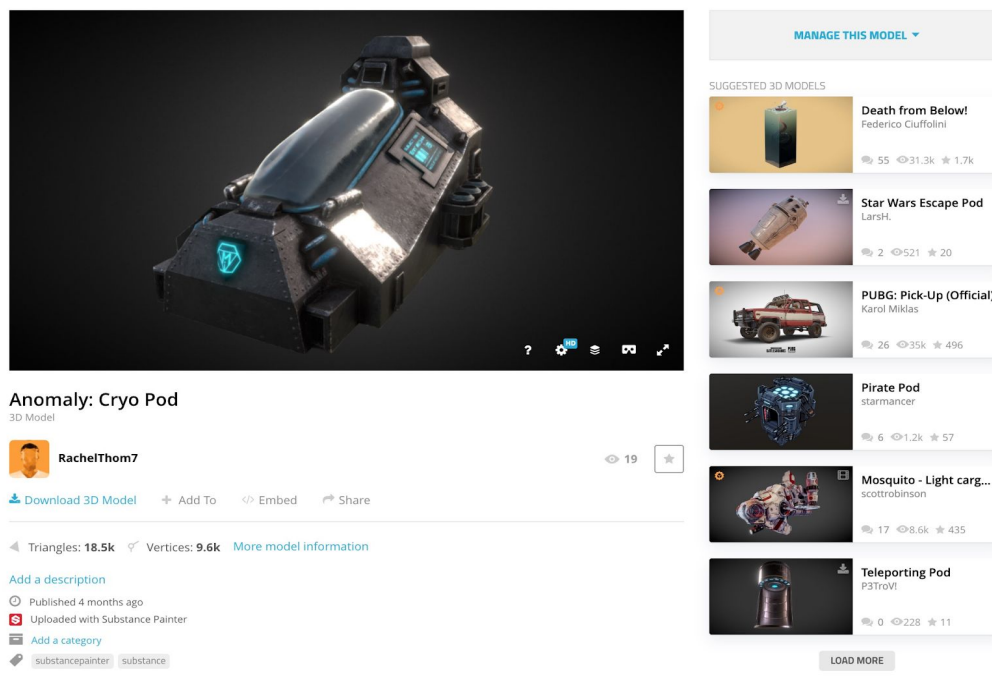

Figure 2: Sketchfab Model Viewer

In addition, one of Sketchfab's most attractive and innovative features is its allowance of its 3D model viewer to be embedded in any other website. This is the reason for its versatility and ability to be used for so many applications.

Why is it being organized?

After the advent of computer graphical user interfaces, computer graphics has exploded as a discipline. The introduction of 3D animated films, 3D video games, cinematic visual effects and more recently AR and VR technologies all increase the proliferation of 3D content in the public sphere. But until recently, 3D content production was fairly inaccessible to non-professionals. To create a 3D model, it was necessary to own and know how to use specialized and oftentimes very expensive software, something limited to those who worked to make 3D models as their job.

More recently, however, 3D modeling is not an activity available only to professionals. Free and open-source 3D modeling programs like Blender and Rhino are available to anyone with a capable computer, and many companies like Autodesk offer copyright-limited versions of their softwares to student learners for free. In addition, media websites like Youtube, Vimeo, Pluralsight and Lynda offer a multitude of tutorials available for almost every skillset imaginable. Viewership has become more accessible as well - each new major graphics card release from NVIDIA or AMD allows even faster 3D computations to take place, on everyday laptops. VR headsets like the simple google cardboard or more advanced Oculus Go allow casual users the option to consume VR content.All of this means that more and more people are looking to create and share 3D content, and recent developments like Facebook's embedded 3D model viewer support this claim.

This trend indicates the need for a website to serve as a platform to store and organize 3D content. This is exactly what Alban Denoyel, CEO of Sketchfab, set out to do when creating the website in 2012. The website began with a simple 3D model viewer made in WebGL. It was initially made to cater to professionals working in 3D-related industries, but soon expanded to cater towards anyone who could make a 3D model. As the first company that aimed to cater towards this need, Sketchfab quickly became established as the de facto online 3D model viewer and browser. As of six months ago, the website has surpassed 1 billion total page views.

How much is it being organized?

The site's top menu bar has nested categories based on what a user is looking for. Referring back to figure 1 we can see that there are drop-down menus for "Explore" and "Buy 3D Models." These two categories both share 18 sub-categories to peruse. In addition to the shared sub-categories, there are also 4 categories only in the "Explore" menu, and 5 categories that only appear in the "Buy 3D Models" Menu. Models can belong to more than one category and many overlap. Almost all categorizations are permanent, with the notable exception of "popular," "staff picks" and "bestselling", which depend on their popularity with users, site owners and buyers.

When is it being organized?

In terms of the site's categorization, 3D models are organized as soon as they are published. When publishing a model, uploaders are prompted to choose up to three categories to sort their model into, which correspond

to the site's overarching categories. They can also optionally add "meta tags" which are keywords that are used to enhance searches for models. Users are also prompted to write a brief description of their models so that they may be found more easily by the site's search engine. A "discoverability" meter on the side of the upload window increases as users increase the length of their description or number of tags related to the model.

How or by whom is it being organized?

Sketchfab exists to provide a platform for both consumers and producers of 3D content. It organizes uploaded models into categories based on what they are, as well as intended use.
The uploaders themselves categorize their models , but Sketchfab determines what the overall categories are. These categories are in the following structure:
As discussed briefly in the "How much is it being organized" section, there are nested categories, with "Explore" and "Buy 3D Models" at the top. These categories share 18 sub-categories. And respectively have 4 and 5 categories each that are not shared between them. The notable difference is that clicking on a shared category in "Explore" will return results that are both available and not available for purchase, while clicking the same category in "Buy 3D Models" will return only results that are available for purchase.
The following diagram depicts the categorization structure for 3D models stored with Sketchfab:

**Figure 3:** Sketchfab Categorization Structure

In addition to the overall hierarchy of the categories, I instantly noticed that the types of categories created were somewhat confusing. Some clearly overlapped - if a user uploads a 3D model of their dog, does it go into "characters and creatures" or "animals and pets"? Likewise, would a 3D model of a human wearing an

extravagant ball gown go into "People", "Characters and creatures" or "Fashion and Style"? If this person wearing a ball gown was a recording of something like a historical gala, would it also fit into "Cultural heritage and History?" The questions abound. The conclusion I've made is that there is a clear tradeoff between 1) *the simplicity and elegance of categories,* and 2) *the precision of categorization for each anticipated use case*. Sketchfab has clearly leaned towards the latter. By aiming their categories at specific disciplines, they optimize the user experience towards content discoverability.

After extensive browsing of the various models uploaded to Sketchfab, it becomes clear that users upload models for a variety of purposes, which almost always fall into the following categories:

1) **Spaces** - Models are used by interior designers or architects to help clients visualize spaces before they exist.
2) **Products** - Models are used by product designers of various disciplines to sell products and allow for buyer immersion, inspection and customization before purchase. Instead of looking at a series of 2D images of a product and deciding if you want to buy it, a potential buyer can look at it from any angle and even customize it in your browser. This usually makes use of the ability to embed the Sketchfab model viewer in any website.
3) **Art** - Models are created by 3D artists of various disciplines to document their skills, sell or offer models to be used in any 3D application (games, animation, VFX), or simply for the sake of creating. This category is very broad and spans all skill levels. The embedded viewer allows artists to showcase their work on their own portfolio websites, and allows anyone assessing an artist's ability to inspect the model to see the exact details of how it was produced (UV coordinates, texture sheets, and wireframe view).
4) **Culture** - Models are created to document or preserve some sort of cultural artifact. This was the case with the BBC project to document a soon-to-be-destroyed Mosque in Mosul, Iraq - photo-scanning techniques allowed a team to scan the entirety of the mosque and its subterranean tunnels, all of which can be now virtually toured online with the Sketchfab viewer.

These categories are highlighted with the following diagram, which divides the shared categories into the four use cases:
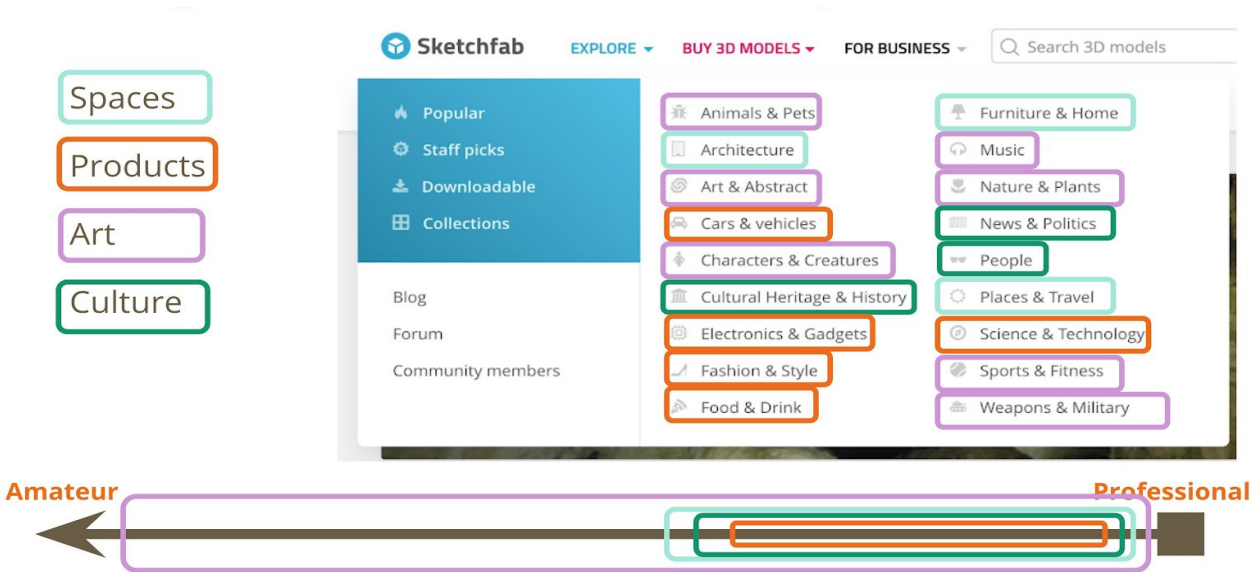
Below the categories is a scale highlighting the approximate level of specialization of the categories. Most categories are concentrated in the professional realm, where users upload models because it is part of their job. However all categories, especially art, are expanding towards the amateur area of the spectrum (hence the arrow), indicating the increasing accessibility of 3D tools.

Other Considerations

The categories I created are in no way exhaustive of the full spectrum of use cases 3D content creators may have. They are simply a reflection of my acknowledgement that the vast majority of the 3D models I encountered on the site fell into those categories, and all of the categories Sketchfab provided fell into those use cases. This indicated to me that Sketchfab was aiming its user interface towards these specific cases.

In addition, my analysis undeniably is biased towards the idea that 3D content is the future of media. As a 3D artist, my future partially hinges on the truth of that statement.

References

Case Study: 3D Viewer API, BBC News. (2019, May 06). Retrieved from

https://sketchfab.com/blogs/enterprise/customer-stories/media/3d-viewer-bbc-news

George, A. L., & George, A. L. (2018, November 20). One billion 3D views and counting – TechCrunch. Retrieved

from https://techcrunch.com/2018/11/19/one-billion-3d-views-and-counting/