SketchUp: An Easy-To-Use 3D Design Tool that Integrates with Google Earth

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ABSTRACT

Google SketchUp is a free, easy-to-use modeling program that lets you design and create 3D objects. With just a few simple tools, you can create 3D models of buildings, everyday objects and terrains. Once you have built your models, you can place them in Google Earth, post them to the 3D warehouse, or print hard copies. SketchUp also supports Ruby-based plug-ins to allow you to programmatically manipulate the internal object model. You can manipulate polygons, objects, and even the camera.

Keywords: Design**,** Human Factors, User Interfaces Graphical user interfaces, 3D, CAD, graphics design, Ruby.

INTRODUCTION

SketchUp [1] is a simple yet powerful 3D design tool that can be used for early architecture concept designs, creating stand-alone 3D objects and creating objects that can be integrated into Google Earth [2].

Figure 1: view of the SketchUp Interface

Drawing tools

SketchUp provides 2D drawing tools such as line, rectangle and circle, which can then be extruded into 3D with a simple **push-pull tool**. The combination of 2D drawing and 3D extrusion make SketchUp simple yet powerful.

Intuits Action

Critical to working in 3D through a 2D input device (mouse) is SketchUp's ability to intuit the point, edge and surface. As you draw or move the mouse around, these points highlight and text appears to let you know that you are working on a surface, have found the mid-point or golden rectangle, etc. Lines and shapes drawn on surfaces can then be extruded to easily generate complex 3D objects.

Object and Camera Manipulation

The next important element is simple switching between object manipulation and camera view manipulation. The mouse normally interacts with the objects in the scene, but pressing the scroll wheel then allows you to rotate and zoom.

Publishing

Once you have created an object, you can publish it out to the world through the Google 3D warehouse [3]. You can also share your thoughts, tips and tricks, tutorials, through the SketchUp forum [4].

You can also embed your 3D object in Google Earth [2]. Conversely, you can import a piece of Google Earth's textures and then design from that. This allows you to use the photos as references for creating correctly scaled objects.

Ruby Plug-Ins

SketchUp supports a plug-in architecture where you can write Ruby plug-in modules. You can programmatically control features such as camera manipulation and object model manipulation (move, delete, create, query, etc.).

REFERENCES

1. Google SketchUp: http://sketchup.google.com

2. Google Earth: http://earth.google.com/

3. 3D warehouse: http://sketchup.google.com/3dwarehouse

4. SketchUp forum: http://forum.sketchup.com/