3D Modeling of Watertank

Project Synopsis

of Major Project

Bachelor of Technology
(Information Technology)

Submitted by:
Harnarinder Singh Deol
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146031
1411262

V.P.O Ranguwal Disit Ludhiana
9814797691
honeydeol264@gmail.com

Guru Nanak Dev Engineering College
Ludhiana 141006

Abstract

CAD development project discuss the work done in computer-aided-design. Computer-aided design (CAD) is the use of computer systems to assist in the creation, modification, analysis, or optimization of a design.I explored OpenSCAD source code. OpenSCAD is Free and Open Source CAD Software. OpenSCAD is a fully comprehensive 3D CAD application that you can download and install for free. There is a large base of satisfied OpenSCAD users worldwide, and it is available in more than 20 languages and for all major operating systems, including Microsoft Windows, Mac OS X and Linux (De- bian, Ubuntu, Fedora, Mandriva, Suse ...). OpenSCAD is an application for Computer Aided Design (CAD) in three dimensions (3d). OpenSCAD is a software for creating solid 3D CAD objects. It is free software and available for Linux/UNIX, MS Windows and Apples OS X. Unlike most free software for creating 3D models (such as the famous application Blender) it does not focus on the artistic aspects of 3D modelling but instead on the CAD aspects. Thus it might be the application you are looking for when you are planning to create 3D models of machine parts but pretty sure is not what you are looking for when you are more interested in creating computer-animated movies. OpenSCAD is not an interactive modeller. Instead it is something like a 3D-compiler that reads in a script file that describes the object and renders the 3D model from this script file (see examples below). This gives you (the designer) full control over the modelling process and enables you to easily change any step in the modelling process or make designes that are defined by configurable parameters. Also, this project makes this Project 3D model of Water Tank.In this project, the user will be able to enter the specifications of the Water Tank through the web browser using Django (Python Web Framework) and on the back-end, the OpenSCAD will use those input values to Draw the Water Tank for certain parametric and in this by filling a dimmension of a water tank by the user on a web browser and he/she will obtain a zip file on a browser then a user can download that zip file from a browser and unzip that file and open that file in a OpenSCAD. when this file is open by the user in an OpenSCAD then hs to be/she has to be render that file with a function key (f5). The output that can be taken has format .scad. This project is completely open source and the entire code is available to the user as and when required. There is also Complete developers Documentation as well as User manual along with it that helps using it a lot easier.

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Harnarinder Singh Deol

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CHAPTER 1

INTRODUCTION

1.1 Overview

Figure 1.1: OpenSCAD's logo

User Interface for Customizing Models in OpenSCAD is the project that I worked upon it in my "Minor Project". It is under the umbrella organization of BRL-CAD. OpenSCAD is a free and Open-source software application for creating solid 3D CAD objects. It is a script only based modeler, with a specific description language. Parts cannot be selected or modified by mouse in the 3D view. An OpenSCAD script specifies geometric primitives and defines how they are modified and manipulated to render a 3D model. OpenSCAD is available for Windows, Linux and OS X. It does constructive solid geometry (CSG). OpenSCAD has in a way redefined how easy 3D modeling can be. But the Wikipedia article on OpenSCAD says that it is a non-interactive modeler, but rather a 3D compiler based on a textual description language. Pay attention to the above line, its primarily what Ill be talking about. Solid 3D modeling. That sounds like some serious business. But its just an awesome tool for making models pertaining to many uses (mostly 3D printing). And 3D printing as we can all agree upon is cool. 3D models can be created by anyone using OpenSCAD. OpenSCAD is as much for designers as it is for you and me. What else can most people agree upon apart from the fact that solid 3D modeling is cool? A graphical interface is simpler and more intuitive to use. There is a general aversion for typing commands in order to get things done. Simply put, more people have an inclination towards GUI.

1.2 The Existing System

In Past the people were spending their alot of a very usefull time for writing a code to make a WaterTank in different size. But know I made in a specification Form in which a user can put a values in it according to the dimension he/she needed. By this the user time will be saved he/she can use this usefull time in an other important thing. Limitations of previous system

1. No batch mode
2. Complex workflow
3. Not open-source (User not modified the software)
4. They need installation and a lot of system resources
5. Platform dependent
6. You could only put the dimension then the drawing will automatically in the front of you.

1.3 User Requirement Analysis

For User Requirement Analysis, users of this system have been asked about possible requirements that this software should have and we got following resultant list of outputs-:

1. Provide on-line way to analysis so that individual does not have to install anything.
2. Make it work like batch mode. so, that user can give inputs together and relax.
3. Help M.Tech and Civil Engineer to analysis structure.
4. All the data of Staad Pro file is store in database like a tree. By the result it is very easy to read data.
5. Rendering 3D model on browser without any plugin installation.
6. Make PDF of different of the WaterTank

CHAPTER 2

FEASIBILITY STUDY

2.1 Feasibility Study

Feasibility analysis aims to uncover the strengths and weaknesses of a project. In its simplest term, the two criteria to judge feasibility are cost required and value to be attained. As such, a well- designed feasibility analysis should provide a historical background of the project, description of the project or service, details of the operations and management and legal requirements. Generally, feasibility analysis precedes technical development and project implementation. There is some feasibility factors by which we can determine that project is feasible or not

- **Technical feasibility**: Technological feasibility is carried out to determine whether the project has the capability, in terms of software, hardware, personnel to handle and fulfill the user requirements. This whole project is based on making 3D waterTank model and on the OpenSCAD and Django for user interface. Technical feasibility of this project revolves around the technical boundaries and limitations of the OpenSCAD and Django. Structure Information Modeling is technically feasible as it is built up in Open Source Environment and thus it can be run on any Open Source platform.

- **Economic feasibility**: Economic analysis is the most frequently used method to determine the cost/benefit factor for evaluating the effectiveness of a new system. In this analysis we determine whether the benefit is gain according to the cost invested to develop the project or not. If benefits outweigh costs, only then the decision is made to design and implement the system. It is important to identify cost and benefit factors, which can be categorized as follows:

  1. Development costs
  2. Operating costs

  Structure Information Modeling Software is also Economically feasible with 0 Development and Op- erating Charges as it is developed in Django framework and OpenSCAD which is FOSS technology and the software is operated on Open Source platform.

- **Operational feasibility**: Operational feasibility is a measure of how well a project solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development. All the Operations performed in the software are very quick and satisfies all the requirements. This project is also operational feasible as it automates the

work of solving the problem of analysising the structures which not only saves time but also saves money as most of the work is done by Employees and M.Tech students is done by this software.

2.2 Objective of Project

Structure Information Modeling Software is a web based software (that means it can run on any operation system) and the main objectives of this project is to:

1. To inspire M.Tech students to automate their work and do programming
2. Perform most of difficult Calculation work
3. Make it work like batch mode. so, that user can give inputs together and relax.
4. Accept inputs from the user in *.scad file format
5. Help M.Tech and Civil Engineer to analysis structure.
6. Reduce the time for analysis.
7. Generates the final output in the form of PDF.
8. Provide on-line way to analysis so that individual does not have to install anything.

CHAPTER 3

PLANNING OF WORK

The basic implementation of this project is done using prototype model. There is need to modify the structure of the project. We have to divide the task into there parts and its describe the with following:

1. **Front end** In this the layman can be interact with the web browser. In this a layman can get a form on the web browser with a fully dimmension of a water tank.The layman can fill the values in the form on a web browser. Then layman can get a submit button on a browser then layman can submit that value by clicking a submit button on a browser. Then whole the values of water tank that can be filled by a layman can be record by pressing a submit button.Then their will be a zip file downloading option on a web browser layman click on that option then the file will be downloaded in the form of a zip file.

2. **Back End** The main core of this project is in OpenScad macro this macro will actualy create the water tank according to user Specification.

3. **Interface** In Last, The GUI of the project will be defined which will include view function to generate the ouput according to the users input. For rendering 3D model of Water Tank.

CHAPTER 4

FACILITIES REQUIRED FOR PROPOSED WORK

4.1 Software Requirements

The following softwares may be used while developing and testing the software:

1. Python (2.7)(https://www.python.org/)
2. django (1.9)(https://github.com/django)
3. OpenScad (https://www.thingiverse.com/jumpstart/openscad)
4. OpenScad (https://cubehero.com/2013/11/19/know-only-10-things-to-be-dangerous-in-openscad/

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