

Development of a Fully Functional Computer Game Engine

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1 Abstract

Computer games are becoming more and more complex with each new product that competes in the game industry. Game development has grown into a booming market dependent greatly on the capabilities of graphical technology. Computer games have furthered the field of computer graphics through the development of new, better methods of achieving certain graphical effects displayed to the gamer. Because computer games require real-time computations and the audi-

ence demands more impressive eye-candy, it has been a constant battle to satisfy the players' needs. This project deals with programming a computer game engine that provides ample features to be able to create a computer game that could compete in this rapidly growing market in terms of basic 2D and 3D features as well as special effects.

2 Introduction

This computer game engine uses the Microsoft Direct X API with Windows API and

C++ in order to accomplish the implementation of a fully functional engine.

3 Background

Microsoft Direct X stands for Direct Access, which literally means direct access to a computer's video memory. The normal method of graphical programming was normally done using GDI (Graphical Device Interface) prior to the release of Direct X. It was the Windows platform's interface between the programmer and video memory, used primarily for bitmap drawing of icons and background images which proved to be too slow for use with computer games. If a game programmer wanted to make a graphically intense program at the time, he/she had to switch into DOS mode to directly access video memory.

After the release of Direct X, program-

mers did not have problems with Windows Memory Protection and would not have to switch into DOS mode because Direct X would override the memory protection procedures of normal Windows. Ever since then, more and more computer programs made use of Direct X and almost all video hardware companies now make products that allow hardware support using Direct X. Computers could make use of higher resolutions available on video cards up to millions of color variations known as True Color that stored the red, green, and blue components each to a single byte. Because of this, graphical computer applications and games quickly advanced to the point of photo-realism.

4 Details of Implementation

Many features of a generic computer game engine were programmed that is necessary in most computer games, as well as extra features that can enhance a game program in audio and visual aspects.

The necessary features are:

1. The initialization of a computer to be set into the optimal graphics resolution mode for a certain platform.
2. The functions that can be used in order to draw objects onto the computer screen, ideally in both 2-Dimensions and 3-Dimensions.
3. An input interface to process the interaction between the user and the computer program.
4. A sound/music interface for the game program.
5. A time interface which is needed for any real-time game program.

6. A method of detecting collision between objects.

Extra features are:

1. Predefined object animation (e.g. Keyframe Animation)
2. Different object rendering modes (e.g. Wireframe)
3. Cel-Shading.

5 Limitations

Limitations of this project will be the amount of time available in finishing this project. Also, some features may need a very high level of mathematics knowledge.