

# Three-Dimension Package Design Based on X3D and JAVA Technology

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**Abstract:** The paper gives knowledge of X3D and java for design of package, which is applied to establish reality three-dimensional scene and designed solid network program. A example is gave to validate the feasibility of the technology of virtual reality in carton.

**Keywords:** Virtual Reality, X3D, Java, Package Design

## 1. X3D

Along with the computer technology quickly developing, the network has playing a very important role in our society. In the network, a lot of new technologies are used in some field, for example the aspect of intelligent and multimedia etc.

X3d is a Virtual Reality modeling language and can establish three-dimensional scene and design solid network program. It combines internet、multimedia、intelligent etc and implements a flash purpose from two-dimensional to three-dimensional. So it weakens the limitation between the network and the user. The reality and practicability is already carried out by X3D.

X3D is a replacement of VRML. VRML is once a Virtual Reality modeling language and has a good foundation in network<sup>[1]</sup>.

With X3D the internet has some characteristics<sup>[2]</sup>, for example:

(1) It has a powerful function for network and X3D program embedded.

(2) It has a function of multimedia and can make an effect of multimedia.

(3) It can establish a solid scene for users rather realize something in network.

(4) The function of apperceive can be actualized with X3D. So a dynamic interaction between the user and the solid can be carried out.

In X3D a content built can be thought as a scene. All things in the scene should be thought *node*. A node includes a group of event which can be accepted and transmitted. Nodes are used one other by these events. So nodes are the most important element in an X3D.

## 2. JAVA

Java is a language of program which can be applied to diverse computer systems in network. Java has some traits about object oriented、distributed、multithreading、transplantable and so on which cause

the function of internet application more stronger than foretime. Applet of Java can be transmitted with webpage and downloaded in client to run it. It is a particular dominance in development of network program.

Though X3D has a good trait on distributed but can not provide a standard of network. To satisfy date input and output real-time, the dates of node in X3D must be changed. EAI (External Authoring Interface) can carry out interaction real-time.

So X3D is used to make a 3D interface to show how these dates can be disposed. If Java is used to connect a explore and the scene of X3D, these dates will be quickly handled.

## 3. An application on design of carton with X3D and Java

Nowadays most software of packages is still applied in the design of two-dimensional. Their products are not intuition and not let users enjoy immediately the molded appearance. It will largely restrict the package design which should be variety、rich and colorful. Some three- dimensional package design exploited already overcome these shortcomings of two-dimensional software of package, however, it has itself shortcoming. The period of exploitation is so long that difficult to fit the demand of package design. The technology of X3D+Java for package design, however, can make out vivid three-dimensional package and users can directly see these packages with internet. It may improve the interaction and agility for these packages. A program executed is very small, so users see it from internet with very quickly speed. So the Virtual Reality technology can provide a more widely field for three-dimensional package design.

To adopt the technology of X3D+Java for studying box-model, the main content will contain some things, as follows:

(1)It analyzes and studies the frame of carton.

To classify kinds of carton, some similitude or uniform traits will be found from sculpt and an angle of frame. It can confirm some design parameters of domain frame. These design parameters can be amended by a user when a new frame of carton will be demanded. So a large storehouse of carton may not be built.

(2)The mathematic model of three-dimensional carton may be built for basing on the sorts of carton. It can achieve a reality effect when rendering and image is done at the virtual reality. So it can implement a real effect of package.

(3)For X3D embedded in Java, a user can change some design parameters in internet by the demand of model, material, design effect of a carton. Then these dates can be carried out in Java, and a new real carton will be directly showed in a screen by X3D. So it can provide a more firsthand and convenient way to designers and users.

In the package design system, a Java Applet and a virtual scene of X3D are embedded in one webpage. A Applet contains some program of associating with X3D. A user can input dates by a client and implements a control to the three-dimensional model in computer (Figure 1).

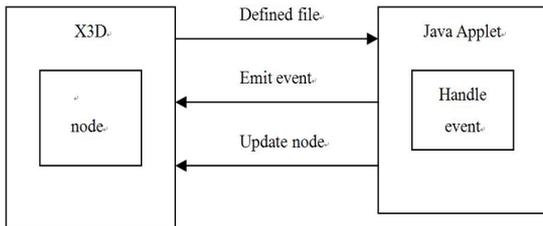


Figure 1 the relation of X3D and Java Applet

Currently a lot of package corporations have already carry through a management of network, some order form can be book by network. Client must not finish a business book with seller on the locale. The traits of X3D is providing the stage for the business movement. A document of X3D can be compiled by any text editor and the capacity of X3D are usually very small. So it is propitious to be transmitted by network.

A carton of cosmetic is studied to analyze the application X3D and Java to a design of package.

Firstly, a three-dimensional model will be built and confirm a ration of its long, width and high. It need change *appearance* of *Shape*. It constructs an image of dimension (Figure 2).

Secondly, a period of time *TS* is defined. Some cycle numbers *cycleInterval* from *TimeSensor* is gained. *Loop* is confirmed to cycle. By the *ROUTE*

sentence, every plane of the carton will rotate in turn according to impress line.

For example:

```
ROUTE MOVE.translation_changed TO BOX.set_translation
```

In order to describe reality, to adjust the fictitious light, the fictitious light can be set on anywhere, any point of view to see the carton. It provides a wonderful method to enjoy the effect of virtual reality package (Figure 3).

Final, a complex control of movement can be implemented with X3D embedded Java. Users adjust the shapes of carton with inputting parameter and use *ImageTexture* to stick a two-dimensional image on the model in computer. So a effect of virtual reality package is finished.

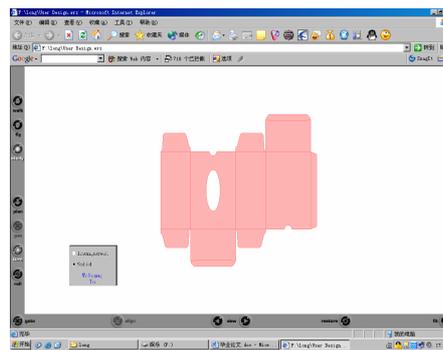


Figure2 a unfold map of packaging box

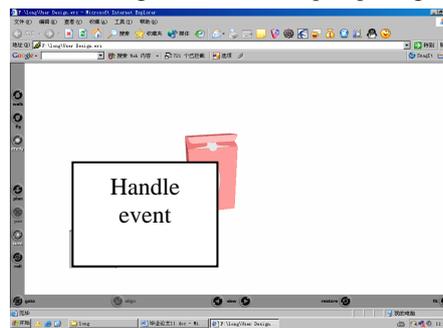


Figure3 a forming map of packaging box

## 4 Conclusions

From above all of these, some groupware of package and date of image are combined for describing the real package in computer by build a three-dimensional carton. A user discovery that the three-dimensional carton puckers and spread by internet, and the same time the inner framework will be discovered. The Virtual Reality can largely improve package design and can play an important role in a field of electro-business. It can be largely improved with Java. They will have a very widely field and a very actually merit and have a more effect

on the electro-business and no-paper office with the development of software and hardware of computer.

It can confirm that three-dimensional design of package will have a newness future with the technology of X3D and Java fetched in the field of package. It is a good example for other industry.

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