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Interactive Systems: The Review of Models and System Requirements

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***Abstract*- In modern life, people tend to represent the world not merely in 2 dimension, more intuitive, realistic products were demanded. The technology of 3D visualization emerged as the times require. It was widely used in the field of urban planning, military command, and city simulation and so on. Many university, company and institute developed different kinds of 3D software. The disposal, modeling and visualization of 3D data are very important in the construction of digital earth. Now, one can get fine 3D model with software such as 3DMax and so on. But the 3D system is only perfect in visualization without any function of spatial analysis.**

***Index terms* – 3D , city simulation,digital earth.**

I. INTRODUCTION

Any language makes some ideas easy to express and other ideas difficult. As we will argue in this paper, today's mainstream programming languages are ill-suited for expressing multimedia animation (3D, 2D, and sound), both in their basic paradigm and their vocabulary. These languages support what we call 'presentation-oriented' programming, in which the essential nature of an animation, i.e., what an animation is, becomes lost in details of how to present it. We consider the question of what kind of language is suitable for capturing just the essence of an animation, and present one such language, Fran, synthesized by complementing an existing declarative 'host language,' Haskell, with an embedded domain-specific vocabulary**.** The paper is divided into various sections as follows: section II gives idea about concepts of interactive system, section III is all about comparison of presentation and modeling of 3d geometry. Section IV consists of for requirements for interaction between 2d and 3d system. The last section then concludes the discussion.

3D data model which needed to be researched in future. Meanwhile, many GIS software extended the original version with module of 3D, such as IMAGIS，VRMAP，CCGIS and so on [2]. Powerful spatial analysis functions were provided in the 2D GIS software: buffering, network analysis, surveying, spatial and attribute inquiring, symbolization. While, the extension function of 3D were good at the representation of terrain, instead of features in the world. So, it was difficult to unify both the visualization and spatial functions together.

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II. CONCEPTS OF INTERACTIVE SYSTEM

Many university, company and institute developed different kinds of 3D software. The representative works were Multigen Creator, 3DMAX and Cyber- CityGIS [1]. People could establish and manage 3D models in 3D software. The 3D models established were intuitive, realistic. As for the function of spatial analysis, it was restricted by the theory of In addition, there were disadvantages of the independent 2D or 3D system. On the one hand, in 2D system, the whole study area was represented abstractly. It was easy to be located. But the world human being existed is 3 dimensions. The abstraction led to the absence of the following information: the geometric location information, the topological information and semantic information of the third dimension [3]. The 2D map could not represent the world completely. Meanwhile, the abstraction was often multisense and difficult to dig out the spatial information. On the other hand, roving in the 3D system, without globe field of vision, the primary users always get lost.

The realization of 2D and 3D interactive system could be completed in 2 ways: the unified model and the message drived model [4].

A. The Unified Model

It was the most ideal way to establish the unified model. 2D and 3D were the projection of the model. The interface of 2D and 3D were the view to interact. No matter the manipulation of 2D or 3D data, both resulted in the manipulation to the unified model. Thus, it was easy to keep consistency of data. But it was difficult to establish the unified model because of the difference between the 2D geometric data and the 3D object data.

B. The message-drived model

Now, it was a compromise way to keep the consistency between 2D and 3D data by the message-drived model. Based on the same coordinates, the paper realized the interaction of 2D and 3D data.

III. PRESENTATION VS. MODELING FOR 3D GEOMETRY

The practice of 3D graphics programming has made tremendous progress over the past three decades. Originally, if you wanted your program to display some graphics you had to work at the level of pixel generation.

You had to master scan-line conversion of lines, polygons, and curved surfaces, hidden surface elimination, and lighting and shading models-rather complex tasks. A significant advancement was the distillation of this expertise into rendering libraries (and of course underlying hardware). With a rendering library, you could express yourself at the level of triangles and transformation matrices. While advancement, these libraries presented a view of a somewhat complex state machine containing registers such as the current material properties and the current local or global transformation matrices. You had to drive this state machine, push register values onto a stack, change them, instruct the library to display a collection of triangles, and restore the registers at the right time.

The next major advancement was to further factor out common chores of graphics presentation into libraries that presented complex structured models, as exemplified in such systems as PHIGS, SGI's Inventor and Performer, VRML, and Microsoft's Direct3D RM (retained mode). The paradigm shift from presentation to modeling for geometry has had several practical benefits: ease of construction, regulation, authoring, usefulness and longevity, economy of scale.

In spite of the benefits listed above, not everyone has made the shift from presentation to modeling of geometry. The primary source of resistance to this paradigm shift has been that it entails a loss of low level control of execution, and hence efficiency. As mentioned above, handing over low level execution control from the application to the presentation subsystem actually benefits execution efficiency where authors lack the significant resources and expertise required to implement, optimize, and port their programs for all required platforms. In other cases, as in the case of current state-of-the-art commercial video games, the resources and expertise are available and well worth the considerable investment. An example is Doom, which would have been a failure at the time if implemented on top of a general-purpose presentation library. On the other hand, even Doom and its successors really adopt the modeling paradigm, in that they consist of a rendering engine paired with a modeling representation. In addition to the loss of direct control of efficiency, modeling tends to eliminate some flexibility in the form of presentation-level tricks that do not correspond to any expressible model. In our experience, these tricks tend not to scale well and are not composable, and in cases that do, are achievable through model extensibility.

There have been many other similar paradigm shifts, generally embodied in specialized languages, sometimes with corresponding tools that generate the language. Examples include dialog box languages and editors; grammar languages and parser generators; page layout languages and desktop publishing programs; and high level programming languages and compilers.

IV. REQUIREMENTS FOR INTERACTION BETWEEN 2D AND 3D SYSTEM

The following are the main requirements developed for the interaction between 2D and 3D system:

- When the users roving in the 3D world, the corresponding location and field appeared in the 2D view.
- When the location in the 2D map changed, the corresponding scene in 3D view changed too, and the vice versa.
- When the geometry in the 2D map was selected, the corresponding 3D model was highlighted, and the vice versa. The same function was applied to the selected region and 3D models included.
- When the 2D map was edited, the same modification should be made in the 3D system. For example, if the users added a new building in the 2D system, a new 3D model could be added to the 3D system. In addition, the users could select the 3D symbol from the symbol database with the ideal color and texture.

V. CONCLUSION

Multimedia Systems refer to the coordinated storage, processing, transmission and retrieval of multiple forms of information, such as audio, image, video, animation, graphics, and text. The growth rate of multimedia services has become explosive, as technological progress matches consumer needs for content. Paper reviews various thoroughly about the interactive systems along with their requirements.

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