CREATIVE SERVICES AND TOOLS FOR GUIDING MULTIMEDIA APPLICATION DEVELOPMENT

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ABSTRACT

The multimedia application development is making its presence felt in almost all walks of life today. The development of these systems is highly effort intensive and entails usage of lots of creative services. There is no one model or approach for designing and developing multimedia content. Implementation of a typical Multimedia application is done using specific authoring tools or programming languages. Depending on one’s creativity, one can mix and match the various tools. This paper highlights the use of the creative services and process flow in the multimedia application development. This paper also provides some insight into the tools that are used for developing multimedia applications.

1. INTRODUCTION

A typical multimedia application design process comprises of many major processes as illustrated in figure -1.

The most important process in the entire development cycle is the content generation. This process involves enormous creativity. This paper mainly focuses on the activities involved in the creative services of multimedia design process and is discussed in section 2 and explains a few of the useful design tools in the following sections.
2. CREATIVE SERVICES

The two fundamental activities in the creative services in developing a multimedia content are the Preproduction process and the Motion capture process.

2.1 PRE-PRODUCTION PROCESS

Pre- Production is the process of charting out an organized plan for the entire multimedia application prior to its development. This involves content development, technical execution and marketing. During pre-production process, the starting point is the content or the script which specifies the storyline of the application. The script is first broken down into individual scenes, which are then broken down into shots. For each shot location, props, cast involved, costumes required, and the camera angles are then identified. In addition if any special effects and visual effects are to be employed, decision about it is also made. The tasks involved in the pre-production process are given in figure -2.
The major task in the pre-production process is the script analysis, that essentially means breaking down of the script into smaller units. This script breakdown is an integral part of the pre-production process for any film or a television episode or a play, or even a comic book or for just about any multimedia application development. Character design, storyboard design and modeling of the concept are major activities of Pre production process.

2.1.1 CHARACTER DESIGN

It is one of the most important aspects in any multimedia application development. In order to make an impact on the viewers it is imperative to create characters having realistic human expressions. Once the character is decided the first and foremost thing is the selection of the costume. Following which a scaled drawing of the character is produced. It is then followed by creation of a model of the character. The model can be made out of clay, wire etc. This model will provide the basis for further development. Hence for any 3D modeling and animation, character design is the most crucial activity[2]. Figure-3 provides some illustrations on different characters

![Figure-3 Character Design](image-url)
2.1.2 TOOLS FOR CHARACTER DESIGN

As character design is the most important part of the multimedia application, it is important to choose an appropriate tool for this activity. A wide variety of tools are available for designing the characters for multimedia applications. Some of these tools have been discussed in the following sections.

2.1.2.1 3DS MAX 2013

*Autodesk 3ds Max* is a powerful 3D modeling, animation, rendering, and compositing package. It is a favorite among character animators and game artists. This is due to its ready-to-use template-based toolset. Its other features include character rigging systems, comprehensive polygon modeling, UV editing, and texture painting as shown in figure: 4. It’s development environment supports C++ and .NET. In addition, it supports advanced hardware shader technology and dynamics capabilities, including NVIDIA PhysX integration, viewport preview and rendering of HLSL (High Level shader Language) [1]. Autodesk 3ds Max Design 2013 software focuses more on creative rather than technical challenges [4].

![Figure-4 3ds Max 2013](image)

2.1.2.2 POSER PRO 2012

*Poser* is a virtual photo or film studio which enables addition of human element to any application, still or an animated image without the hassle and cost of using real models and sets. *Poser* comes with ready-to-pose 3D human figures including hair, clothing, props, scenery, lighting and camera effects. It is not suitable if the image has to be created from the scratch. *Poser Pro 2012* delivers the most complete suite of Weight Map Creation tools. Weight Map Rigging is the standard for high-end applications. The Poser Pro Weight Map Rigging system is an open, well documented platform with support for third party weight mapped figures delivered in the easily editable Poser PZ3 file format [3]. Constraints channels and objects are a simple to use new feature in *Poser 9* and *Pro 2012* that can provide powerful animation effects.
2.1.2.3 AUTODESK MAYA 2013

Autodesk Maya is very powerful, complete one stop professional solution for 3D modeling, animation and rendering. The primary reason for its enormous popularity is due to its open architecture and the fact that it offers a huge amount of objects and effects to work on various application projects. It provides the support of a well-documented and comprehensive Application Programming Interface (API) and few embedded scripting languages namely the Maya Embedded Language (MEL) or Python. This combination of openness and adherence to the industry standard 3D visual effects, computer graphics, and character animation tools makes it extremely useful to all professional film, television, game development and design projects. Autodesk Maya 2013 software delivers practical toolsets to help create and maintain the modern, open pipelines and powerful new toolsets for dynamic
simulation, animation, and rendering giving it a entirely new levels of creativity. In addition, the Open Data initiative introduced in Maya 2013 offers tools to help facilitate parallel workflows and better complexity handling [5]. The drawbacks of this software include a very lengthy installation process, slow start up and high level of complexity for the beginners.

2.1.3 FLOW BOARD OR STORY BOARD

Flow board or story board is the process of organizing graphics elements in the form of illustrations or sequence of images. It is used to confine the ideas within a domain before taking action. In *Windows Movie Maker* or other movie making software, the Storyboard is an editing area located at the bottom of the window. It is a panel of pictures or other movie clips, laid out in the sequence as shown in figure-5.

![Figure-5 Storyboard](image)

2.1.4 TOOLS FOR STORYBOARD DESIGN

The following section describes the tools that enable people to incorporate a new technology in their own work practice[6]. Some of the design tools for storyboard generation are as follows

2.1.4.1 STORYBOARD QUICK V6 2012

*Storyboard Quick* can be considered as a traditional storyboard tool as it does not use 3D. It has an easy to learn and simple interface. The new version *Quick v6.1 & Quick Studio v6.1* adds the Layers Palette for optimized storyboarding. The layer Palette manages the elements of the frames with additional ease. The layers can be grouped, copied, deleted and changed [7]. The interface for the story board generation is shown in figure-6
2.1.4.2 STORYBOARD ARTIST 5.1 2012

Storyboard Artist gives the ultimate productivity experience that enables amazing creativity and movement. It facilitates effective communication and presentation of production ideas. Also this cinematic software for media professionals speeds up the preproduction, pre visualization, revisions and presentation.[8].

It can support creation of every kind of storyboard with a workflow that incorporates media from any dimension. It provides the facility to import 3D (.skp) files from a warehouse of free 3D graphics and to import script from a wide variety of screenwriting applications including Final Draft. The Import Video option allows to scrub a movie file and to apply transformations to a frame and drop it in the boards. The Export option uses to export the finished project as QuickTime, Flash Movie and print it in customizable or preset layouts. The typical environment is shown in figure-7.
2.1.4.3 REDBOARD

Redboard is a revolutionary technology which is used to accurately plan and manage the 3D animation production from the storyboard stage and then seamlessly transfer camera and scene data into your 3D workflow [9].

It also exports complete storyboards with cameras, character positions and timing to *Autodesk Maya*, *3DS Max* and *Softimage*. The character and prop animation can be created directly from the Redboard storyboard sequence. This technology uses a standard Edit Detail List (EDL) to the editing software in Redboard for animation timing and automatic route sheet creation [9].

2.1.4.4 MATCHWARE'S MINDVIEW

*MindView 4 MAC* is an easy to use mind mapping software application designed to help users brainstorm, organize and present ideas in Apple Mac platform. Based on the proven Mind Mapping theory, it enhances creativity, clarifies thinking and improves memory retention and recall. *MindView 4 MAC* includes the new MAC Lion OS interface, a variety of ready-to-use templates, easy-to-use wizards and professional clipart to improve the layout.

One can Export the completed Mind Map to Microsoft Word, Microsoft PowerPoint, PDF, HTML or Mediator. *MatchWare's MindView* is a comprehensive storyboarding software solution that helps to visualize and organize presentations instantly[10]. The figure-8 illustrates the mapping of ideas.

![Figure-8 MatchWare's MindView](image.png)

2.1.5 CONCEPT PAINTING

In order to depict a concept many parameters have to be considered. Some of the important parameters are Layers, Exposure/Lighting, Shadows, Highlights, Surfaces, Materials, Textures, Translucency, Reflections, Composition, and Color Temperatures. Majority of the tools offer the facility to use these parameters. Some the painting tools are discussed in the following section.
2.1.5.1 ADOBE PHOTOSHOP CS6 EXTENDED 13.0.1.1

Adobe Photoshop CS6 is a stable version of the industry standard image editor with some interesting new features. Probably the most notable new feature is the Content Aware tool which makes editing Photoshop more "intelligent" with a streamlined interface. In addition, basic video editing functions have been added for the first time. It is a powerful and flexible software having intuitive interface and keyboard shortcuts. The only drawback is that it requires powerful computer for execution purpose [11]. Some of the concept paintings are shown in the figure-9.

![Figure-9 Concept painting using Photoshop](image)

2.1.5.2 GLYPH – MATTE PAINTING TOOLKIT FOR MAYA 2013

The Matte painting Toolkit is a suite of tools designed for visual effects artists using camera projected textures to build full Computer Graphics environments for feature films, games and architectural visualizations. This includes techniques using which one can create a virtual reality. That is, it creates an illusion of reality that is not possible to build and control in the real world. Sky replacements, set extensions, city-scapes are the usual suspects for a matte painting[12]. An example Matte Painting is given in figure-10.

![Figure-10 Matte painting](image)
2.1.5.3 DEEP PAINT 3D / DEEP UV

Deep Paint 3D is the leading painting and texturing solution used by film studios, broadcast, and interactive entertainment industry. This tool allows easy painting and texturing of 2D and 3D models. It can be stand alone, or integrate workflows with plug-in support for existing Digital content creation authoring applications and tools. Deep UV is a breakthrough UV mapping technology for the creation and modification of UV mapping for n-polygonal models within an interactive 2D and 3D UV mapping environment[17].

2.2 MOTION CAPTURE PROCESS

Motion capture or mocap is a popular process for generating human animation based on the storyboard. The alternate method is key frame animation which requires a lot of expertise and time. Mocap involves steps like props making, shot break down and rehearsals as shown in figure-11. This has to be then cleaned up, tested and converted to appropriate optimized file format for production.

Usually this mocap process involves a person wearing a special suit covered with strategically placed reflective balls or special optical sensors. Several video cameras film the person as he executes the desired motion and then a computer tracks the motion of each ball and converts the motions into a computer file and it is illustrated in the figure-12. The file can then be applied to a rig (a character with a skeleton or 'armature'). This rig may belong to a person or animal or any other character [13].

![Motion capture process](image)

Figure-11 Motion capture process
2.2.1 TOOLS FOR MOTION CAPTURE

The two main techniques for motion capture process are electromagnetic or optical. Today, the use of optical motion capture technology is a widely accepted technique, used daily not only by animators but also by researchers and clinicians all over the world. By understanding the basics of human motion, medical professionals can improve treatment during a rehabilitation process and obtain guidance in selecting suitable training equipment.

2.2.1.1 QUALISYS MOTION CAPTURE SYSTEMS

Qualisys motion capture systems are also used in industrial applications. Complex, 3D vibration problems can easily be measured and analyzed. In car development, interior design can be improved by using motion capture and ergonomics tools to evaluate comfort and safety factors for the car driver. Animation and virtual reality presentations use motion capture for increased realism and a more interactive environment. Some of the motion capture systems are shown in figure-13 [14].
2.2.1.2 MOTION ANALYSIS – MOTION CAPTURE SYSTEMS

Motion Analysis corporation is the motion capture leader for 3d passive optical motion capture systems. They were the first to introduce an all-digital motion capture camera, the Eagle Digital Camera, at SIGGRAPH in 2001. The Raptor series of motion capture systems are used to capture motion outdoors as well as indoors without changing any of the hardware or software on the system. The latest system in this series is the Raptor-12 Digital RealTime System consisting of Raptor-12 digital cameras and Cortex software, which captures complex motion with extreme accuracy as shown in figure-14. Each of the Raptor series comes with the compatible motion capture software’s like cortex, Calcium solver, Skeleton builder, DV reference, Sky scripting and SONIC viewer[15].

![Figure-14 Cortex: An integrated motion capture Software](image1)

2.2.1.3 VICON MOTION CAPTURE SYSTEM

The Vicon motion capture system is marker-tracking system which captures/records real time human data and applies it to computer-generated characters It consists of ten cameras outfitted with Infra Red optical filters and an array of IR LEDs, and a set of reflective dots. The dots, arranged on the hand of the subject (human or non-human primate), reflect the IR radiation emitted by the LEDs. All other light is filtered so that the system only recognizes the dots[16]. The images taken from the cameras are used to construct a three-dimensional representation of the markers using compatible motion capture software. The Vicon motion capture system is shown in figure-15. A common problem with real time motion capture is the presence of noise. There are many filtering systems and techniques to eliminate the “bad data”.

![Figure-15 Vicon Motion capture system](image2)
3. CONCLUSION

This paper discusses the major processes applicable in the creative services employed for the development of multimedia project. Salient features of important tools that facilitate implementation of these applications is also discussed. This study infers, that the development of an effective multimedia digital content/applications is largely dependent on creative quotient of the developing team rather than the tools used. However the tools discussed are not exhaustive but representative and more prevalent in the multimedia industry. For character design Autodesk Maya, for storyboard Storyboard Artist, for concept paint Adobe Photoshop CS6 and Deep Paint 3D/ Deep UV and for motion capture Motion Analysis appear to be the favorite tools being preferred by major studios.

REFERENCES

1. http://usa.autodesk.com/3ds-max/