A Study of Visualization Elements of Shadow Play Technique Movement and Computer Graphic Imagery (CGI) in Wayang Kulit Kelantan

Dahlan Abdul Ghani

Malaysian Institute of Information Technology-
Universiti Kuala Lumpur,Malaysia
dahlan@miit.unikl.edu.my

Abstract – *In the attempt to preserve and safeguard the unique heritage of Wayang Kulit (Shadow Play),UNESCO has designated it as a Masterpiece of Oral and Intangible Heritage of Humanity on 7th November 2003. Wayang Kulit Kelantan in Malaysia is threatened with imminent extinction. This paper reviews the critical situation of Wayang Kulit Kelantan in Malaysia. The visualization and movement of Wayang Kulit Kelantan is described into four major aspect, which are the puppets, shadows, screen for shadow projection (Kelir) and its light source. It also reviews the comparison methods and techniques between Wayang Kulit Kelantan traditional shadow play and Computer Graphics Imagery (CGI) used as a prototype design in traditional Wayang Kulit Kelantan.*

Keywords – *Wayang Kulit Kelantan, Shadow Play, puppets, kelir, Computer Graphic Imagery (CGI), visualization, prototype.*

INTRODUCTION

Puppetry is one of the most ancient forms of epresentation, diffused all over the world in different shapes, degrees of freedom in movements and forms of manipulation.[1] This research focus on Wayang Kulit Kelantan. It is believed to have originated from Cambodia, but brought to Kelantan kingdom. The wayang kulit kelantan is widespread on the Coast East Peninsular Malaysia.Wayang Kulit Kelantan is the pre-eminent form of shadow puppet theatre in Malaysia and the stylistic differences seem to be particularly evident [2].

The wayang kulit kelantan is well known performing arts heritage symbol to the country. It was one time fairly widespread that Wayang Kulit Kelantan served not merely as entertainment but more importantly it functios as a vehical for the transmission of norms and values and as an intermediary between the real and the nether worlds.

As mentioned by Mohamed Ghouse "that traditional theatre (refers to wayang kulit) has been neglected and a few have succumbed to this neglect and died a natural death" [3]. One of the degree factors of this traditional culture is the process of modernization or using high tech

gadgets such that cinemas and videotape recorders to villages. Among the steps taken by the Pas-led Kelantan Government when it came to power was to ban several traditional performances like performing arts of wayang kulit (figure 1), dikir barat and menora, which were deemed un-Islamic has made the situation worsed.

Figure 1.0 The Heritage of Wayang Kulit Kelantan Performance
(copyright@ dianais.com2010)

The addition of *Heritage* (*Warisan*), to the functions of the Arts and Culture Ministry recently, actually augurs well for the local entertainment industry. It is clear that with the current situation and the level of support in Malaysia, Wayang Kulit Kelantan is unlikely to last long without some kind of strong official support [4]. Hence, there is an important steps needs be taken to preserve this art or heritage form slowy vanished.

Not many attempt has being made to digitalized wayang kulit. Some researchers suggested that in order to survive in the era of globalization, Wayang Kulit need a new alternative in media output, to be digitalized into the Iworld and to be watched on the computer screen or cinema. [5].

This paper describes the visual styles of Wayang Kulit Kelantan focusing on the four major aspects, which are the puppets, shadows, screen for shadow projection (Kelir) and its light source. This paper also will look into the comparison between shadowplay technique and computer graphic imagnery(CGI) techniques in wayang kulit kelantan.

Visualization Approach on Wayang Kulit Kelantan

Firstly, this research looks brief studies on the visual approach of Wayang Kulit Kelantan (as shown in Fig. 2) by discussing on the four major elements, which are its puppets, shadows, Kelir (screen) and light source.

Figure 2.0 Wayang Kulit Kelantan Character visual

A.*Puppets*

The puppet design or concept used in wayang kulit Kelantan or sometimes refered as Wayang Kulit Siam are reflected on iconography and design in Malaysian Wayang Kulit, connections with cultures beyond Malaysian shores are apparent.[6]   Usually, Wayang Kulit shadow puppet characters measuring approximately 71 centimeters in length and width not exceeding 30 centimeters. The puppets are divided into profile   (gods, warriors, princess, prince), are constructed and carved from cow, buffalo hide and either depict sylised human shapes or an amalgam of human and animals shapes. The facial caharacteristic includes mouth , nose or forehead which has some similarity with Javanese puppets and the overall impression conforms ideal of Malay beauty. [7]

Indian influence is evident in the colour symbolism. Wayang Kulit Kelantan performs stories from local version of the Ramayana from episodes lores & legends. Noble characters such as Hanuman or Seri Rama are usually colored in white and green color symbolised the characteristic of prince and to portay them as part of protagonist character to the audience and indirectly color creates an outstanding reflection of the character. The colours are not regarded as continuiting a guide to temperaments of various puppet characters. Accroding to Mr Hamzah Awang Mat the famous *Tok Dalang* familiar with Wayang Kulit Kelantan, the puppets has being flourishing in state of Kelantan for many years and the puppets or doll are colorufully decorated and their vivid colors are refelected on screen.[8] another important aspect here is that all characters be patterned batik clothes that become the identity of the puppet itself.

The charcarcter craft or orges uses colors that symbolized warrior such red which highlights significant elements of Islamic culture that have shaped Indonesian and Malay traditional theatre through the adaptation of borrowed genres such as taziya, as well as locally created styles of shadow play (wayang kulit) and the doll-puppet theatre (wayang golek); are the use of important themes from Islamic literature.[9]

Example the ogres main figures such as Seri Rama, Laksamana, Siti Dewi and Sirat Maharaja (fig.3) are usually painted with red faces based on a belief derived from the Holy Quran, that giants or ogres (jin) have their origins in fire [10]. Apart from their size which are bulk, refined or coarse characters are identifiable from the shapes and texture, eye, craft and form. With exception Pak Dogol & Wak Long, each having two moveable arms and chin, the rest of the wayang figures each has only one moveable arm which can be articulated by manipulating the thin bamboo stick attach to the palm of the puppet.

Figure 3.0 Character involves in Wayang Kulit Kelantan (Sri Rama, Sita Dewi, Wok Yah)
(copyright@ smp2252marlin.blogspot.com 2010)

B. *Shadow*

The shadows are cast on a cotton screen and illuminated by a single oil lamp. Today it is more likely that an electric bulb is used for the lighting.[11] When held up behind a piece of white cloth, with an electric bulb or an oil lamp as the light source, shadows are cast on the screen. The position of the lamp or bulb is facing the mastermind and partly closed so that the resulting light is focused in one direction only. The lack of these two angles will cause a shadow puppet show to be bland and uninteresting. [12] Shadow illusion and motion is visible (refer to Fig.4) in many scenes especially during the The Legend of Dewa Kertapati episode and in fighting scenes. This is not much seen in other Wayang Kulit performances.

C. *Kelir*

The Dalang projects the shadow of his puppets on the Kelir (Screen) during a performance. This Kelir is mounted on a wooden or metal frame in such a manner that it tilts inwards slightly, facing downwards to the Dalang. The Kelir is usually completed with a decorated border, tassels or otherdecorative features. According to the interview with famous *puppeteer or Dalang* Sri Neng Buah at Bengkel Seni Warisan Wayang Kulit 2010, the Kelir is a symbolism of all life in the universe, that everything that begins must be ended. Each presentation begins with and ends with Lenggang Banyan Pacak. It should only be touched by pressing the puppets towards it fighting scenes in order to show the fighting effects and remain flat and calm throughout other scenes with mild occasional touches.

COMPUTER GRAPHICS IMAGENERY (CGI)

Computer-generated imagery (CGI) in films has advanced to the point that it's often difficult for viewers to figure out which scenes have visual effects in them. The use of CGI rapidly increased during the past decade, which might be characterized as the twilight of traditional effects.[13] To develop wayang kulit kelantan using CGI is possible could be done. The main reason that CGI has supplanted models and motion control is its unlimited potential. It may not be easy or cheap, but anything that a writer or director imagines can be created with computer graphics.

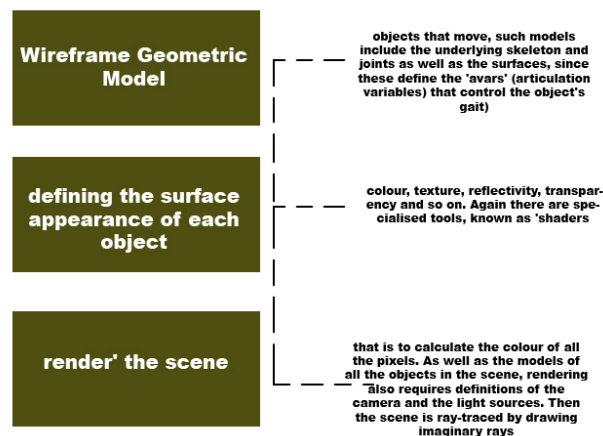| Wireframe Geometric Model | objects that move, such models include the underlying skeleton and joints as well as the surfaces, since these define the 'avars' (articulation variables) that control the object's gait) |
| defining the surface appearance of each object | colour, texture, reflectivity, transparency and so on. Again there are specialised tools, known as 'shaders |
| render' the scene | that is to calculate the colour of all the pixels. As well as the models of all the objects in the scene, rendering also requires definitions of the camera and the light sources. Then the scene is ray-traced by drawing imaginary rays |

Figure 4.0 The CGI model in 3D animation form

Digital puppetry is the manipulation and performance of digitally animated 2D or 3D figures and objects in a virtual environment that are rendered in real-time by computers is a component of CGI element (refer figure 4.0) . It is most commonly used in film and television production, but has also been utilized in interactive theme park attractions and live theatre.

Perhaps the first truly commercially successful example of a digitally animated figure being performed and rendered in real-time is Waldo C. Graphic, a character created in 1988 by Jim Henson and Pacific Data Images for the Muppet television series The Jim Henson Hour.

Henson had been trying to create computer generated puppets as early as 1985[12] and Waldo grew out of experiments Henson conducted to create a computer generated version of his character Kermit the Frog.[13] Waldo's strength as a computer generated puppet was that he could be controlled by a single puppeteer (Steve Whitmire) [14] in real-time in concert with conventional puppets. The computer image of Waldo was mixed with the video feed of the camera focused on physical puppets so that all of the puppeteers in a scene could perform together [15] .

It was already standard Muppeteering practice to use monitors while performing, so the use of a virtual puppet did not significantly increase the complexity of the system. In post production, PDI

re-rendered Waldo in full resolution, adding a few dynamic elements on top of the performed motion.[16]
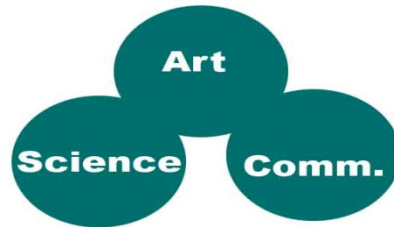

Figure 5.0 The digital puppetry in CGI consist of Art, Sciene & Communication
(copyright@ Dahlan Abd Ghani 2010)

Obviously there have been many major and profound applications of computer graphics in its short history. However,the recent past of computer graphics is but a prelude of an event or experiment. Computer graphics can and will touch every human in a number of ways from entertainment to assisting in finding the cure of the most dreaded diseases through Human Computer Interaction.

Computer graphics Imagery (CGI) can and will have a profound effect in digital puppetry. CGI is a powerful medium but only if combined with the principles of information design. Example from figure 5.0, wayang kulit itself potray as an aesthetic art from the visual point of view.

To incorporate CGI into wayang kulit, the element of sciene is use from the aspect of software to develop it in 3D or virtual environment. The art challenges and the technology inspires the art. Therefore CGI or animation itself is one of the most prominent aspects of popular culture worldwide. It informs every aspect of the visual terrain that surrounds us everyday.

Realism & CGI Implementation

In order to develop the prototype design on wayang kulit in CGI environment, we focused on 3D modelling & animation in the wayang kulit itself. Liz Faber & Helen Walters suggest that animation may be found "occupying a space between film-making, art & graphic design" [17]

Its much more interesting from an original 2D puppet of wayang kulit being introduced in a 3D environment. Animation offers a different vocabulary of expression to live action and enable greater creative freedoms. The traditional wayang kulit kelantan for example uses a Tok Dalang to narrate a story but in CGI environment it can be recorded or digitized and edited with sound effects.
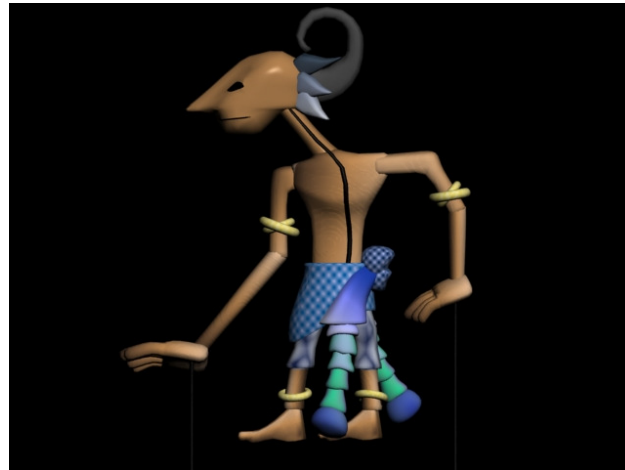
Figure 6.0 Seri Rama 3D Model using NURBS & Polygon in 3D
(copyright@ Dahlan Abd Ghani 2010)

In terms of modelling (refer to figure 6.0), we designed the puppet base on character of Sri Rama using NURBS & Polygons in 3D animation software. We had to scan the original picture of the puppet and bringing it into 3D Max for modelling. The puppets modelling part was difficult especially in designing the craft edges of the puppet, eyes, mouth, and surface.

On Texturing to a 3D model, the traditional puppet has various type of color and skin texture which a figure takes several weeks to make. It is **a complex handmade process.** The artist start from a master model which is traced out onto "Kulit" (skin or parchment). The figure is then smoothed, usually, with a glass bottle. After it is smoothed, the artists start painting the puppet. Scholar Angela Hobart argues that puppets "may appear only fleetingly on the stage, so their contours must be precise for the spectators to recognize them" (Hobart, 67). It is very difficult to map the texture to model as the correct axis and also UV mapping. We are able to texture with a basic structure eventhough the realistic looks did not have a 100% similarity with an traditional puppet. the character The character itself
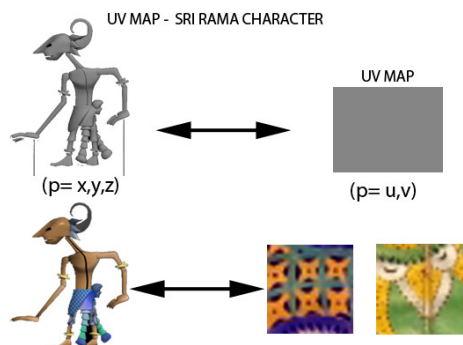

Figure 7.0 The application of a texture in the UV space related to the effect in 3D.
(copyright@ Dahlan Abd Ghani 2010)

On Animation pratice, when animation is made in the traditional frame-by-frame form, it is comparatively easy to define, but this is significantly problematised in the digital era. According to *Prof.Ghulam-Sarwar Yousof;1998*,a shadow play performance hinges on the master puppeteer or *Tok Dalang*. A single puppeteer (dalang) sits behind a shadow screen illuminated by a coconut oil lamp. He manipulates the puppets, improvises the dialogue and gives voices to all of the puppets. To his left and right sit his two assistants. To create visual effects, the performer swings the oil lamp. In CGI or 3D environment, we use keyframe, lighting and camera to render the sequence file in order to have a realism effect in 3D. Realism is the concept that inevitably accompanies the development and asimililation of three dimensional computer graphics. The puppet itself has being attach with strings and the movement and sychronized (refer to figure 7.0). We had difficulty to engaged the rhythm of movement as the original puppeteer will animate the puppets traditionally.
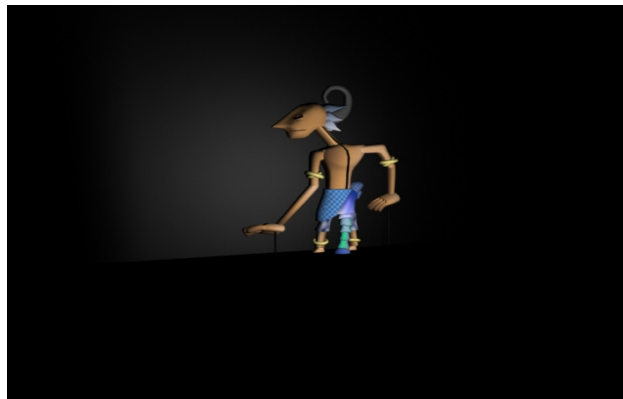

Figure 9.0 The 3D puppet model being animated
(copyright@ Dahlan Abd Ghani 2010)

On Cinematography, CGI produce special effects, figures, backgrounds, or other materials in film. Some references studies was done in applying the techniques use on CGI effects. For example, in *The Lord of the Rings*, director Peter Jackson uses CGI to add artificial lighting, produce a massive battle scene, and build false environments. Using CGI, the character Galadriel was shown to glow bright white despite being surrounded by the deep blue tones of the setting in the scene where she shows Frodo her mirror. Then, to stage vast crowds of soldiers out of only a few actors in costumes, the program Massive (for "Multiple Agent Simulation System in Virtual Environment") was also used. Additionally, the mountains and the trees in the background of Shire are generated by CGI. [18]

Through this research, for the cinematography, we plan to design a 3D model of the stage as shown in (refer figure 10.0),comes with a screen to potray the shadow of the puppet moving and applying special effects using Adobe After Effects. But we find it quite difficult again in terms of modelling. Thde realism effect on "panggung or stage has turned out to be more complex then expected. The digital recreation of any object involves shape, lighting effects on surface and also pattern of the movement and the problem requires an exact underlying pyshical properties and process to develop.

Figure 10.0 A Reference image to model "panggung" in 3D
(copyright@ raykinzoku.fotopages.com 2010)

For further experiment, we did music compositing, recording Tok Dalang voice and applying with some effects. Indeed, as pointed out by Goto and Muraoka (1999) and Scheirer (2000), untrained listeners understand music to some extent without mentally representing audio signals as musical scores: music transcription is a skill mastered only by trained musicians. The loud, vigorous sounds enamanting from esemble drums, percussions, gongs and a reed wind instrument best exemplify the music for the most popular wayang kulit kelantan or Siam.

We used audio software called "Sony SoundForge" to record, edit, effects including fading, controlling the hertz, vibrato and many others that could enhanced the audio as the sync with the animation being played and maintained the overall mood from the audio design itself. This music compositing also involves music arrangement and story narrator.

The elements of CGI from audio visual that was design will enhanced and set a new alternative in a new media entertainment. And therefore a survey was conducted in getting the inputs as the impact or significant between Traditional method and digital technology as a convergenance medium of entertainment.

V. Results

No	WAYANG KULIT KELANTAN		
	Category	*CGI*	*Traditonal*
1.	**Visualization**	**84.2%**	**99.5%**
2.	**Animation**	**68.9%**	**97.7%**
3.	**Cimenatography**	**76.5%**	**98.2%**
4.	**Audio**	**86.9%**	**96.5%**
5.	**Realism**	**75.6%**	**99.7%**

Table 1.0 A survey data on comparison between Traditional & CGI method in Wayang Kulit Kelantan

A survey was conducted among adult people in Klang Valley between age 21 – 45, in comparison between the traditional wayang kulit kelantan and cgi visualization. Overall from the statistic

table 1.0 is shows the visualization element, people (especially malay society) prefers wayang kulit in traditional manner (with the usual texture and crafted puppet) compare with CGI 3D model puppet. The result from the survey, we identified that in terms of the model puppet, the traditional hand made puppet symbolized unity, aesthethic value and heritage to the society and its diffcult to convince the society in terms of CGI. Nevertheless using CGI, almost 45.6% feel not all traditional performing arts work should be digitized. From the survey also it shows that more detail work in terms of the modelling puppet, texturing and craft should be more realistic when applying CGI or 3D animation in order to have an equal balance in terms of visualization and realism effect.

In the context of animation from table 1.0, the survey portay the peope are still favourable & prefereable to be animate the puppets traditional way compare to used CGI. This is due to the fast movement, shadow distortion and story narration played by the Tok Dalang using his puppets and lights which are belief to be more convincing compare to CGI technique. In CGI, the puppets are seems to be more limited in terms of movement which are done by keyframing, special effects and camera which defeats the traditional way of wayang kulit itself. There are few suggestion feels that the wayang kulit kelantan puppet should be animated like film concepts such as "Shrek", "Ratatouile" and etc in order to have an different kind of approach using cgi capabilities.

From the audio perspective, the survey summarize that the audio played during the "live" performing theatre are much more entertaining and phenomenal. The audio orchestra creates mood, atmosphere and enchanted emotions during the performance. Like wise using software to synchornized the audio with the animation or cg puppet, its much more than a plan situation and lack of convincing. On the postitive part, audio in cg environment are able to edited, special effects, and create synchronization between the narrator and music score for each performance done.

Lastly, from realism it seems the puppet shadow play from traditional method preserved the heritage as a symbol of performing arts of the country but using CGI technology, are unable to made way or replace the existing shadow play theatre. Usually, the viewers sees these simulated puppets as images on a flat screen, however new interfaces are being develop in cg (3D, virtual reality) to enhance the illusion of their three-dimension presence. Again, "Realism" is the concept that inevitability accompanies the development and assimilation between 3D environment or digital puppetry and traditional shadow play puppet wayang kulit kelantan show.

CONCLUSION

The convergance between CGI and traditional wayang kulit kelantan is a nobel approach to maintain the prescius heritage of the country. Even though the interest wayang kulit among the young generation is slowy being fading out, efforts in terms digitization would help to englighthed the valuabe performing arts icon to the country

References

[1] Paolo Bottoni1, Stefano Faralli, "CoPuppet: Collaborative Interaction in Virtual Puppetry", Springer-Verlag Berlin Heidelberg , 2008

[2] Ghulam-Sarwar Yousof. The Malay Shadow Play. The Asian Centre.1997

[3] Traditional Malay Theatre, Mohamed Nasaruddin Ghouse, Dewan Bahasa Dan Pustaka, 2009

[4] Ghulam-Sarwar Yousof. The Malay Shadow Play as a Continuing, Changing Tradition, Dimensions of Shadow Play in Malay Civilization. UiTM, Malaysia. 2006

[5] Mohd Ghouse Nasaruddin. Wayang Kulit Dalam Era Globalisasi, Wayang Dalam Bayang. USM, Malaysia, 2001

[6] Ghulam-Sarwar Yousof., Enyclopedia in Malaysia "Performing Arts",Volume 8, Archiplego 2004

[7] Amin Sweeny, "Malay Shadow Puppet", Shenval Press, A. Thompson, 1972

[8] Hamzah Awang Amat, 'Malaysian Shadowplay Performance", Wayang Kulit filled with Lights & Shadows , Japan Foundation   Cultural Centre, 1994

[9] Ghulam Sarwar Yousof, Islamic elements in traditonal indonesia & Malaysian theatre, Kajian Malaysia, Vol 28, 2010

[10] Mohamed Najib Ahmad Dawa. Susur Masa. National Art Gallery Malaysia BSLN. 2008

[11] http://www.asiaexplorers.com/malaysia/wayang-kulit.htm

[12] Artikel http://warisan.kita.net.my/artikel/kesenian-wayang-kulit 14th 2009

[13] Doug Roble & Nafees Zafar, Journal IEEE Society, 2009

[14] Sturman, David J. A Brief History of Motion Capture for Computer Character Animation, accessed February 9, 2007

[15] Henson.com Featured Creature: Waldo C. Graphic (archive.org), February 9, 2007

[16] Walters, Graham. *The story of Waldo C. Graphic*. Course Notes: 3D Character Animation by Computer, ACM SIGGRAPH '89, Boston, July 1989, pp. 65-79

[17] Faber, L & Walters H.Animation Unlimited : Innovative short films since 1940 London : Laurence King Publishing 2004, p6

[18] Bordwell, David, and Kristin Thompson. *Film Art: an Introduction*. New York: McGraw-Hill, 2010.