

Digital media animation design based on max script language

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Abstract

MAX SCRIPT can perform a large number of routine operation to solve the repetitive modelling task for us in the process of manufacture. This thesis mainly realizes wolf's character animation and the action of walking, running, jumping, falling down and finger gestures of character animation are designed. Modelling, pasting material, skeletal skin and importing code is investigated. And at the same time, Max Script of 3D MAX can make production of animation more rapid and precise.

Keywords: digital media, animation, Max Script

1 Introduction

3DSMAX was developed by Autodesk company, which is a most widely used three dimension animation software in the world today [1, 2]. It has a wide range of applications, and plays an important role. At present, the development of domestic three dimensional animation falls behind some countries such as Japan and the United States [3, 4]. English and programming base of designers engaged in art design generally is not high, and books about MAX script scripting language is very few. Animation professional level is relatively backward. If some complex animation is made, it is very difficult to complete or not nearly as well. Foreign animation basically uses script language to produce complex scenes, the effect of which is more perfect and more efficient.

3DS MAX is three dimensional animation design software, which is the most common and the most powerful domestic animation. Research and application for modeling technique of 3D animation character based on 3DS MAX was proposed by PENG Guo-hua [5]. Application of multi-media technology in the classroom teaching of 3ds max was proposed by QIN Zhi-xin [6]. Deng Shiyuan [7] created animation images with Chinese culture characteristics through analyzing the Chu art characteristics and taking them as artistic reference of animation modelling. Study on three-dimensional visual modeling for switchboard of ship power station and simulating operation of manual starting was given by Jiang Chuanli[8].Virtual city modeling method in 3DS MAX and multigen creator was proposed by HUANG Yanfang [9].

MAX script is embedded scripting language of 3DS MAX that can only be used under the interface of 3DS MAX. Scripting language is designed for application that uses un-typed methods to achieve high-level programming and has faster development and application than the system program design language. MAX script can perform a large number of housekeeping tasks, solves the repetitive modelling work in the production process and sets complex animation for the object simply [10].

MAX Script is inserted scripting language in 3DS MAX and it provides users with the following features.

1. Describe the 3D Studio MAX all features, such as modelling, animation, material, rendering, etc.

2. The script is integrated into work interface of the user application panel to provide script a standard MAX user interface.

3. Use I/O of the inserted file to build user input/output tools.

This paper mainly uses MAX script to create the Wolf's model and the action of the animation. A text file with ms as its suffix is set up, which can be established by using any text editor or by choosing New Script of MaxScript menu.

macros.run "Objects" "Sphere"

Sphere radius:14.4704 smooth:on segs:32 chop:0 slice:off sliceFrom:0 sliceTo pos:[-148.495,84.9498,0] isSelected:on

set animate on

sliderTime = 100f

move \$ [193.172,-151.558,0].Choose the "Run Script" of "MaxScript" in 3DMax menu to run the above script. (1) observe the effect (2) choose "MaxScript Listener" of "MaxScript" as shown in figure 1, then you can start to examine the script code of current operation. Any operation in 3DS Max can be expressed as a line of script code.

In the next section, model making of wolf is investigated and relevant codes are given. In Section 3, motion synthesis of the designed wolf is given. In section 4, animation effect of wolf is given, including running, walking and falling down of the wolf. Section 5 gives some conclusions.



FIGURE 1 MaxScript Listener

2 Model making

Through the code, animal models are created. Modelling steps are as follows. 1. The foot modelling 2, The trunk modelling 3, and The arm modelling 4, Hand modelling and 5. Facial modelling. The core code of creating an object, moving, rotation and guiding angle is given. Box lengthsegs: 1 widthsegs: 1 heightsegs:1 length:1033.33 width:835.08 height:175.034 (create a rectangle of a specified dimension).

```
mapcoords: on pos:[-8732.92,901.543,0] is Selected:on
select $Box01
```

```
macros.run "Modifier Stack" "Convert_to_Poly" (The
cuboid is converted to editable poly)
```

```
subobjectLevel = 4
modPanel.setCurrentObject $.baseObject
$.EditablePoly.SetSelection #Face #{3}
$.bevelHeight = 16.64
$.bevelOutline = 2
$.EditablePoly.buttonOp #Bevel
```

The code of using Nusmr for detailed division is as follows.

Nusmr points to the polygon segmentation in detail. Polygon can be made more pliable and suitable for animation production, which can be set up by adjusting the segmentation.

```
actionMan.executeAction 0 "40472"
select $Box01
clearSelection()
select $Box01
select #($Box03, $Box02, $Box01)
clearSelection()
select $Box01
subobjectLevel = 2
modPanel.setCurrentObject $.baseObject (core code)
$.surfSubdivide = on
$.isolineDisplay = on
$.subdivSmoothing = on
$.surfSubdivide = off
subobjectLevel = 0
actionMan.executeAction 0 "60010" --Render: Render
scene dialog switch
```



FIGURE 2 Front view



FIGURE 3 Back view



FIGURE 4 Full view with hand



FIGURE 5 Effect after texture script



FIGURE 6 Effect after texture script

Front view of wolf is shown in figure 2, back view of wolf is shown in figure 3, and full view with hand is shown in figure 4. After the model is built, the corresponding material of each model should be given. In the implementation of a virtual animal, fidelity of material largely determines the true animal sense. In order to achieve a more realistic material, surface texture must be used. Effect after texture script is shown in figure 5 and figure 6 respectively.

Part of the material code:

```
$.EditablePoly.SetSelection #Face {}
$.EditablePoly.SetSelection #Face #{144}
$.EditablePoly.SetSelection #Face #{144..145}
$.EditablePoly.SetSelection #Face #{144..146}
$.EditablePoly.SetSelection #Face #{128..148}
$.EditablePoly.setMaterialIndex 2
actionMan.executeAction 0 "50048"
mediMaterials[1].shaderType = 4
mediMaterials[1].adTextureLock = on
mediMaterials[1].diffuseMap = falloff ()
mediMaterials[1][#Mapping][# Diffuse color
_map_0_Falloff].color1 = color 0 27 161 (Diffuse
instruction)
mediMaterials[1][#Mapping][# Diffuse color
_map_0_Falloff].color2 = color 205 219 235
mediMaterials[1].selfillumMap = falloff ()
mediMaterials[1].opacityMap = falloff ()
mediMaterials[1].diffuseRoughnessMap = falloff ()
mediMaterials[1].bumpMapEnable = on
mediMaterials[1].bumpMap = Noise ()
mediMaterials[1][#Mapping][# concave-convex
_map_4_Noise].type = 2
mediMaterials[1][#Mapping][# concave-convex
_map_4_Noise].levels = 2.9(Attenuation instruction)
```

Effect of skeletal skin is given below. Skeletal skin is created based on skin of the skeletal system, which makes the body mesh deformation be consistent with the skeletal system movement, including muscle tension and torsion.

Part of MAX SCRIPT code is as follows. skeletal skin is shown in figure 7.

```

actionMan.executeAction 0 "40003" -- open the file
actionMan.executeAction 0 "40472" -- MAX SCRIPT:
MAX SCRIPT listener
select $Box01
select '$Bip01 R Hand'
select #($Bip01 R Finger0', '$Bip01 R Hand', '$Bip01 R
Forearm', '$Bip01 R Finger1', $Box01)
select #($Bip01 R Hand', $Box01)
clearSelection()
select $Box01
actionMan.executeAction 0 "224"
freeze $
select '$Bip01 R Finger1'
clearSelection()
macros.run "Inverse Kinematics" "Bones"
macros.run "Objects Systems" "Biped"
$Bip03.name = "Bip02 pelvis"
$Bip03.name = "Bip02 Spine"
$Bip03.name = "Bip02 Spine1"
$Bip03.name = "Bip02 Spine2"
$Bip03.name = "Bip02 Spine3"
$Bip03.name = "Bip02 L Thigh"
$Bip03.name = "Bip02 L Calf"
$Bip03.name = "Bip02 L Foot"
$Bip03.name = "Bip02 R Thigh"
$Bip03.name = "Bip02 R Calf"
$Bip03.name = "Bip02 R Foot"
$Bip03.name = "Bip02 L Clavicle"
$Bip03.name = "Bip02 L UpperArm"
$Bip03.name = "Bip02 L Forearm"
$Bip03.name = "Bip02 L Hand"
$Bip03.name = "Bip02 R Clavicle"
$Bip03.name = "Bip02 R UpperArm"
$Bip03.name = "Bip02 R Forearm"
$Bip03.name = "Bip02 R Hand"
$Bip03.name = "Bip02 head"
$Bip03.name = "Bip02 footprint"
$Dummy01.name = "Bip02 head Nub"
$Bip04.name = "Bip03 pelvis"
$Bip04.name = "Bip03 head"
$Bip04.name = "Bip03 footprint"

```

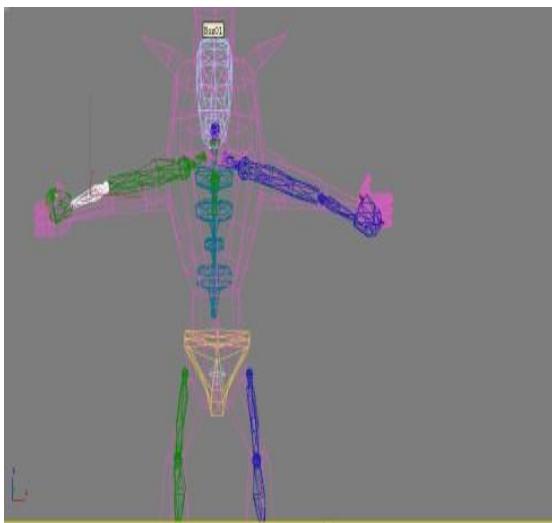


FIGURE 7(a) Effect of skeletal skin

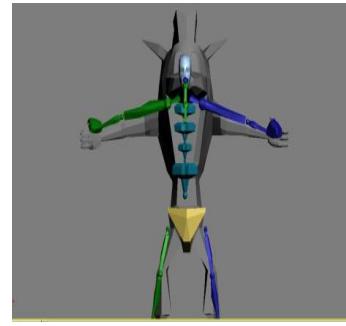


FIGURE 7(b) Effect of skeletal skin

3 Motion synthesis

In the process of movement, a few scripts associated with movement are connected together, making the model be able to complete the series of coherent movement. Implementation effect of motion synthesis is to make several sets of disjointed movement synthesize to the same period of the animation. In the thesis, the script will complete continuous motion animation of a wolf. The script is a complete action script generated by the MAX script in advance. Key code of act of walking is shown in figure 8. Key code of running action is shown in figure 9. In this way, we can use multiple MAX SCRIPT codes to produce the action of walking, running, jumping and falling down. Core codes are as follows.

```

actionMan.executeAction 0 "40003"
actionMan.executeAction 0 "40003"
select $Box01
modPanel.setCurrentObject $.baseObject
$.surfSubdivide = on
subobjectLevel = 1
modPanel.setCurrentObject $.baseObject
subobjectLevel = 0
subobjectLevel = 2
modPanel.setCurrentObject $.modifiers[#Physique]
actionMan.executeAction 0 "40471"
macros.run "MAX SCRIPT" "Launch_VMS"
actionMan.executeAction 0 "40472"
actionMan.executeAction 0 "40003"
select '$Bip01 R Forearm'
actionMan.executeAction 0 "40472"
clearSelection()
actionMan.executeAction 0 "40472"
select '$Bip01 L UpperArm'
actionMan.executeAction 0 "40472"
clearSelection()
actionMan.executeAction 0 "40472"
'$Bip01 L UpperArm'

```

Through the adjustment of the camera script, makes control of camera lens more precise and more regular. The common script language related to camera movement is as follows.

```

script MoveViewInStart()
script MoveViewInStop()
script MoveViewOutStart()
script MoveViewOutStop()
Script CameraZoomIn(x)
Script CameraZoomOut(x)
Code of increasing the animation time range is as follows.
---Assign rotation script controller
Ctrl=obj. rotation. controller=rotation—script()
--Set time range wide in case user expands it later Set

```

Time Range ctrl (interval—100 10000)

```
--put script string rito script controller .ctrl .script=
scriptstr
b=box height:10          --1
at time 5 animate on b.height=50    --2
at time 10 animate on b.height=100   --3
bhc=b.height.controller      --4
bhk=bhc.keys                --5
addnewkey bhc 7              --6
addnewkey bhc 9              --7
for k in bhk do format "%:%\n" k.time k.value --8
selectKeys bhc (interval 7 9)  --9
deleteKeys bhc #selection     --10
bhk                           --11
addnewkey bhc 7              --12
addnewkey bhc 9              --13
selectKeys bhc (interval 7 9)  --14
deleteKeys bhc #selection #slide --15
bhk                           --16
addnewkey bhc 7              --17
addnewkey bhc 9              --18
selectKeys bhc (interval 7 9)  --19
deleteKeys bhc #selection #slide #rightToLeft --20
bhk                           --21
addnewkey bhc 8              --22
i=getKeyIndex bhc 8          --23
selectKey bhc i               --24
moveKey bhc i 10             --25
bhk                           --26
getKeyTime bhc 4             --27
b.width.controller=noise_float() --28
numkeys b.width.controller    --29
```

FIGURE 8 Key code of act of walking

```
$Box:Box04 0 [0.000000,0.000000,0.000000] --1
50           --2
100          --3
Controller:Bezier_Float        --4
#keys(0f, 5f, 10f)            --5
#Bezier Float key(3 0 7f)      --6
#Bezier Float key(4 0 9f)      --7
0f:10.0
5f:50.0
7f:74.08
9f:95.5022
10f:100.0                     --8
OK           --9
OK           --10
OK           --
#keys(0f, 5f, 10f)            --11
#Bezier Float key(3 0 7f)      --12
#Bezier Float key(4 0 9f)      --13
OK           --14
OK           --15
#keys(0f, 5f, 10f)            --16
#Bezier Float key(3 0 7f)      --17
#Bezier Float key(4 0 9f)      --18
OK           --19
OK           --20
#keys(0f, 5f, 10f)            --21
#Bezier Float key(3 0 8f)      --22
3            --23
OK           --24
OK           --25
#keys(0f, 5f, 10f, 18f)       --26
18f          --27
Controller:Noise_Float         --28
-1           --29
OK           --
```

FIGURE 9 Key code of act of running

4 Animation effect



FIGURE 10 Effect of walking



FIGURE 11 Effect of falling down



FIGURE 12 Effect of running

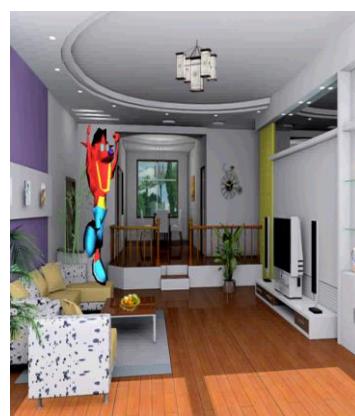


FIGURE 13 Effect of jumping



FIGURE 14 Effect of movement of fingers

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Finally, the designed animation effect is given. Effect of walking is shown in figure 10, effect of falling down is shown in figure 11, effect of running is shown in figure 12, effect of jumping is shown in figure 13 and effect of movement of fingers is shown in figure 14.

5 Conclusions

Firstly, model making of wolf is investigated and relevant codes are given. Then Motion synthesis of the designed wolf is investigated. Animation effect of wolf is shown, including running, walking and falling down of the wolf. It can be seen that production of animation is more rapid and precise.

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