The Expansibility of Three Dimensional Soft Ware Nodes Function

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Abstract: Maya soft ware utilities nodes have might function, some of them are hep math calculation for us, we can use these nodes to complete something that isn’t belong to three dimensional soft ware through combine.

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1. Multiplication with color

Three dimensional soft ware contains a lot of calculate mode, we can see image that sustained by calculate, three dimensional soft ware in nowadays, node is a mainstream, the node is that some diminutive calculate cell, through permutation and combination these diminutive calculate cell to get the result you need. Here these nodes complete the duty that in dependent of three dimensional design to expand function of soft ware.

First explain the node, instance color, creating a checked texture and a gradual changed texture, and then a multiply and divide node, later input the two textures to the multiply and divide node, calculated by it, output the result to a single color, at last get the result in the yellow frame, in Fig.1.

![Fig 1. Two textures multiplied by multiply and divide node](image)

Integrate Fig. 1, instance red, when it multiply by black, red RGB channel number multiply by black RGB channel number, any number multiply by zero you will get zero, so the result is black, moreover it multiply by white, any non-zero number multiply by one you will get original number, the color doesn’t change, so the checked texture and the gradual changed texture multiplied, the color in the black area changed into black, the color in the white area hold the line, finally, we get the result in the yellow frame.

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\begin{align*}
\text{Red} &= 1 \times \text{Red} = 0 = \text{Red} = 0 \\
\text{Green} &= 0 \times \text{Green} = 0 = \text{Green} = 0 \\
\text{Blue} &= 0 \times \text{Blue} = 0 = \text{Blue} = 0
\end{align*}
\]

\[
\begin{align*}
\text{Red} &= 1 \times \text{Red} = 1 = \text{Red} = 1 \\
\text{Green} &= 0 \times \text{Green} = 1 = \text{Green} = 0 \\
\text{Blue} &= 0 \times \text{Blue} = 1 = \text{Blue} = 0
\end{align*}
\]

2 Addition with color

Now get rid of multiply and divide node, introduce plus and minus node, input the two textures to the plus and minus node again, because we use plus to calculate, we will get the result bigger than one, instance red, the red R channel add the white R channel, we get two, but it different from color, because the white color is the brightest, when here is some number excess number one we according to one to calculate, at last we get white. Red channel number add black channel number, because the black channel is zero, output number doesn’t change. In Fig.2, after adding checked texture and gradual changed texture, we get the result that some black area in checked texture displaced by gradual changed texture, the white area hold the line.

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\begin{align*}
\text{Red} &= 1 + \text{Red} = 1 = \text{Red} = 1 \\
\text{Green} &= 0 + \text{Green} = 1 = \text{Green} = 0 \\
\text{Blue} &= 0 + \text{Blue} = 1 = \text{Blue} = 1
\end{align*}
\]

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\begin{align*}
\text{Red} &= 0 + \text{Red} = 0 = \text{Red} = 0 \\
\text{Green} &= 0 + \text{Green} = 1 = \text{Green} = 1 \\
\text{Blue} &= 0 + \text{Blue} = 1 = \text{Blue} = 1
\end{align*}
\]
Through two simple examples, we can see that Maya encapsulate some calculation into nodes, calculating the input number then output the result. In the daily grind, when we want to calculate grade, we need to multiply some number by vary percent separately, then collect the number, here expand Maya software supplied nodes can realize, through combination these calculate nodes, we can realize the aim expediently.

According fact thing to decide how many number to calculate, if we need two or three to multiply, we need create two or three nodes, input the correleative number into the number position, it will multiply portrait corresponding number in Input1 and Input2, in Fig. 3, multiply the number in red frame and the green frame in each attribute editor. After calculating in multiply and divide node, then collecting the number into plus and minus node, after adding, inputting the number into any node, we can get the final result. In Fig.4.

For getting much more use, we want the operation get much more human via Maya connection editor, we create a Locator in soft ware interface, and then append attribute, as InputA, InputB……the new attribute’s number corresponding pre- multiply and divide node’s, after increase input attribute column, and then create a output attribute column, in Fig.5. interlinking new attribute and multiply and divide node’s attribute with link editor, in Fig.6. now input number into the Locator’s new attribute, at multiply and divide node’s corresponding location we will get the same number, in this way, we needn’t to open node edit interface, we need input number into appoint location column to change the number in this node, avoid to move mouse repeat.

Connecting plus and minus node’s output attribute to Locator’s Output column, in Fig.7’s arrowhead way, we need lock irrespective attribute avoid some needless operation.

Red = 1 + Red = 0 = Red = 1
Green = 0 + Green = 0 = Green = 01
Blue = 0 + Blue = 0 = Blue = 0

Fig 2.Two textures added by plus and minus node

3 Node’s application

Fig 3..Multiply numbers by vary percent separately

Fig 4..Collect numbers into plus and minus node

Fig 5..Append attribute for Locator

Fig 6..Set up connection between attributes

Fig 7..Set up connection between attributes
Because the number in the Locator’s Output column is inputted by plus and minus node, the yellow grounding number imported by other channel, which can’t rejigger by hand. Now input numbers into InputA, B, C in turn, we can get final result in Output, it is a shortcut, avoid repeat operation, in Fig.8.

![Input numbers into InputA, B, C, get final result in Output](image)

There are so many nodes in Maya, if we can expand, full use these nodes and combine, it would take advantage for work and daily life. Although some official softwares have the same function, there is lack of or isn’t in the push of official software, under these condition, we use the known software is a good choice, and we can get more understanding with expanding the function of nodes.

**References**
