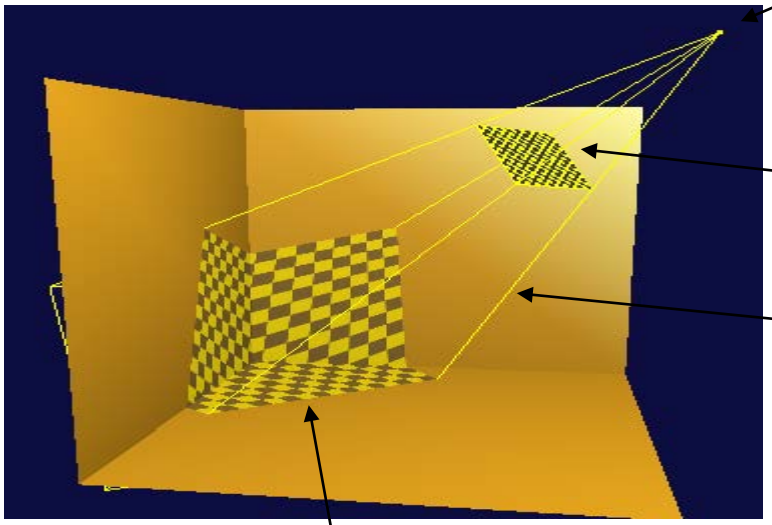
Projective Texture Mapping

Projective Texture Mapping

- A method for texture mapping which allows the texture image to be projected onto the scene as if by a slide projector[Cass Everitt, 1999)



Projective Texture Mapping

- Defines new 3 nodes related to projective texture mapping by using WebGL + X3DOM

X3DTextureProjectorNode

X3DTextureProjectorNode : X3DChildNode

TextureProjectorPerspective: X3DTextureProjectorNode

TextureProjectorParallel : X3DTextureProjectorNode

Projective Texture Mapping

X3DTextureProjectorNode

X3DTextureProjectorNode : X3DChildNode{

SFNode	[in,out]	metadata	NULL	[X3DMetadataObject]
SFString	[in,out]	description	""	
SFVec3f	[in,out]	location	0 0 1 (-∞,∞)	
SFVec3f	[in,out]	direction	0 0 1 (-∞,∞)	
SFFloat	[out]	aspectRatio		
SFFloat	[in,out]	nearDistance	1	
SFFloat	[in,out]	farDistance	10	
SFBool	[in,out]	global	true	
SFBool	[in,out]	on	true	
SFNode	[in,out]	texture	NULL	[X3DTexture2DNode]

}

X3DTextureProjectorNode

```
x3dom.registerNodeType(
        "X3DTextureProjectorNode",
        "X3DChildNode",
        defineClass(x3dom.nodeTypes.X3DChildNode,
            function(ctx){
                x3dom.nodeTypes.X3DVRNode.superClass.call(this, ctx);
                this.addField_SFNode(ctx, 'metadata', null);
                this.addField_SFString(ctx, 'description', '');
                this.addField_SFVec3f(ctx, 'location', '0 0 1');
                this.addField_SFVec3f(ctx, 'direction', '0 0 1');
                this.addField_SFFloat(ctx, 'aspectRatio', '0');
                this.addField_SFFloat(ctx, 'nearDistance', '1');
                this.addField_SFFloat(ctx, 'farDistance', '10');
                this.addField_SFBool(ctx, 'global', true);
                this.addField_SFBool(ctx, 'on', true);
                this.addField_SFNode(ctx, 'texture', null);
            }
        )
);
```

X3DTextureProjectorNode

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>Project Texture Mapping</title>
<link rel='stylesheet' type='text/css' href='https://www.x3dom.org/download/x3dom.css'/>
 <script src="x3dom-master/test/x3dom-full_include.js"></script>
</head>
<body>
      <x3d width='500px' height='400px' id="vux3dom" showLog="true">
      <scene>
              <shape>
                <appearance><Material diffuseColor='0.5 0.5 0.5'></Material> </appearance>
               <box></box>
              </shape>
         <X3DTextureProjectorNode description="PTM1" location="3 3 3" direction="-1 0 -1" nearDistance="1"
     farDistance="10" global="true" on="true">
               <ImageTexture url='apple.jpg' repeatS='false' repeatT='false'/>
        </X3DTextureProjectorNode>
      </scene>
      </x3d>
</body>
</html>
```

Projective Texture Mapping

TextureProjectorPerspective

TextureProjectorPerspective : X3DTextureProjectorNode {

SFNode	[in,out]	metadata	NULL	[X3DMetadataObject]
SFString	[in,out]	description	""	
SFVec3f	[in,out]	location	0 0 1	
SFvec3f	[in,out]	direction	0 0 1	
SFFloat	[in,out]	fieldOfView	π/4 (0,π)	
SFFloat	[out]	aspectRatio		
SFVec3f	[in,out]	upVector	0 0 1	
SFFloat	[in,out]	nearDistance	1	
SFFloat	[in,out]	farDistance	10	
SFBool	[in,out]	global	true	
SFBool	[in,out]	on	true	
SFNode	[in,out]	texture NULL	[X3DTexture2DNode]	

}

TextureProjectorPerspective

```
x3dom.registerNodeType(
        "TextureProjectorPerspective",
        "X3DTextureProjectorNode",
        defineClass(x3dom.nodeTypes.X3DTextureProjectorNode,
            function(ctx){
                x3dom.nodeTypes.TextureProjectorPerspective.superClass.call(this, ctx);
                this.addField_SFNode(ctx, 'metadata', null);
                this.addField_SFString(ctx, 'description', '');
                this.addField_SFVec3f(ctx, 'location', '0 0 1');
                this.addField_SFVec3f(ctx, 'direction', '0 0 1');
                this.addField_SFFloat(ctx, 'fieldofview', 3.14/4);
                this.addField_SFFloat(ctx, 'aspectRatio');
                this.addField_SFVec3f(ctx, 'upVector', '0 0 1');
                this.addField_SFFloat(ctx, 'nearDistance', 1);
                this.addField_SFFloat(ctx, 'farDistance', 10);
                this.addField_SFBool(ctx, 'global', true);
                this.addField_SFBool(ctx, 'on', true);
                this.addField_SFNode(ctx, 'texture', null);

            }
        )
);
```

TextureProjectorPerspective

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>Project Texture Mapping</title>
<link rel='stylesheet' type='text/css' href='https://www.x3dom.org/download/x3dom.css'/>
 <script src="x3dom-master/test/x3dom-full_include.js"></script>
</head>
<body>
      <x3d width='500px' height='400px' id="vux3dom" showLog="true">
      <scene>
              <shape>
                <appearance><Material diffuseColor='0.5 0.5 0.5'> </Material></appearance>
               <cylinder radius="1" height="1.5"></cylinder>
              </shape>
        <TextureProjectorPerspective description="PTM2" location="3 3 3" direction="-1 0 -1" nearDistance="1"
    farDistance="10" global="true" on="true" fieldofview="0.26" upVector="0 1 0">
              <ImageTexture url='apple.jpg' repeatS='false' repeatT='false'/>
        </TextureProjectorPerspective>
      </scene>
      </x3d>
</body>
</html>
```

Projective Texture Mapping

TextureProjectorParallel

TextureProjectorParallel : X3DTextureProjectorNode{

SFNode	[in,out]	metadata	NULL	[X3DMetadataObject]
SFString	[in,out]	description	""	
SFVec3f	[in,out]	location	0 0 1	
SFVec3f	[in,out]	direction	0 0 1	
SFFloat	[out]	aspectRatio		
MFFloat	[in,out]	fieldOfView	-1 -1 1 1 (-∞,∞)	
SFFloat	[in,out]	nearDistance	1	
SFFloat	[in,out]	farDistance	10	
SFBool	[in,out]	global	true	
SFBool	[in,out]	on	true	
SFNode	[in,out]	texture	NULL	[X3DTexture2DNode]

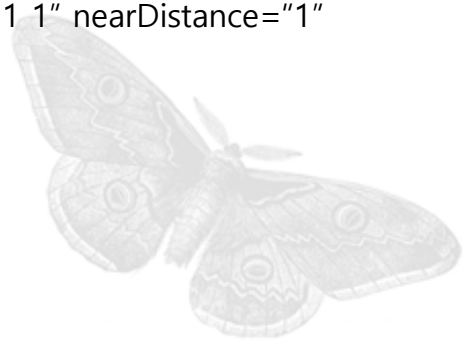
}

TextureProjectorParallel

```
x3dom.registerNodeType(
        "TextureProjectorParallel",
        "X3DTextureProjectorNode",
        defineClass(x3dom.nodeTypes.X3DTextureProjectorNode,
            function(ctx){
                x3dom.nodeTypes.TextureProjectorParallel.superClass.call(this, ctx);
                this.addField_SFNode(ctx, 'metadata', null);
                this.addField_SFString(ctx, 'description', '');
                this.addField_SFVec3f(ctx, 'location', '0 0 1');
                this.addField_SFVec3f(ctx, 'direction', '0 0 1');
                this.addField_SFFloat(ctx, 'fieldofview');
                this.addField_SFFloat(ctx, 'aspectRatio');
                this.addField_SFFloat(ctx, 'nearDistance', 1);
                this.addField_SFFloat(ctx, 'farDistance', 10);
                this.addField_SFBool(ctx, 'global', true);
                this.addField_SFBool(ctx, 'on', true);
                this.addField_SFNode(ctx, 'texture', null);
            }
        )
);
```

TextureProjectorParallel

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>Project Texture Mapping</title>
<link rel='stylesheet' type='text/css' href='https://www.x3dom.org/download/x3dom.css'/>
 <script src="x3dom-master/test/x3dom-full_include.js"></script>
</head>
<body>
      <x3d width='500px' height='400px' id="vux3dom" showLog="true">
      <scene>
              <shape>
                <appearance><Material diffuseColor='0.5 0.5 0.5'></Material> </appearance>
               <IndexedFaceSet solid='false' coordIndex="3 2 1 0 -1, 4 5 2 3-1, 5 6 1 2 -1">
                   <Coordinate point="1 0 1, -1 0 1, -1 0 -1, 1 0 -1, 1 1 -1, -1 1 -1, -1 1 1 "></Coordinate>
               </IndexedFaceSet>
              </shape>
        <TextureProjectorParallel description="PTM3" location="3 5 3" direction="0 1 1" nearDistance="1"
      farDistance="10" global="true" on="true" fieldofview="0.26">
              <ImageTexture url='apple.jpg' repeatS='false' repeatT='false'/>
        </TextureProjectorParallel >
      </scene>
      </x3d>
</body>
</html>
```



Thank you.