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Introduction to 3D Modelling

VERSION 8.X

By Arran Rothwell-Eyre December 2014

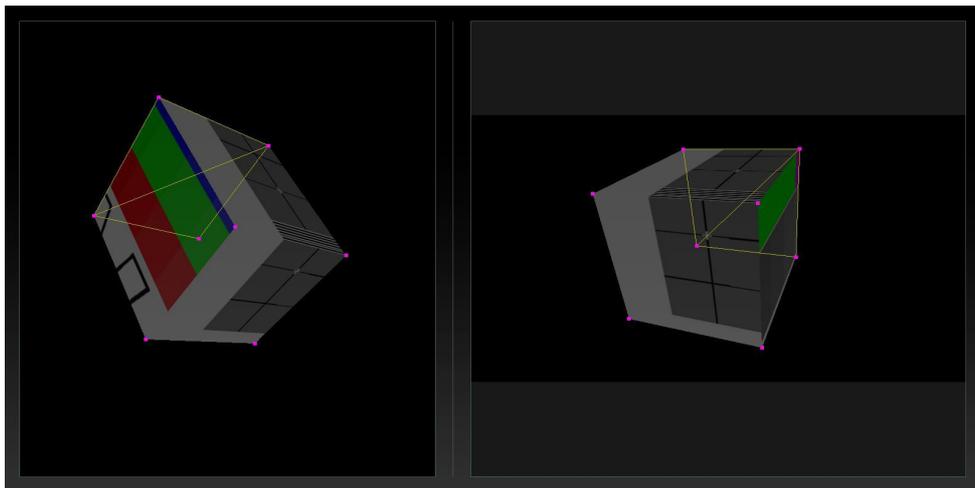
with Additions by Dave Green & Ciaran Abrams

An Introduction To 3D modelling

Many users are not familiar with the concepts involved with 3d modelling and in turn are therefore not aware of the benefits that using them can bring to your workflow.

A 3d model does not contain information about the shape of the model or faces themselves – it defines the positions of the vertex points which form the corners of the objects and places a skin between these points. The model file also contains the UV mapping information. UV mapping is the process of applying a texture to the faces of your object, which in turn generates coordinate data that tells the software which pixel needs of the graphics to be on which face by using a relative scale of 0 to 1 for the coordinates.

A relative scale is used instead of absolute pixel values so that flexibility in terms of altering resolutions may be maintained instead of needing to remake the model for each different size of texture. U and V are used to describe the horizontal and vertical position within the coordinate range – you might expect X and Y to be used instead of U and V, but as they are traditionally used in relation to the physical position of the object U and V are used to avoid any confusion.



In Ai terms, there are two major benefits to using 3d models:

vertex editing : as only the vertex point locations are stored within the model, the faces are calculated in real time which means that the points can be moved to adjust the placement of corners and edges and the software will always make sure the faces are complete whether untouched or altered.

UV Mapping : as the texture uses a relative coordinate system instead of absolute pixel values, any modification of the model structure itself will not result in the loss of image integrity or placement of pixels - the correct part of the image will stay on the correct face at all times.

These two key properties of 3d models allow Ai to make use of realtime adjustment in the model without destroying the hard work of the content creators and can even allow for processes like morphing between models to be used – particularly useful when working on projects which require moving stage elements to change shape or position during a show.

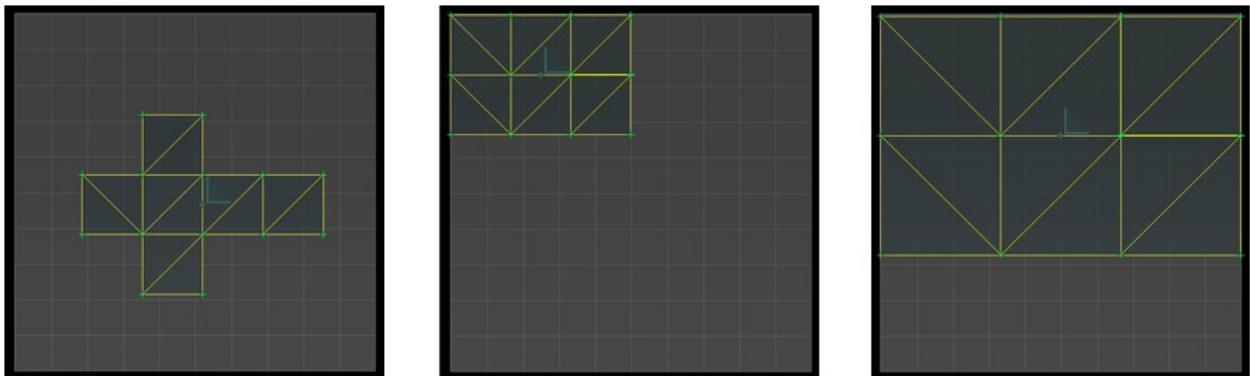
Once a model has been created and UV mapped, it is generally possible to export what is known as a UV template – quite simply, this is a map of the screen shape laid flat across our texture area which gives an outline of all faces in use and can be passed onto content creators to then use this as a guide to where to place the graphics they are working on which can allow them to carry out complex image creation techniques such as perspective illusion and create impressive shows.

When creating your 3d screen model its worth considering a couple of things which can make your workflow easier and your project function more smoothly.

On the model itself, its generally a good idea to delete any faces which will not be used. For instance, it is only possible for a person to see three sides of a cube and depending on your stage placement, this could be true for a whole audience – removing these unwanted faces will simplify your model, making it less complicated to use in the mapping process.

UV unwrapping can often give results which are spread across your texture leaving a lot of unused areas. This is less than ideal in terms of both resolution – lots of the pixels are unused – and texture size – running a larger canvas size than necessary.

Whether you want to use all the pixels or reduce your canvas size, it makes sense to place the faces within your UV map as close to each other as possible whilst respecting any faces or edges which need to stay connected for animation purposes. The following image shows three examples of the uv layout for a cube – the first is just unwrapped and unoptimised, the second uses the same size faces but can be drawn in texture a quarter of the size and the third uses the same overall texture size, but maximising the faces to increase the pixel resolution available to each.



To make things easier for everyone involved in the project, it makes sense to give out a template of how your texture is applied to your screen model – it can be a valuable tool both for those making content for the screens and whoever does the final mapping. Whilst everyone has a personal preference to creating a template, its generally common practice to try to use visibly different colours on adjacent faces and to add some kind of naming convention to make it easier to refer to specific components. In the following example we can see an example of the Eric Prydz Cubic show with the template applied to the 3d model and also laid out flat.