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Since the stencil and stitching algorithms are almost complete, now I moved on to the other

Banking Tool

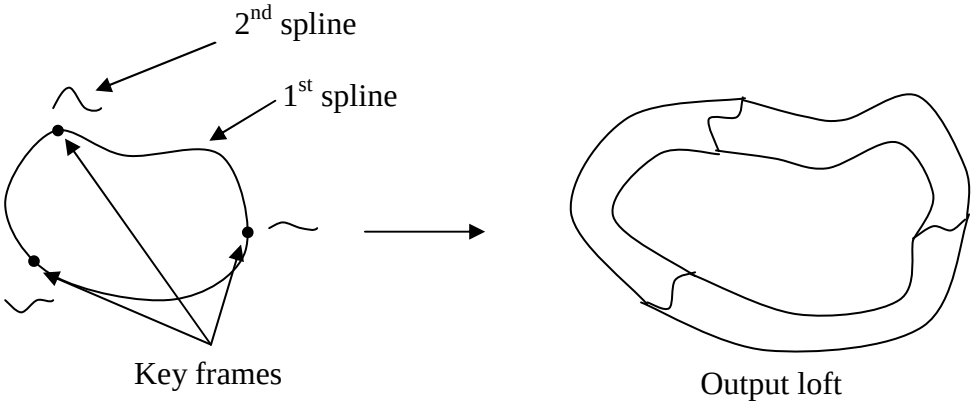
Input:

1. A spline (1st spline) with key frame positions which can be selected by the user.
2. A 2nd spline which acts as the banking shape to be applied at each key frame position.
3. The width of the 2nd spline and the angle by which it must be bent/rotated at each key frame of the 1st spline (to provide for undulations in the output loft).

Output:

1. A 3D loft which follows the 1st spline and interpolates between the different shapes of the 2nd spline between the key frames.

Example:



We may have to specify key frames in the 2nd spline too in order to perform accurate interpolation. Moreover, the number of such key frames must be fixed for all key frames of the 1st spline. Texture mapping for the final loft can be done from max itself, and so the tool doesn't need to do anything about it.

Course of action:

I'm planning to do something similar to the 'Loft' compound object creation plugin in 3dsMax. It will be a modifier plugin where we have some parameters for angle and width. The 1st spline will be converted into a loft when the 2nd spline is picked from the viewport. In the beginning, we can have the control points of the 1st spline as the key frames, but in future we can allow the user to pick the key frames from the UI. However, the main issue is the absence of source code for the 'Loft' plugin.

Track Combining Tool

Input:

Two or more tracks, which can be represented as lofts, each with their own texture.

Output:

A combined track, whose geometry is calculated using the stitching algorithm (or an improvisation, to reduce the number of triangles in the overlapped area). The new texture is a combination of blended textures of the two tracks in and around the overlapped region. The non-overlapped regions retain their original textures.

Work done:

The geometry part is complete, with the two tracks combined into one using the "stitching" algorithm, as shown below:

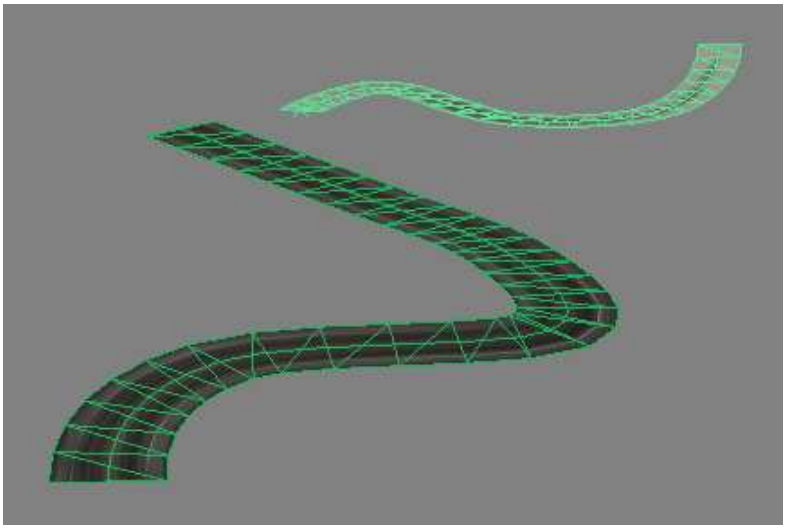


Fig.1. Two input tracks

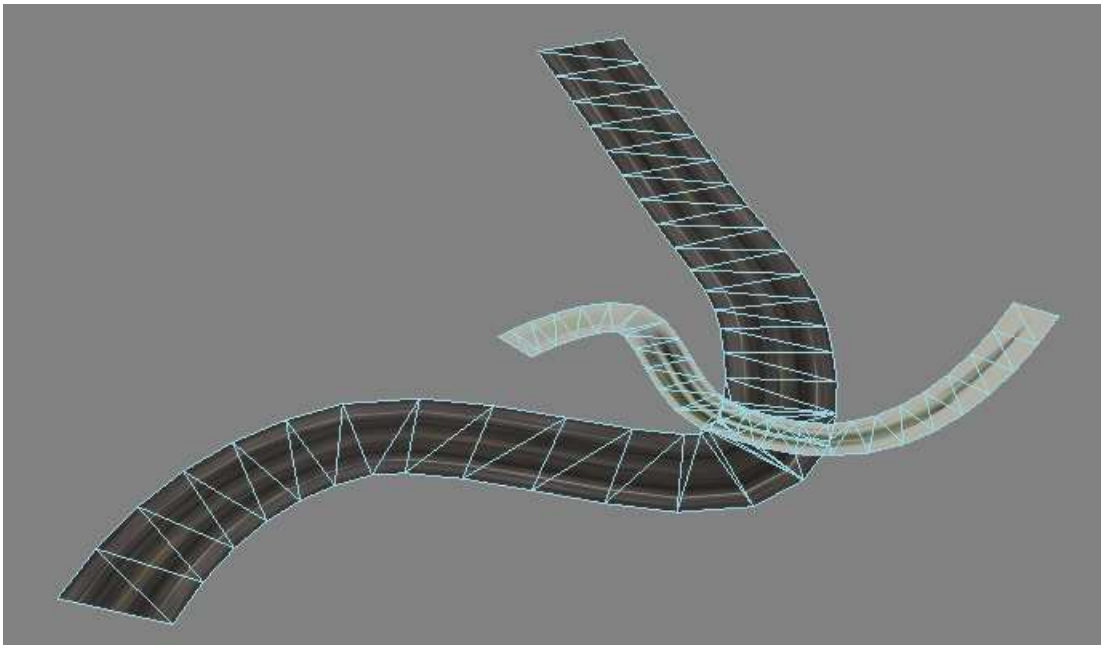


Fig.2. Output stitched track

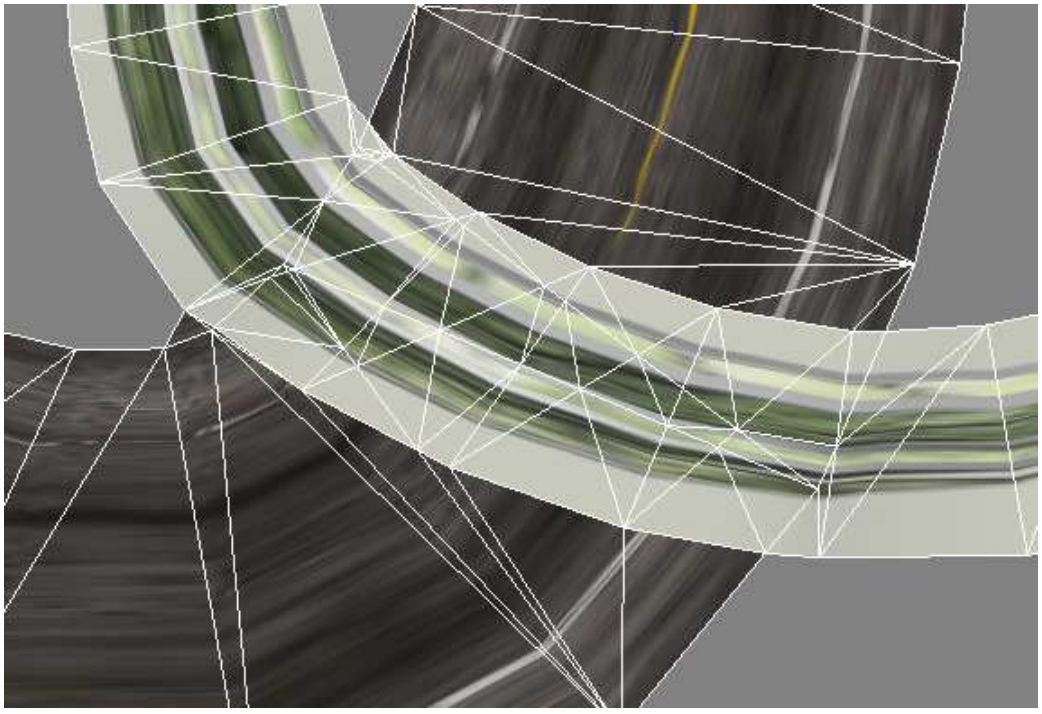


Fig.3. Overlapping region

For the purpose of track combining, the MaxStencil plugin was modified to include an “Irregular Stitching” option where we pick the second loft as the source object and don’t cut it if it extends beyond the destination object.

The texture blending part seems more complicated, and for that, we may have to change the geometry over the stitched region to introduce some kind of regular grid, and a variety of combinations of the two textures over that region.

The above idea can be explained for the simple case where 2 tracks intersect at right angles, as shown below:

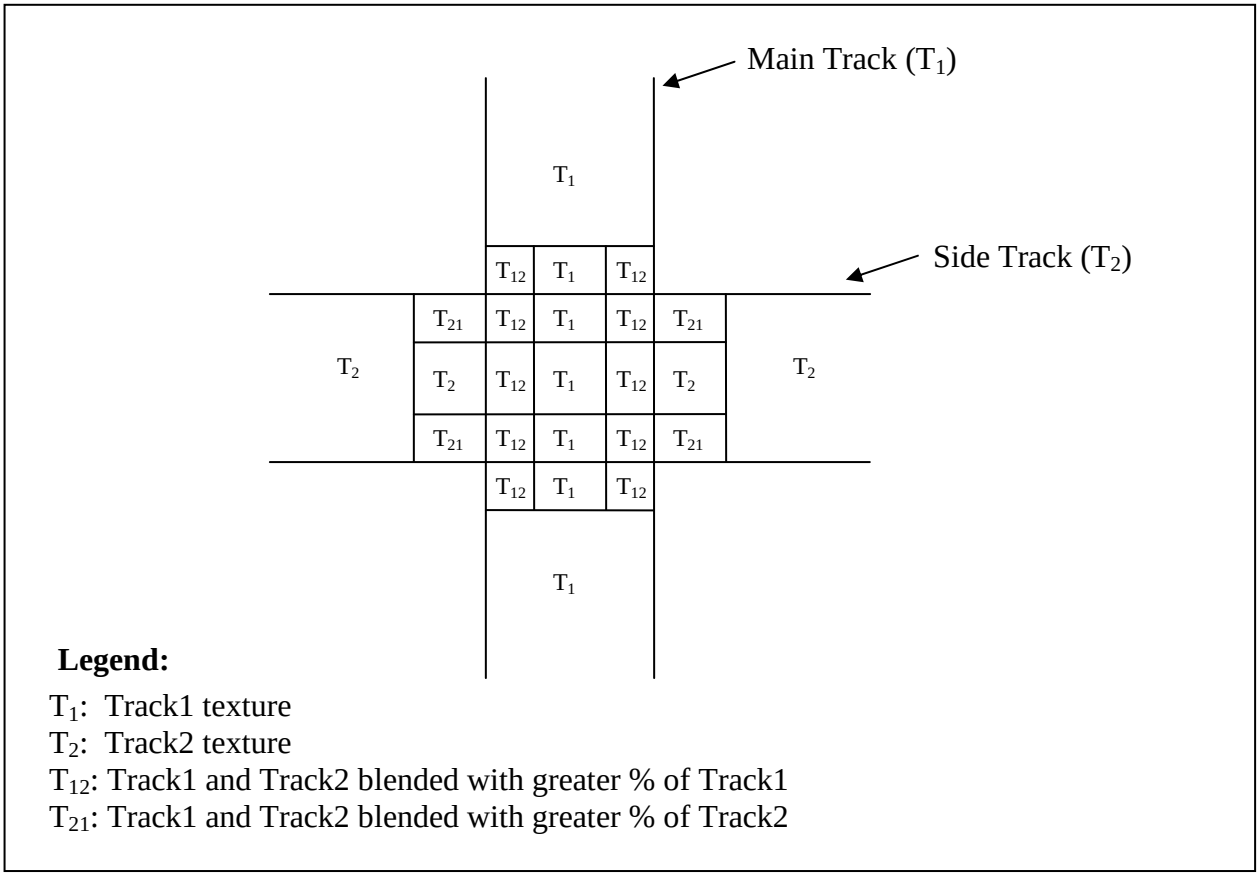


Fig.4. One possible texture blending idea

In order to do the above, the steps to be followed are:

1. Modify the triangulation in and around the stitched area to make it look like a patched grid (see ***Fig.4***).
2. Calculate the UV co-ordinates for the new patch based on T_1 and T_2.
3. Create two new textures (T_{12} and T_{21}) based on % of blending
4. Use the UV co-ordinates, calculated in step 2, over the new patch for the blended textures.