Search

Stanford Polygon .PLY File Description

PLY is a computer file format known as the *Polygon File Format* or the *Stanford Triangle Format*. The format was designed to store three dimensional data from 3D scanners. It supports a relatively simple description of a single object as a list of nominally flat polygons. A variety of properties can be stored including: color and transparency, surface normals, texture coordinates and data confidence values. The format permits one to have different properties for the front and back of a polygon.

File Format

Files are organized as a header, that specifies the elements of a mesh and their types, followed by the list of elements itself, usually vertices and faces eventually other entities such as edges, samples of range maps, and triangle strips can be encountered.

The header of both ASCII and binary files is ASCII text. Only the numerical data that follows the header is different between the two versions. The header always starts with the line 'ply'. The header helps to identify this as a genuine 'PLY' file.

```
ply
```

The second line indicates which variation of the PLY format this is. It should be one of:

```
format ascii 1.0
format binary_little_endian 1.0
format binary_big_endian 1.0
```

Future versions of the standard will change the revision number at the end - but 1.0 is the only version currently in use.

Comments may be placed in the header by using the word 'comment' at the start of the line. Everything from there until the end of the line should then be ignored. eg:

```
comment This is a comment!
```

The 'element' keyword introduces a description of how some particular data element is stored and how many of them there are. Hence, in a file where there are 12 vertices, each represented as a floating point (X,Y,Z) triple, one would expect to see:

```
element vertex 12
property float x
property float y
property float z
```

Other 'property' lines might indicate that colours or other data items are stored at each vertex and indicate the data type of that information. Regarding the data type there are two variants, depending on the source of the ply file, the type can be specified with one of

char uchar short ushort int uint float double, or one of *int8 uint8 int16 uint16 int32 uint32 float32 float64*. For an object with ten polygonal faces, one might see:

```
element face 10
property list uchar int vertex_index
```

The word 'list' indicates that the data are a list of values - the first of which is the number of entries in the list (represented as a 'uchar' in this case) and each list entry is (in this case) represented as an 'int'.

At the end of the header, there must always be the line:

```
end_header
```

In the ASCII version of the format, the vertices and faces are each described one to a line with the numbers separated by white space. In the binary version, the data are simply packed closely together at the 'endianness' specified in the header and with the data types given in the 'property' records. For the common "property list..." representation for polygons, the first number for that element is the number of vertices that the polygon has and the remaining numbers are the indices of those vertices in the preceding vertex list.

Import

Stanford Polygon (.PLY) files can be imported into **Surfer**. The geometry (shape) information from PLY models is the only item imported. Any surface/material properties of the PLY model are ignored. No import options dialog is displayed.

Import Automation Options

No import options are available.

Reference

This implementation is based on the file format described in Greg Turk's 1998 "The PLY Polygon File Format" document, which can be found on the Internet.

See Also

[File Format Chart](#)