ABOUT THE COVER

Program translates statistics into 3-D color map of Europe

Wm. Randolph Franklin, Rensselaer Polytechnic Institute

In keeping with the theme of this issue, the cover shows a three-dimensional map of Europe viewed from the south. Each country is raised into a prism whose height is proportional to the number of IEEE Computer Society members in that country. With the varying colors, one can quickly obtain an impression of how membership varies geographically and can easily see which countries have the most members.

The cover picture and the image below were produced by the program Colorview. It is a 2000-line Ratfor program running on a Prime 750 with 1M bytes of memory. The display device is a DeAnza 512×512×28 image processor, and the picture was shot as a 35-mm slide on a Dunn camera. Colorview uses a depth-buffer algorithm: a 512×512×3 byte intensity buffer stores the current red, green, and blue intensity of each pixel, and a 512×512×2 byte depth buffer stores the distance from the viewer of the face visible in that pixel. When a new face is plotted, it overwrites the intensity in each pixel where it is closer than the value stored for that pixel in the depth buffer. Colorview requires two minutes of CPU time and three minutes of disk time on an unloaded system to produce each plot.

The hue at any point on the sides and tops of the prisms is a function of the distance of that point from the base plane. It is not linear, since it is more pleasing to use a cubic spline interpolation between two primary colors: red and green for the bottom half, and green and blue for the top half. At each point in the interpolation, the color component with the greater intensity is kept at full intensity; thus the sum of the intensities is not constant. This too produces a better picture.

The picture above is a graphic depiction of the Census Bureau's 1970 statistics on Americans whose parent(s) were not born in the US. Each color band represents a range of percentages from the state's total population. This picture and the cover picture were produced at the RPI Image Processing Lab (copyrights by Wm. Randolph Franklin, 1982).

Wm. Randolph Franklin is an assistant professor at Rensselaer Polytechnic Institute in New York. He is also a principal with Hudson Data Systems, a firm that produces business graphics.