Abstract

There are many examples in biomedical research of recording time signals with multi-sensor arrays whose elements are arranged in irregular, three-dimensional grids [1, 2, 3, 4]. If the nodes in such arrays can be connected into "surfaces", it is possible to employ linear interpolation techniques to display scalar data values on the grid, provided the node locations, and their connectivities, are known. The program *map3d* was developed to provide flexible interaction with such grids, and the data values associated with them. Briefly, *map3d* provides interactive display of the nodes of the sensor array, and the connectivity mesh (described as line segments, triangles, or tetrahedra), with capabilities for manual editing of the connectivities and subsequent storage of the results. If scalar data are available associated wth the nodes of the mesh, *map3d* will display this data as either colour-coded contour lines or Gouraud or flat shaded surface elements. If there are series of such scalar data (typically in time), the time signals for selected channels can be displayed and used to select which dataset to display. The program has extensive scaling options for data value to colour mapping, different colour maps, and a variety of methods of determining the scope of data scaling. Above all else, the program allows intensive interrogation of both the geometrical mesh and the data values mapped to it.

This technical report describes the design concepts and user interface of the *map3d* program. The code was written in ANSI complient C and makes extensive use of the Graphics Library (GL) routines from Silicon Graphics. The code has been ported, in a somewhat limited edition, to the IBM RS-6000 running AIX, as well as to the Sun Sparc architecture using both Dupont Pixel's and Portable Graphics' (NPGL) GL emulation software. It does not run under OpenGL at this time. The code is not in the public domain, however, the author (macleod@cvrti.utah.edu) will consider reasonable requests for information.