Dirk-Alexander Sennst:

Annotation of processed image data in surgical planning and its visualization with a Java3D based browser

Purpose

We found a need for a structured descriptive language that will enable us to bring together multiple sets of volume data, 3D models, anatomical labels or color and transparency information in order to describe the results of surgical planning work that combines multiple sets of data by processing it with high end hardware. Furthermore a cross platform easy to use software capable of reading and interpreting that language had to be designed.

Material and Method

Developing an XML-based medical reality modeling language (MRML) format was done by defining an appropriate document type definition (DTD). A standardized format was used in order to easily connect an interpreting software to the data without the necessity of writing a specific parser. Our viewing tool is built on the base of object oriented programming in Java and Java3D using the latest software technology. Three dimensional models and volume data are being stored either locally or on a remote disk.

The anatomical structures are generated and shown in a tree structure at the same time being accessible by picking them in 3D space. They can be selected in predefined groups, which let the user apply a new level of transparency on the whole group at once.

Result

By using the recently released Java API for XML Parsing we are able to make use of staying with standardized formats for the MRML-files where we implemented a data structure storing international labels of anatomical structures. The XML encoding enables us to built an anatomical hierarchy displayed as a tree and loading the three dimensional models which are kept in the Visualization Tool Kit (VTK) file format into a virtual space. Putting a lot of effort in the design of the graphical user interface.

Conclusion

It was possible to develop a software that is capable of interpreting XML-based MRML files making a step forward in bringing together multiple sets of data and additional information. Our mostly platform independent viewing tool is merging it into a three dimensional scene bringing all this information to the low cost computer of the clinical physician at a high level of presentational quality.