

VOXEL-MAN 3D-Navigator

Inner organs. Regional, systemic and radiological anatomy. DVD-ROM for Windows 95/98/NT/2000/ME/XP in English and German. New York: Springer electronic media; 2003. ISBN 3-540-40069-9; price: US \$99.00

As a teacher of human anatomy, I am always eager to review anatomical textbooks and atlases because they give valuable insight into the ever-changing world of teaching and studying anatomy. The approaches to teaching anatomy are many and varied, ranging from problem-based courses, cadaver dissections, anatomical models, theoretical approaches, and coloring atlases to multimedia. With VOXEL-MAN 3D-Navigator, teachers and students have a wonderful opportunity to use a novel tool of exploration of three-dimensional anatomical models. This new kind of atlas, for anatomy as well as radiology, promises to be different and novel compared with regular text-books, atlases, or even multimedia programs – by providing normal three-dimensional anatomy, it gives a context to its radiological presentation, and it does so fully interactively.

The DVD ROM comes in a neat cardboard package that contains a guide booklet in both English and German, as well as a pair of red/green glasses for stereoscopic viewing.

The material presented (the “scenes”) was generated from frozen cadaver cross-sectional images of the Visible Human Project (National Library of Medicine, Bethesda, MD, USA). Due to the limited storage on a DVD ROM, the original resolution of the photographic and computerized tomography (CT) images of the cadaver had to be reduced or down-scaled to 650 anatomical 3D objects of the organs of the chest, the abdomen, and the pelvis, including larger vascular and nervous structures of the corresponding spaces. A second CT data set (of a slightly higher quality, taken at 3 mm slice distances) was made from a fresh cadaver. This data set is used only for CT correlation, as it is not congruent with the photographic data set of the Visible Human.

The VOXEL-MAN system, used for 3D segmentation, visualization, and interactive scene creation, was developed at the Institute of Mathematics and Computer Science in Medicine at the University Hospital Eppendorf, Hamburg, Germany.

Once inserted into the DVD drive (minimum requirements: CPU Pentium 400 MHz, 96 MB RAM, DVD drive, screen resolution 1024×768 pixels, 16 M colors) the VOXEL-MAN 3D-Navigator autostarts (without installing on the hard drive – hence no HDD space requirements), opening several windows (most notably the Naviga-

tor window, ie, the Main Menu, and the Table of Contents window).

Although the interface (graphical user interface) is intuitive and simple to use, the booklet comes in quite handy, as well as the instruction window for selected scenes.

The Main Menu has a Menu and Control Bar, which allow for an easy and problem-free navigation through the scenes and use of the Navigator.

The Table of Contents window is organized into two distinct segments – anatomy and radiology. The anatomy segment is further divided into: 3-D dissection, selected systems, and cross-sections part, all of which are further divided into interactive scenes, 8 of which are stereoscopic (red/green format). The radiology segment is further divided into x-ray and tomography scenes. Every scene has a detailed list of objects that can be viewed. For most of the “scenes,” there is a choice of several views – all regional anatomy relation to peritoneum and systemic anatomy – depending on the context of the scene. Every scene can be viewed at different sizes – 50, 75, 100, 150, and 200%, making it easy to enlarge specific segments for a more detailed view. The objects can be named using the nomenclature for German, English, or Latin. And double-clicking the list of objects while using one of the modes – (un)paint, (un)mark, annotate, and seek – leads you to the specific point of interest, with the best practical point of view, or marks it/paints it to make it easily visible.

An Instruction window (with a collapsible content tree and search capabilities) helps you navigate through a specific scene, instructing you how to interact with the model, ie, how to precisely guide the cursor, how to navigate the scene, or how to learn about objects from the list of objects.

A handy “Home” button allows for an easy return to the Table of Contents for new investigations.

Easy navigation and exploration with the mouse is intuitive and also instructed in the Instruction window. It allows learning about structures – their morphology and their relationships – by clicking and holding the left mouse button. Moving the mouse from left to right allows moving the model left to right, while moving it upwards or downwards adds or removes the layers from the model.

Brain and skull. Regional, systemic and radiological anatomy. 2CD-ROMs for Windows 95/98/NT/2000/ME/ XP in English and German. New York: Springer electronic media; 2001. ISBN 3-540-14910-4; price: US \$89.95

Similar in concept with the “VOXEL-MAN 3D-Navigator: Inner organs,” “VOXEL-MAN 3D-Navigator: Brain and skull” is as much a stand alone product as its namesake.

The most notable difference is the storage on two CD-ROMs, and the need to install the software (minimum requirements: CPU Pentium 400 MHz, 64-98 MB RAM, 8× CD-ROM drive, 120 MB HDD space, screen resolution 1024×768 pixels, 16 M colors), which then becomes accessible through a desktop shortcut.

Also, the material for this product (for scene generation) was generated from several sources as follows: 1) the Visible Human Project (National Library of Medicine, Bethesda, MD, USA); 2) the T1-weighted magnetic resonance imaging (MRI) data were generated from a patient with a tumor in the right temporal lobe of the brain; 3) the computerized tomography data were generated from scanning a cadaver; and 4) the scenes with vascular structures of the head were derived from a model developed by the late Markus Urban based on MRI scans of his own head (the product is devoted to him, as he died in a traffic accident in 2000).

Other notable differences are as follows: the nomenclature is available also in French (though not in object descriptions or the vascular system) and Japanese (only on systems with Japanese fonts); the Views (on the control bar) depict morphology, function, and blood supply; and for some scenes one can select mono or stereo vision (there are a total of 36 interactive scenes, half of which are in stereoscopic mode).

Finally, you should heed the advice given by the creators of the Navigator and copy the CDs to the hard disk (space requirement 1.4 GB), which increases the performance and the functionality of the program.

User support for the Navigators is accessible through the helpdesk (Troubleshooting) or the VOXEL-MAN web page with all the updates and bug fixes.

After “playing” with the Navigators for several weeks and everyday finding new things to be impressed with (and finding a few errors in the Latin nomenclature in the object lists), I can safely say that studying the intricacies of the human body, the relations of structures or their continuity from one region to the other, has never been easier, more interactive, more fun, or more impressive.

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