

Catalog of the links with animations, 2D, 3D and endoscopic images of the individual systems and organs in the virtual anatomy atlas of the human body

Category: 6. Web, web-based applications, internet information space or 7. Users' experiences with distance education

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Expanded abstract

Introduction

As the saying goes «A picture is worth thousand words», and if the picture is animated, in motion, or followed by sound effects, than it is worth even more. A goal of this study is to help the users (primarily the students of biology, medicine and anatomy) to get an insight into the organs and systems of the human body, as well as the principals of their functioning by using two- and three-dimensional images, animations, elements of virtual reality, and images of probes inserted into individual human organs and systems. Individual images are showing differences between the normal (healthy) condition and the abnormal (unhealthy) condition.

Usage of virtual anatomy atlas, in comparison to a classic «paper-made» atlas has numerous advantages. Organs and systems can be viewed from different perspectives, they can also be magnified and minimized. Typically, the systems are shown in one layer that can be highlighted (by different colors, or by disproportional magnification), while the other layers can be hidden or made transparent.

Since there are already many similar topics on the web, this study has collected large number of links to those web sites, the content is systemized in order to enable the users to gain the access to the various topics, methodologies, user tools and users, all in one place.

Why not use only one web site containing a complete virtual atlas?

Institutions or individuals that are producing such topics, are putting on their web sites what they consider might be important or simply emphasize parts of their primary interest (for example, some will elaborate on the anatomy of the brain to its smallest details, while the rest of the human body will be presented parenthetically). Usually, they are using only one or two imaging tools.

Web site designed for this study will offer large number of sources that are using various tools. Images are limited to 2D- and 3D-animations of organs, systems and whole human body and to the video or similar recordings produced during diagnostic or surgical treatments of patients.

Structure of the web site

Structure of the web site strives to be logical and intuitive. At the home-page, virtual atlas is divided on 11 parts – menus - for display of the following systems and organs:

1. The complete body, systems and individual organs – containing links to the web sites from numerous sources which are showing 2D- or 3D-animation of a whole body, organs and systems;
2. Motoric system – DivX movie showing functioning of the arm;
3. Bones and joints – images of foot, hand, arm and spine. It is particularly interesting to view animation of various treatments used to «repair» spine from various illnesses or damages/traumas;
4. Central nervous system – primarily showing the brain, brain atlas, parts of the brain and (virtual) endoscopy of the brain;
5. Respiratory system – review of the respiratory system, animation of lungs, larynx and trachea;

6. Heart and cardiovascular system – animation of the heart, interior images of the heart, various images of the aorta. Events during fibrillations of the heart;
7. Senses of hearing and sight. Animated images of the eye reaction to the light;
8. Immune system – this group includes understanding how immune system works, cells and organs of the immune system, animated images of antibodies;
9. DNA – includes images of the interactive animated anatomy of DNA, transcription of DNA into RNA, RNA translation and animation of DNA replication;
10. Endoscopic images - interesting images of healthy and diseased organs or systems made during endoscopic examinations. There are (virtual) images of the brain, lungs, trachea, larynx, ear, heart and other organs. Images are shown in MPEG or GIF formats;
11. Games and quiz – visitors can interactively, in different ways, re-examine their knowledge of anatomy of internal organs, bone structure, muscles, changes of a human body in puberty, nervous system or other individual systems of the human body.

Overview of existing web sites and comparison with the web sites created in this study

There is a large number of similar web sites with listed links to the anatomy of human body. Some of the existing web sites are showing only individual organs or systems (for example brain or heart), and this analysis does not include them. This analysis also does not include commercial web sites that are not accessible to common users, and those that require an authorization. We will mention only several major web sites that have links to the complete human body atlas.

Web site <http://edtech.kennesaw.edu/web/humanbo.html> - the page with approximately eighty links with description of the anatomy of human body and functioning of individual systems and organs, mainly presented by text or picture, while the number of animated web sites is minimal.

Web site <http://www.cln.org/index.html> provides links to some 5000 pages of educational material, assisting elementary and high school teachers (K12). Out of such a large number of links, there is a relatively small number of medicine-related links, and those that are available have not been structured or specifically marked as animated. Furthermore, chosen links have been adjusted for K12 level (details are omitted, as well as other relevant things).

Web site <http://spot.colorado.edu/~dubin/bookmarks/b/060.html> contains a large number of medical links intended for the wide educational spectrum, but web sites with animation (only a few of them) have not been marked.

Web site <http://members.tripod.com/exworthy/anatrtrtion.htm> also contains large number of links to the anatomy of the human body, describing what and how individual systems and organs function. Only some of the sites are animated (a small number), and these have not been specifically marked.

Web pages created in this study are unique in the world, since they contain links that are directly leading the users intuitively and logically to the animations, 2D or 3D images of the human anatomy. Although the number of links is not high, it is growing progressively.

Problems that may occur during navigation of the web pages

Problems that may occur during use of these web pages are mainly due to a lack of certain plug-ins (on the side of the user) for viewing virtual or other animations. Solution to these problems is to install the plug-ins that is available on the Internet for free.

The next category of problems can be attributed to the size (ten or more megabytes) of certain elements (in particular movies), creating a problem during the download through slow 56K modem connections. The “solution” is to use internet connection that allows for faster flow of data.

Conclusion

Web pages created in this study (<http://www.inet.hr/~jzufic>) would greatly help the users (primarily students of medicine) to gain an overview and learn anatomy of human body using 2D- and 3D-imaging, animation and endoscopic images.

About the authors

Janko Zufic, born in 1967 in Pula, Croatia, graduated with the major in Automation in 1993 from the Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia. He is currently working at the Higher Teacher's School in Pula as a system engineer and professor of several subjects related to informatics. In 2003 he and his colleagues presented a study, "Application of computers in methodical planning of natural and social studies", at the international scientific symposium "IV Days of Mate Demarin" on Brijuni island (Croatia). In 2003 he enrolled in post-graduated doctoral studies at the Faculty of Electrical Engineering and Computing, University of Zagreb. His main area of interest is application of computers in teaching.

Aleksandra Zufic, born in Karlovac (Croatia) in 1969, graduated with a major in Automation in 1992 from the Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia. During her third year of study she was a recipient of the "Josip Loncar" award as the best student in her area of studies. She is currently teaching informatics at the elementary schools "Veli vrh" and "Krnica" in Pula. The main area of her interest is the application of computers in teaching. She is participating in the project "Application of computers in studies and teaching of history". She is an active participant in public discussions regarding curriculum and teaching plan and program of informatics in elementary schools. She is attending the seminar "Quality school".

Note

We need equipments: LCD projector and PC (with USB port). We study presentation with PowerPoint.