BodyParts and Anatomography

Credit: Anatomical art; Kaori Fujieda, OpenGLserver with API + Semi auto data loading system, MRI data incorporation; Nobutaka Mitsuhashi, , BodyParts and anatomography Server ; Bits c.c. , Dissemination with seminars and TV; Hidemasa Bono, Hiromasa Ono, Project Coordination; Nobutaka Mitsuhashi, Hidemasa Bono, Shoko Kawamoto, Scinario, Anatomy and data curation; Kousaku Okubo, DBCLS of ROIS (NM is now in NBDC)

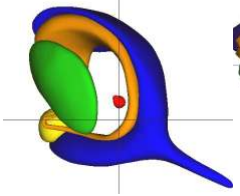
Bodyparts3D is a set of 3D polygon data aiming to represent all the "anatomical concepts"—7,700 listed in Terminologia anatomica. With accompanied rendering system, we aimed to standardize and enhance the medical communication, like Google earth did for events on the globe. Moreover, custom avatar dissemination approach has opened new possibilities.

Pen, Typeface, or Font ?

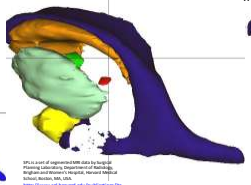
The same text may transmit an idea better when Typed than written, and even better in suitable Font. To make a set of Font data takes cost. But each set serves for the whole world. BodyParts3D can hold multiple polygon data for structural concepts. WebGL Anatomography server supports conversion between them.

Name	Group	Color
Left medial globus pallidus	TALAIRACH_	
Left lentiform nucleus	TALAIRACH_	
Left lateral ventricle	TALAIRACH_	
Left mammillary body	TALAIRACH_	
Left caudate	TALAIRACH_	
Left amygdala	TALAIRACH_	

Fujieda 3.0 Brain Font

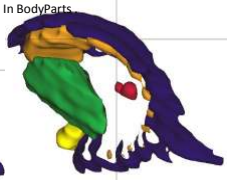


Harvard SPL Brain Font in BodyParts



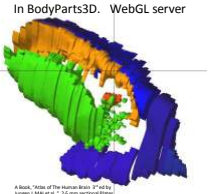
SPL is a set of segmented MR data by Ingrid Kopanitsa, Computational Radiology, Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA.
http://www.spl.harvard.edu/publications/item/view/1895

Talairach Horizontal sectional model Font In BodyParts



The Talairach segmented Brain data by Jack Lancaster and Peter Fox at the Research Imaging Center of the University of Texas Health Science Center San Antonio (UTHSCSA).

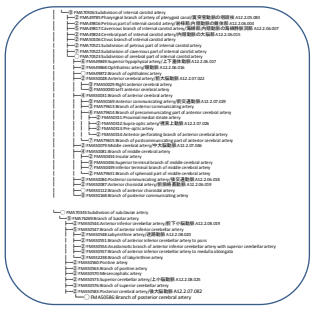
MAI frontal sectional Atlas model Font In BodyParts3D. WebGL server



A Book, "Atlas of The Human Brain 3" ed by Jurgen I. Mai et al. " 2-5 mm sectional Plates were Scanned and Segmented, Annotated and FMA assigned as Polygon Font. Only for internal use for reference by Bits and OK.

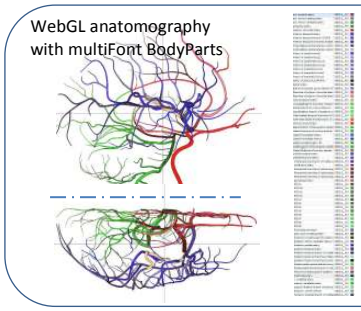
Tree is OK, but can you think with trees?

" Assume the occluded artery from Pt's symptoms " is a common task at clinics. Can you think with two symbolic trees in mind ?

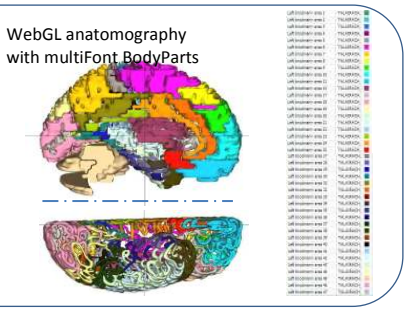


With which can you think with
→
←

Branch-of relation tree extracted from Foundation model for anatomy (Washington U). Tree visualized by Hara K tree-viewer developped at MatsumotoLab. for DBCLS.



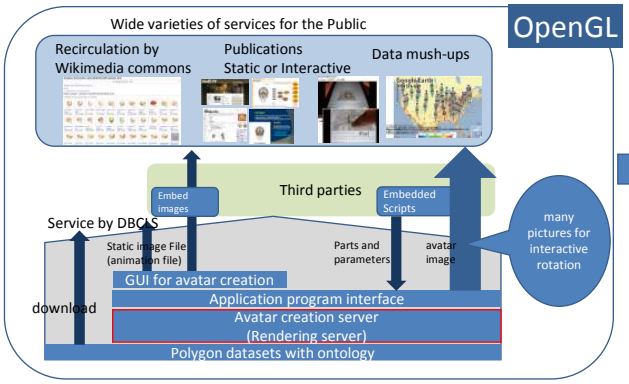
75 segments of Cerebral Arteries in Fujieda Models. Image created by anatomography WebGL testing environment.

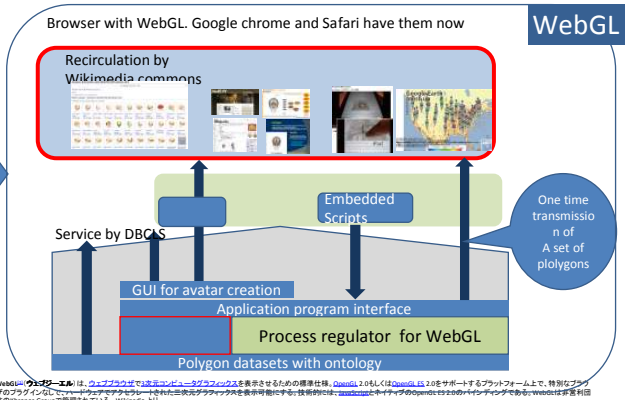


Functional Map of Cerebral cortex (Brodmann) in Talairach Model incroporated into BodyParts DB. Image created by WebGL testing environment.

Do you know how Font works ?

Every time you read on your monitor, hundreds of Font files for letters are called and arrayed to make WYSWYG. Expensive printers have own Font data to reduce the transmition within LAN. Anatomography server is now distributing dozens of 2D images when you Rotate your avatar on your browser. This repetitive transmission over the internet causes poor response. For the smoother interaction, some of the processes are transplanted in Web GL. In our test, rotation response was enhanced x100.





WebGL(ウェブジー・エル)は、ウェブブラウザで3次元コンピュータグラフィックスを表示させるための標準仕様。OpenGL 2.0もしくはOpenGL ES 2.0をサポートするプラットフォームと、特別なブラウザのプラグインなしで、ハードウェアでアクセラレートされた三次元グラフィックスを表示可能にする。技術的には、JavaScriptとネイティブのOpenGL ES 2.0のカイツインドングである。WebGLは非営利団体のKhronos Groupで管理されている。Wikipedia より

What's behind the Art and Web? Playground for BioNLP, Biodatabase.

Creating BodyParts requires better dictionary, ontology, NEI and Ontology mapping.

This is a Project (Problem) Orientated Engineering . Applicable to integration or IR from PubMed, articles, and DBs.

1. To create canonical models, artists recruit various knowledge sources. Unfortunately, they are written in different nomenclature systems. So, data update /curation needs ontology mapping that works.
2. For making bigger parts from smaller parts , FMA Ontology is rigorously used . Because most ontologies are never used in practice, this is a bug fixing process and may end up with one practical ontology.
3. Users search a part from thousands of bodyparts. The way he concepturize is not necessarily the way Ontology does. Then we need a better menu to let him find. This is an new question in Knowledge representation and ontology.
4. Gathering written anatomical knowledge for each ontologyID has been underway to make sure the model is truly canonical. After digitizing the dictionaries and textbooks, we need to identify all the anatomical concept and translate them into universal concept ID. We are vigorously using the 日米羅dictionaries made at DBCLS (SK, KO) and enhancing it for better Named Entity Identification processes.

More to Come:

Artists in DBCLS have created Pharynx (shown above Fujieda Model) , Eyes, Vasculatures in high resolution. They are under curation and mapping to FMA. BPversion4.0 with ~2000 parts will released soon

Poster by K.O ., S.K.

Making larger parts from smaller with FMA derived whole-part relations

Heart and its parts

Brain and its parts