Pediatric Head Atlasses

Release Date: 08/05/2013   Version 1.0
Overview of Pediatric Atlases:

Three mean atlases dedicated for pediatric age clusters : 0 - 2 y.o., 2 - 9 y.o, and 9 - 18 y.o are available to download.
Components of downloadable archived file bundles for each atlas:
- Defaced high resolution (1 mm^3) segmented MRI/CT co-registered volume (7 different tissues are labelled: external air, scalp, skull, CSF, GM, WM and internal air);
- Separate file with dipole coordinates on cortex;
- Separate files of generic 128/256 electrodes montages, co-registered to each atlas (in the same xyz space);
- Lead Field Matrices (LFM) for EGI Geodesic generic 128/256/Super Dense electrodes montages;
- Generic (super dense) LFM to use in any montage by interpolation;
- Matlab scripts for uploading binaries into Matlab;
- ReadMe file (with Metadata, file formats, and other technical details).

Methods:
The atlases were created by fusion (nonlinear warping) of a publicly available probabilistic UNC non-linear- average MRI template for 1 y.o. (Shi et al, 2011), MNI non-linear- average MRI template for 4-8 y.o., and MNI nonlinear average MRI template for 10-14 y.o. (Fonov et al, 2011) to our age matched CTs, and subsequent segmentation with BrainK. The quality of segmentation was validated by visual slice-by-slice inspection and manual correction. The quality of nonlinear warping of brain templates into CT crania was validated by matching the CSF layer thickness to the average CSF developmental curves at several cranium landmarks. Lead Field Matrices were computed on the University of Oregon ACISS cluster using a Finite Difference Model (FDM) solver (Song et al, 2013). The following conductivity values were used based on the average literature data: 0.46 S/m (scalp), 0.018 S/m (skull), 1.79 S/m (CSF), 0.25 S/m (GM), 0.33 S/m (WM) and 0 S/m (air). Quality of the LFMs was validated against head models generated from subject specific CT/MRI.

Data Use Agreement:
Before downloading the atlases you must sign a data use agreement and obtain access privileges to the restricted download pages. The purpose of the data use agreement is to comply with the requirements of our Institutional Review Boards and to avoid infringement of existing US Patents. This is spelled out in the terms of the data use agreement which you can download and review: Data Use Agreement. Please obtain user credentials for this web site by clicking on the "Sign Up" link which is located in the upper right corner of the home page. Please include your user name (not password) in the Data Use Agreement. Please also include in the Data Use Agreement your academic or corporate affiliation.

Once you complete the Data Use Agreement please submit it via email to: Webmaster@pedeheadmod.net. You will be contacted by return e-mail when access privileges are in place. At that point you may click on the links below and download the head models.
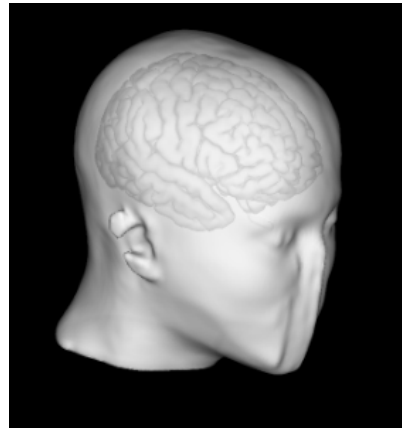
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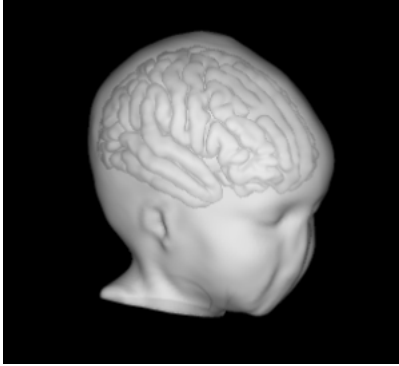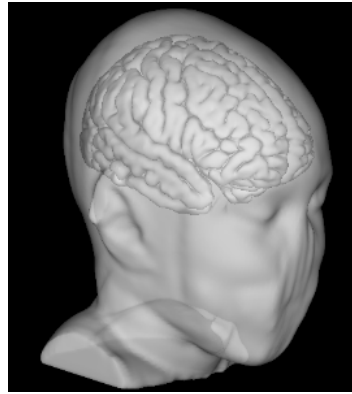
Atlas 1 (0-2 years old)   **Atlas 2 (2-9 years old)**   **Atlas 3 (9-18 years old)**

Works Cited:

Song J, Morgan K, Turovets S, LI K, Davey C, Govyadinov P, Luu P, Smith K, Prior F, Larson-Prior L, Tucker D. Anatomically Accurate Head Models and Their Derivatives for Dense Array EEG Source Localization. Funct Neurol Rehabil Ergon 2013; 3(2-3):275-293. (Paper)