

BrainWeb: Simulated Brain Database

As the interest in the computer-aided, quantitative analysis of medical image data is growing, the need for the validation of such techniques is also increasing. Unfortunately, there exists no 'ground truth' or gold standard for the analysis of in vivo acquired data. These pages provide a solution to the validation problem, in the form of a Simulated Brain Database (SBD). The SBD contains a set of realistic MRI data volumes produced by an [MRI simulator](#). These data can be used by the neuroimaging community to evaluate the performance of various image analysis methods in a setting where the truth is known.

Currently, the SBD contains simulated brain MRI data based on two anatomical models: [normal](#) and [multiple sclerosis \(MS\)](#). For both of these, full 3-dimensional data volumes have been simulated using three sequences (T1-, T2-, and proton-density- (PD-) weighted) and a variety of slice thicknesses, noise levels, and levels of intensity non-uniformity. These data are available for viewing in three orthogonal views (transversal, sagittal, and coronal), and for downloading. Further details about the creation of the SBD are [available](#).

- [Normal Brain Database](#)
- [MS Lesion Brain Database](#)

NEW: [Twenty normal anatomical models](#) are now available.

Note: the SBD is still considered "*under development*", both in terms of the anatomical model and the simulation itself. What you get today may not be the same as what you get tomorrow!

Custom MRI Simulations

This feature allows you to run your own custom MRI simulation (on our server) with any of several pulse sequences and source digital phantoms, and arbitrary values of the acquisition artifacts.

- [\[request a custom simulation\]](#)

Questions?

Take a look at the [FAQ](#).

Publications on *BrainWeb*

We would appreciate it if the following references would be included in any published work that uses this resource:

- <http://www.bic.mni.mcgill.ca/brainweb/>
- C.A. Cocosco, V. Kollokian, R.K.-S. Kwan, A.C. Evans : "*BrainWeb: Online Interface to a 3D MRI Simulated Brain Database*"
NeuroImage, vol.5, no.4, part 2/4, S425, 1997 -- Proceedings of 3-rd International Conference on Functional Mapping of the Human Brain, Copenhagen, May 1997.

- *abstract* available in [[html](#)], [[pdf \(500Kb\)](#)], or [[gnuzip-ed postscript \(500Kb\)](#)].
 - *poster* available in [[pdf \(1.1Mb\)](#)], or [[gnuzip-ed postscript \(850Kb\)](#)].
- R.K.-S. Kwan, A.C. Evans, G.B. Pike : "*MRI simulation-based evaluation of image-processing and classification methods*"
IEEE Transactions on Medical Imaging. 18(11):1085-97, Nov 1999.
- R.K.-S. Kwan, A.C. Evans, G.B. Pike : "*An Extensible MRI Simulator for Post-Processing Evaluation*"
Visualization in Biomedical Computing (VBC'96). Lecture Notes in Computer Science, vol. 1131. Springer-Verlag, 1996. 135-140.
 - *paper* available in [[html](#)], [[postscript \(1Mb\)](#)], or [[gnuzip-ed postscript \(380Kb\)](#)].
 - *poster* available in [[grey-scale postscript \(5.3Mb\)](#)], [[grey-scale, gnuzip-ed postscript \(536Kb\)](#)], or [[colour, gnuzip-ed postscript \(597Kb\)](#)].
- D.L. Collins, A.P. Zijdenbos, V. Kollokian, J.G. Sled, N.J. Kabani, C.J. Holmes, A.C. Evans : "*Design and Construction of a Realistic Digital Brain Phantom*"
IEEE Transactions on Medical Imaging, vol.17, No.3, p.463--468, June 1998.
 - *paper* available in [[html](#)].