

Neuroimaging Informatics Tools and Resources Clearinghouse (NITRC)

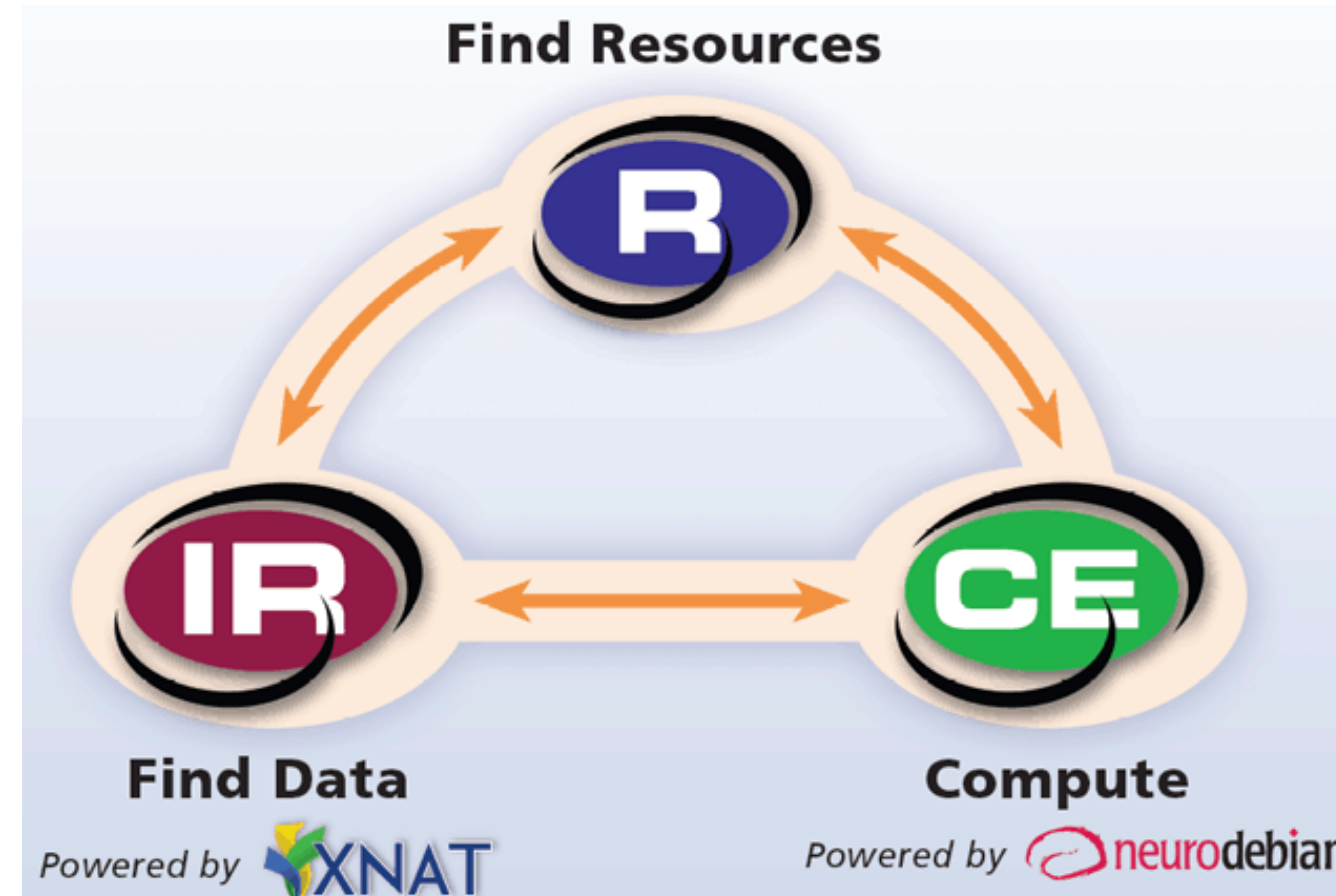
www.nitrc.org

www.nitrc.org/ir

www.nitrc.org/ce

Introduction

Funded by the NIH Blueprint for Neuroscience Research, NIBIB, NIDA, NIMH, and NINDS (1), the NITRC family of services has expanded to support MR, imaging genomics, EEG/MEG, PET/SPECT, CT, optical imaging, clinical neuroimaging, and computational neuroscience communities. These services include:

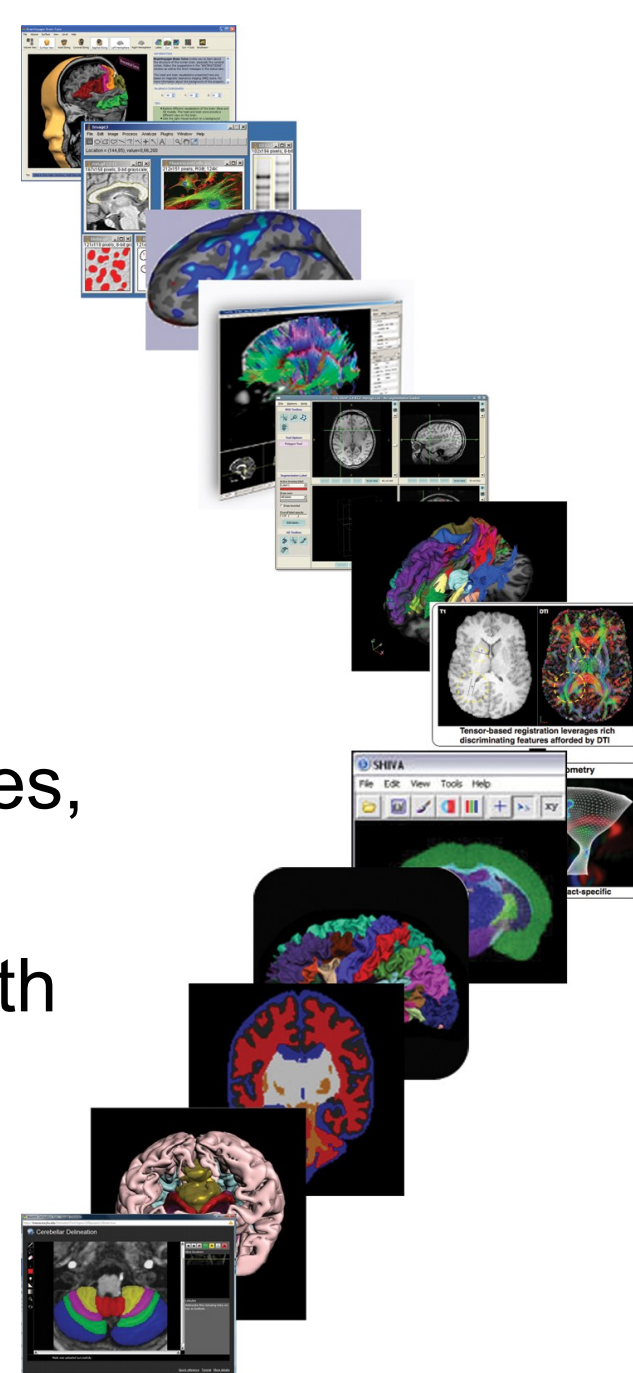


- NITRC Resources Repository (NITRC-R)**, the "go to" collaboration environment that enables the distribution, enhancement, and adoption of neuroimaging tools and resources
- NITRC Image Repository (NITRC-IR)**, a curated repository of NIfTI-1 and DICOM imaging sessions searchable by metadata such as handedness, gender and group including ADHD-200, 1000 Connectomes, ABIDE, CandiShare Schizophrenia
- NITRC Computational Environment (NITRC-CE)**, a virtual big data compute service pre-configured with tens of popular neuroimaging software analysis tools allowing a build your own, or pay-as-you-go compute experience via commercial clouds

Approach

Initially a resources registry for fMRI software, **NITRC-R's** scientific scope continues to broaden based upon the neuroinformatics research communities needs. As the need for identifying, evaluating and repurposing others' tools and resources was successfully met, the next pent-up demand was for a searchable image repository across multiple community-generated and shared datasets. As a result, leveraging XNAT, we developed **NITRC-IR** which is open to researchers as a data commons resource for their data sharing plans. Finally, scientists and researchers are more challenged to secure sufficient computational resources to execute complex computational analysis on these large data resources. So, leveraging NeuroDebian, we developed **NITRC-CE**, which can be downloaded as a script to create you own virtual machine to use on your infrastructure, or you can pay-as-you-go using commercial cloud service including **AWSmarketplace** and **VM Depot** (2). A public Amazon Machine Instance (AMI) is also available.

We encourage the neuroinformatics community to continue providing on-line feedback on NITRC services, their design, tools, resources, and content. We exhibit and train on the **NITRC** triad of services in our exhibit booths at SFN, CNS, and OHBM, offer webinar training on request. Please contact us at nitrcinfo@nitrc.org.



The screenshot shows the NITRC Repository Home Page. It features a navigation menu with options like Home, Tools & Resources, Community, Support, and About NITRC. A search bar is prominently displayed. Below the search bar, there are sections for 'Browse by domain', 'Browse by software', and 'Find neuroimaging tools here:'. A 'Featured tool/resource' section highlights 'Simulated DW-MRI Brain Data Sets for Quantitative Evaluation of Estimated Fiber Orientations'. A 'Community' section lists various activities like conferences, workshops, and funding opportunities. A 'Recently active forums' section lists topics like 'Signed Differential Mapping' and 'Network-based Statistics'. A 'Recently updated files' section lists various software tools and datasets.

NITRC Search and Compare

Browse by Topic allows tool/resource identification based on functionality categorized by the developers. Multiple views, compare by rating, and filtering capability enable easy comparison among tools with similar categories.

The screenshot shows the NITRC Search and Compare interface. It features a search bar with the query 'alzheimer OR cognitive'. Below the search bar, there are several filters and categories. The 'Functionality' section is expanded, showing various tool categories like 'Statistical Operation', 'Quantification', 'Temporal Transformation', and 'Modeling'. The 'Type of Resource' section is also expanded, showing categories like 'Connectome', 'OASIS', 'Paradigm', 'Mouse Tracker', 'BCILAB', and 'Atlas of the basal ganglia'. A 'Download Now' button is visible for the 'VainMap: simple statistical mapping tool'.

Results

With over **4.2 million** page views and **1 million** sessions by **460,700** users, **NITRC-R** facilitates access to an ever growing number of neuroinformatics resources (currently, **720**). Averaging **22,000** sessions and **81,300** pageviews per month, software and data from **NITRC** has been downloaded over **2.4 million** times. **NITRC-IR** offers **6,180** Subjects and **7,620** imaging sessions of searchable data across **12** projects to promote re-use and integration of these valuable shared data. With **75** subscriptions and growing, our newest service, **NITRC-CE** provides simplified deployment of cloud-based computation that supports FreeSurfer, FSL, AFNI and many other software resources. In real-world processing tests, a representative computation that would have taken 24 hours on a high-powered desktop took 25% of the time (8 hours) at a cost of only \$4. The test was a FSL voxel-based morphometry (VBM) computation on 64 subjects from CANDIShare run on a 2.8 GhZ Intel Xeon Mac desktop versus AWS Large instance (m1.large) using SGE parallelization over 4 cores.

Summary

As a 2014 HHSinnovates Semi-Finalist innovation, **NITRC** is continually updated with new content, data, and services. **NITRC** has established itself as a key resource where previously funded tools and resources are presented in a coherent and synergistic environment proven to help facilitate the advancement of neuroscience research. We encourage the neuroinformatics research community to continue to utilize these resources in support of data sharing requirements, software dissemination and cost-effective computational performance.

References: <http://tcg.com/drupal/?q=node/180>, 2. <http://tcg.com/drupal/?q=node/245>



NITRC Image Repository

Detailed searches by metadata across DICOM and NIfTI-1 datasets and downloadable

Filter(s): (M/F LIKE M) AND (Field Strength LIKE 3) AND (Resting TR = 2000) AND (Age = 11)

The screenshot shows the NITRC Image Repository search results page. It displays a table of search results with columns for Label, Project, Subject, M/F, Age, Scans, Field Strength, and Resting TR. The table lists various subjects and their corresponding scan parameters. A 'Download Now' button is visible for each entry. The page also includes a search bar and navigation options.

NITRC Computational Environment

Pay-as-you-go cloud computing with popular imaging tools in a virtualized environment using your, or NITRC-IR, datasets. Download the updated images or just the compute results!

The screenshot shows the NITRC Computational Environment interface. It features a search bar and a 'Download Now' button. Below the search bar, there are several sections including 'Instructions', 'Software License Status', and 'Webstart'. The 'Software License Status' section lists various licenses and their status. The 'Webstart' section provides instructions on how to launch the pipeline web start client.

NITRC Summary Page

Summary pages provide quick access to user ratings and reviews, show how the tool/resource is categorized, and indicate what NITRC sub-functions have been turned on by the tool/resource administrator.

The screenshot shows the NITRC Summary Page for the '1000 Functional Connectomes Project'. It features a navigation menu with options like Home, Tools & Resources, Community, Support, and About NITRC. A search bar is prominently displayed. Below the search bar, there are sections for 'Summary', 'Downloads', 'Recent Activity', and 'Reviews & Ratings'. The 'Recent Activity' section lists various updates and releases. The 'Reviews & Ratings' section shows user feedback and ratings for the project.