How to store imaging data

Use imaging data for research purposes

Medical imaging technologies such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) have had a major impact on clinical care and are now commonplace in almost every hospital. Other than *looking* at the images (e.g., by a radiologist), there is an increasing interest to run quantitative analyses on large quantities of these clinically acquired medical images.

With the increasing availability of processing power, both locally installed or in the cloud, these quantitative analyses become more and more complex and offer us further insight into the working of the human body. For example, it has now become feasible to take a brain scan using MRI and virtually subdivide the brain into many different regions that are each associated with specific brain functions, e.g., vision, hearing or cognitive abilities.

Another example involves taking a CT scan of a patient's abdominal area and automatically extract muscle and fat regions, which you can then further analyse to better understand the patient's body composition. This information has turned out to be very useful to predict overall survival or complications after surgery and may in the near future help medical specialists to decide whether or not to subject the patient to certain treatments, like surgery or chemotherapy.

Imaging-specific data storage

Many of these developments are still in the research phase. This requires that the clinically acquired images are also stored in an environment that facilitates research, preferably in a place where the images can be easily extracted using automated analysis scripts. DataHub has deployed its own XNAT Sustainable Research PACS, an imaging-specific data storage and viewing platform that, given the right access credentials, allows researchers to:

1. Keep their imaging data in a single centralized location on a project basis
2. View the images and meta data online and
3. Access/download the images for further analysis using either manual download or a machine-to-machine interface

XNAT is an open-source IT system that offers full connectivity with DICOM imaging modalities like CT and MRI scanners. It is widely used in research organisations across the world and is the number one open-source IT platform for natively storing medical (DICOM) images and viewing them with the radiology-grade, online OHIF (Open Health Imaging Foundation) viewer.

DataHub XNAT system

As an early adopter, the Maastricht Study has transferred over 100.000 MRI scans collected for more than 5000 study participants to the XNAT system of DataHub in 2020, comprising almost 8 terabytes of data in total. Data transfer for the Maastricht Study will continue to proceed during the course of 2021 and beyond as new subjects are invited and scans are acquired at Scannexus and directly transferred to XNAT at DataHub.

DataHub is an official member of the global XNAT community and has recently, together with other research organisations, submitted a letter of support for obtaining additional funds for further development of the open-source XNAT system. DataHub will continue to work with partners and the XNAT community to extend their XNAT system with additional functionality that helps researchers in and outside of Maastricht to make better use of their imaging data.

If you have imaging data for research purposes and you want to store it in a safe place, please contact us.

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