Annotation and Image Markup - AIM

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CBIIT Links

- NBIA Cancer Data Science website
- NCI Cancer Data Science on Twitter @ NCIDataSci

At-a-Glance Details

AIM Model and Toolkit

- Version Number and Release Date: AIM XSLT Transformation to DICOM Standard TDI 1500 - August 2018, AIM Model 4.2 - February 2018, AIM Toolkit 4.1- November 2013, AIM Template Service 2.0 - April 2014, AIM on ClearCanvas® Workstation 4.5 - May 2014, AIM Template Builder 2.0 - January 2013
- Primary audience: Investigators, researchers, implementers, workstation vendors, clinicians interpreting and manipulating images
- Installation Level: Advanced - technical team required for installation
- System Requirements:
  - MS Windows 2000 or better, 512 MB RAM or better
  - MS Visual Studio 2005 (SP1)
  - Source code available. Binaries available for Windows.

Tool Overview

AIM is the first project to propose and create a standard means of adding information and knowledge to an image in a clinical environment, so that image content can be easily and automatically searched. AIM provides a solution to the following imaging challenges:

- No agreed upon syntax for annotation and markup
- No agreed upon semantics to describe annotations
- No standard format (for example, DICOM, XML, HL7) for annotations and markup

The AIM project includes the following tools.

- The AIM Model captures the descriptive information for an image with user-generated graphical symbols placed on the image into a single common information source.
- The AIM Toolkit has an AIM programming library written in C++ using DCMTK and Xerces for DICOM and XML creation and manipulation, respectively. The library has two logical components: implementation of the AIM information model as an AIM object model, and definition of transformations that can be performed on the AIM object model. The ANIVATR tool is a software application that shows how the library can be used. It is used for validating AIM annotations and transcoding between AIM XML and AIM DICOM SR.
- The AIM Template Service is a web service application that makes it possible for you to upload (publish) and download AIM templates created using an AIM tool such as AIM Template Builder.
- The AIM Template Builder is a Java application that allows you to build templates that are compatible with the AIM Model. Templates are a set of well-defined questions and answer choices that facilitate collecting information for a study. AIM Template Builder has replaced AIM Template Manager.
- AIM on ClearCanvas Workstation is a referenced implementation of the AIM Model. AIM on ClearCanvas Workstation demonstrates how the AIM model and the AIM library can be applied in a real imaging diagnostic workstation. You can use AIM on ClearCanvas Workstation to create AIM XML documents and AIM DICOM SR objects that adhere to the AIM data model. You can also import a new AIM template XML document that

represents a set of controlled questions and answers for each question. Typical users want to make simple and constrained annotations that are reproducible and consistent for the same kind of imaging study.

Technologies Used by the AIM Project

The AIM project team uses the following tools and technologies to develop AIM applications.

- Altova XMLSpy 2013 (Altova)
- Berkeley DB XML by Oracle
- Boost C++ library version 1.34.1 (Boost.org)
- caCORE SDK 4.1.1 (caBIG®)
- CMake 2.8.x and above
- DCMTK version 3.6.x (OFFIS e. V.)
- Eclipse (Eclipse Foundation, Inc.) for Windows and Linux
- Enterprise Architect version 10.x (Sparx Systems)
- gcc, g++ 4.4.5 or above
- Homebrew Package Installer for Mac OS X
- Java JDK 6 (Sun Microsystems)
- Linux OSes (Debian 6.0.x and above and Ubuntu version 11 and above)
- Mac OS X 10.7.5 (Lion)
- Microsoft Visual Studio 2008 and 2010 (Microsoft) with STL
- Xcode 4.6.x and Xcode command line utilities
- Xerces XML library version 3.0.1 (Apache Software Foundation)

Installation and Downloads

Some AIM component downloads are in .rar and .war file compression formats.

`.rar` is a proprietary archive file format that supports data compression, error recovery, and file spanning. Both proprietary and free programs are available for accessing such files. A tutorial on accessing `.rar` files, including a free extractor, is available.

`.war` files (short for Web application Archive) are Java archive files used for packaging and distribution of Web applications. `.war` files often contain a collection of JavaServer Pages, Java Servlets, Java classes, XML files, tag libraries, and static Web pages (HTML and related files). More information can be found in the Wikipedia article.

Background information on Java Web applications is available.

The releases are listed in order by product from newest to oldest. There is also an AIM GitHub Repository

AIM Model

A change log and a description of the model are available.

- AIM XSLT Transformation to DICOM Standard TDI 1500 (August 2018)
- 4.2 (February 2018)
- 4.0 (March 2013)
- Foundation
- 3.0

AIM Toolkit

The release notes explain the differences between releases.

- 4.1 on GitHub (November 2013)
- 4.0 XML Schema (March 2013)
- 4.0 on GitHub (March 2013)
- 3.0.2 (Linux and Windows) (June 2012)
- 3.0.2 on GitHub
- 3.0 XMI and XML Schemas

AIM Template Service

AIM Template Service Documentation includes the user's guide and release notes.

- 2.0/1.1 (April 2014)
- AIM Template Service online (July 2012)
- 1.0 (August 2012)
- 1.0 (DB XML for Windows)

AIM Data Service

Refer to AIME Data Service Documentation for the download file and documentation.

AIM on ClearCanvas® Workstation

Refer to AIM on ClearCanvas Workstation Documentation for a product description, system requirements, and a list of available documentation.

- 4.5 and 4.5 on GitHub (current release, May 2014)
- 4.1.0.0 (November 2013)
- 4.0.0.0 (October 2013)
- 3.5.0.1 (July 2013)
- 3.5.0.0 (February 2013)
- 3.0.4.3
- 3.0.4.2
- 3.0.4.1 (The download file for this release was withdrawn.)
- 3.0.4.0 (March 2012)
- 3.0.3.0 (May 2011)
- 3.0.2.0

XML Schemas and Documents for Segment Properties

- AnatomicRegionAndModifier.xsd
- AnatomicRegionAndModifier.xml
- SegmentationCategoryTypeModifier.xsd
- SegmentationCategoryTypeModifier.xml

DICOM Segmentation Examples

- Synthetic Checker

AIM Template Builder

Refer to AIM Template Builder Documentation for a product description and a list of available documentation.

- 2.0 (January 2013)
- 1.1 (July 2012)
- 1.0 (March 2012)

ATB can import the following lexicons:

- RadLex Lexicon 3.12
- RadLex Lexicon 3.10
- NCIm (NCI MetaThesaurus)

AIM Template Manager

- 1.0 (AIM Template Builder replaces this application.)

Help with Downloading Files in Archive Format

Support

Getting Support

- Email: NCIAppSupport@nih.gov
- Call: 240-276-5541

Open Source Development

Contact Application Support for information about open source development and AIM.

Defects and Feature Requests

- Submit a defect or feature request for AIM Enterprise Service
- Submit a defect or feature request for AIM Information Markup Model
- Submit a defect or feature request for AIM on ClearCanvas Workstation

Presentations, Demos and Other Materials

- Weekly Progress
- Monthly Reports
- Using AIM Tools (PDF of PowerPoint)

- AIM Citations
- AIM Reference Materials

Documentation and Training

- AIM Template Builder Documentation
- AIM Template Service Documentation
- AIM on ClearCanvas Workstation Documentation
- AIM Template Software Setup Manual
- AIM Terms and Concepts