

 VIRTUAL**SKELETON** database

An open access repository for biomedical research and collaboration

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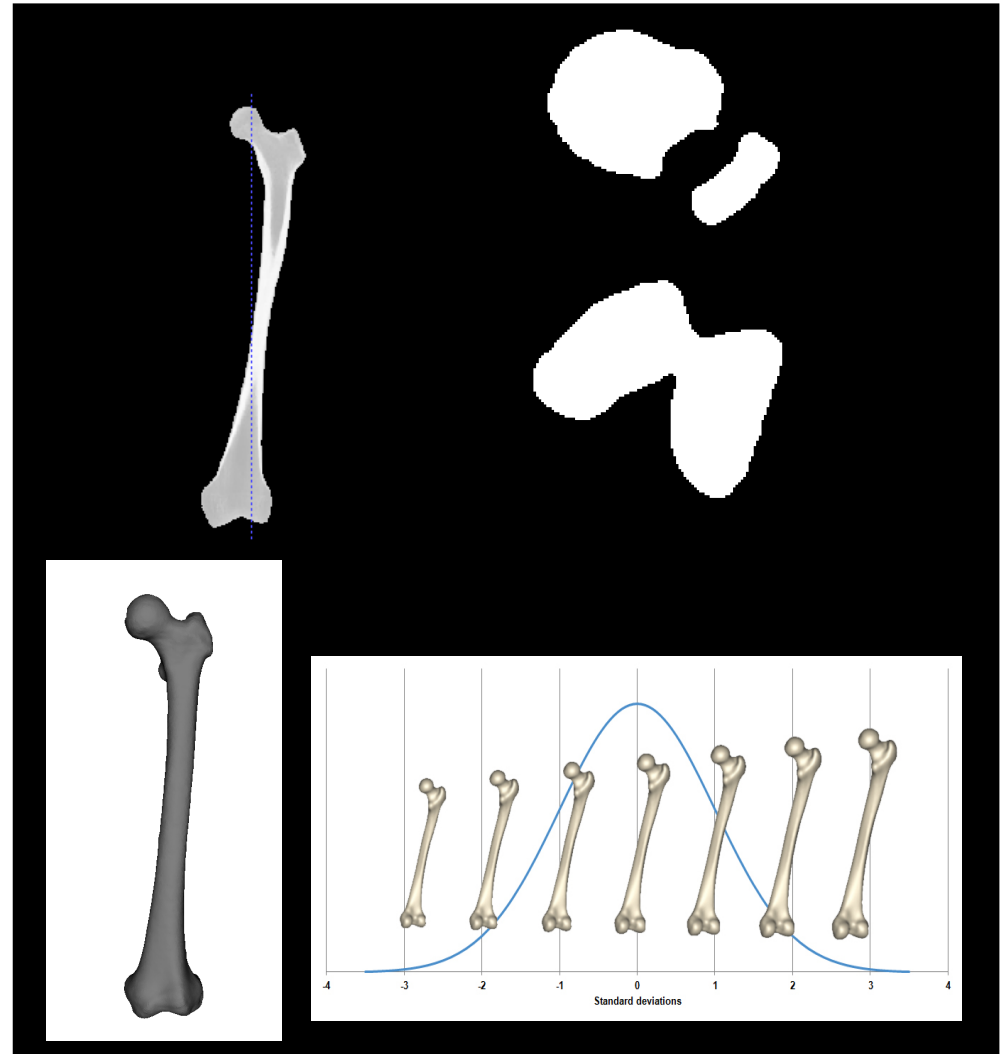
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Switzerland

VSD medical image analysis

- > Image data
 - CT, MRI, UltraSound
- > Processed data
 - Segmentation
 - Surface model
- > Models
 - Statistical shape model (population analysis)
 - Biomechanical model (subject specific analysis)



VSD Motivation

- > Image management difficulties:
 - No adequate image data management systems for research
 - Redundant acquisition work, multiple copies / versions / miss-handling

- > Statistical shape model: **Difficult to obtain relevant data**
 - Large amount of data required
 - Preferably good quality with meta-data
 - Redundant processing work

- > Need to be able to store, track, find, exchange **images and processed data which contain anatomical structures**

Aims

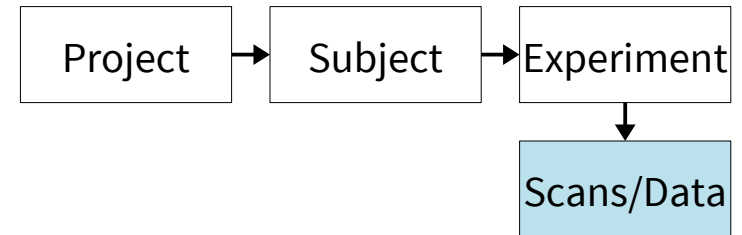
- > Eliminate limiting factors which prevent the fast creation
 - For testing and the application of medical image analysis methods
 - Of high quality statistical models

- > Open access research repository

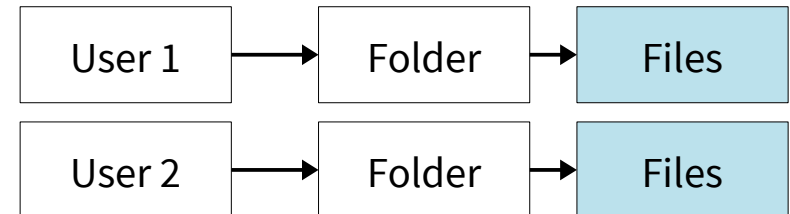
- > Ultimately build a statistical human anatomy model

VSD Custom solution?

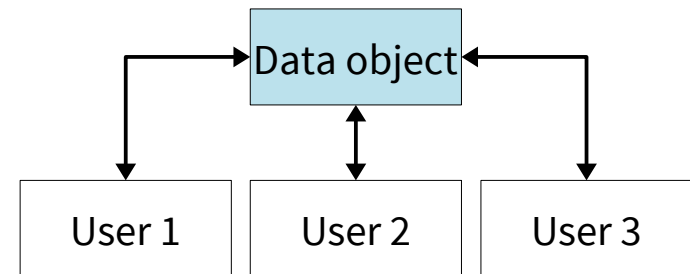
- > NeuroImaging Archive Toolkit (XNAT)
 - Patient specific, PACS like storage



- > MIDAS media archiving platform
 - Cloud storage, archiving



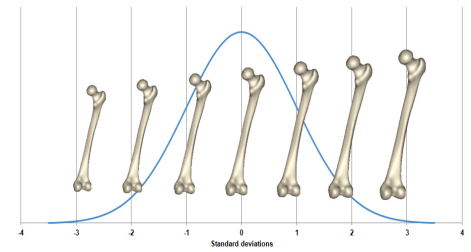
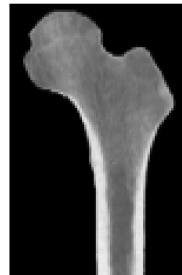
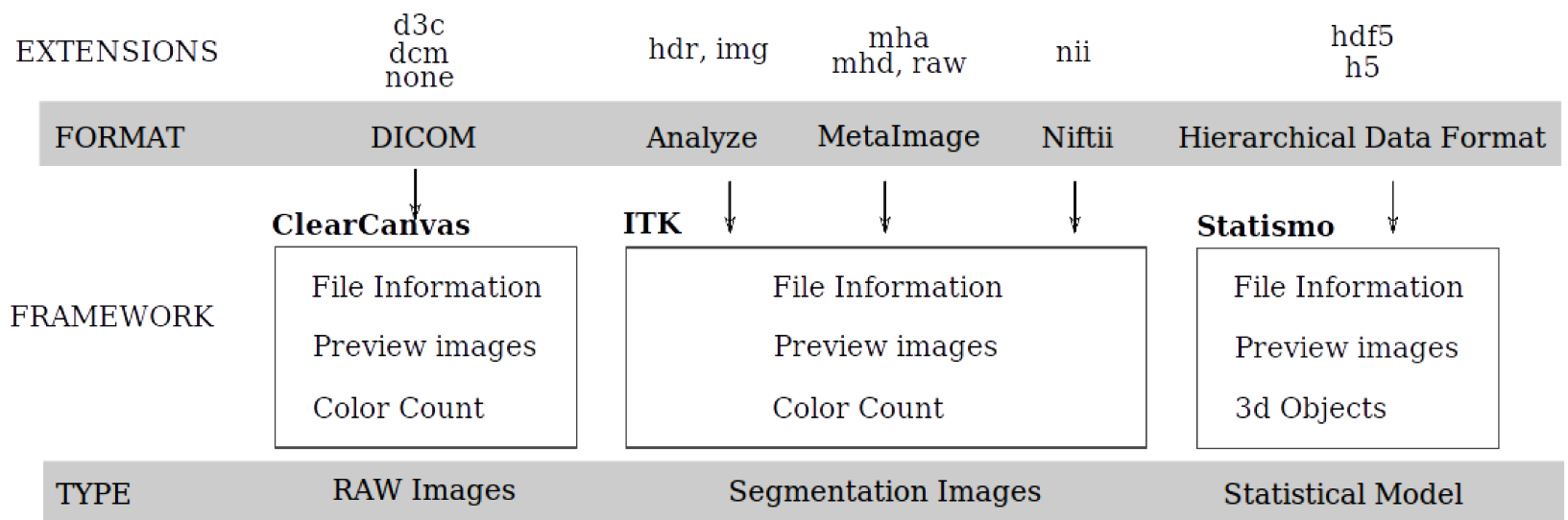
- > VSD Research image repository
 - Data object centric catalog



VSD Architecture

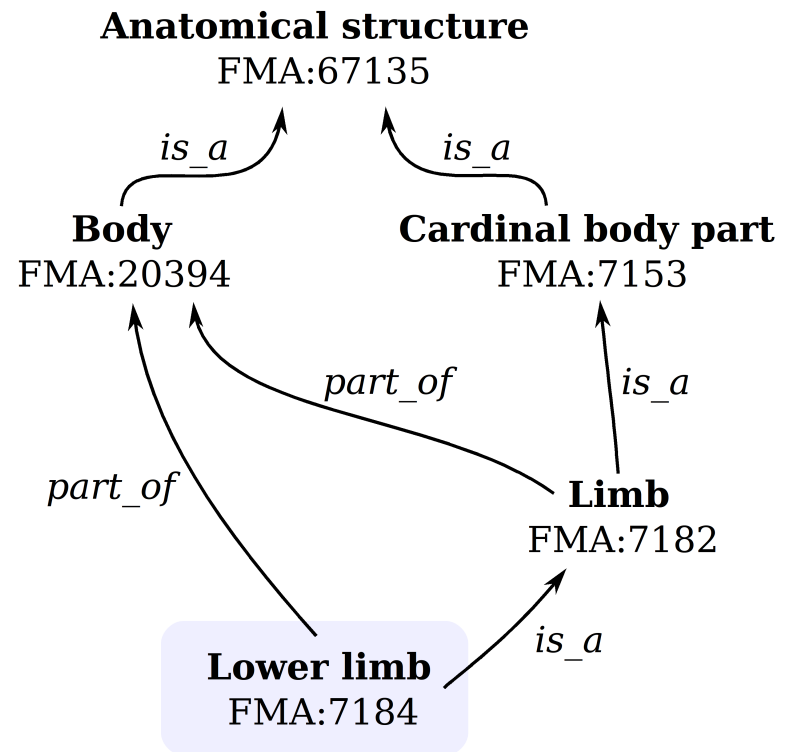
- > Redundant hardware & software setup
 - MS Server 2008
 - MS IIS 7.5
 - MS SQL 2008
 - MS .NET (MVC 4, Razr)
 - SSL
- > Frameworks / Libraries
 - Bootstrap, jQuery, HTML, CSS, js (Web)
 - ClearCanvas (DICOM)
 - ITK / VTK (IA)
 - Statismo, HDF5 (SSM)
 - REST (api)
 - Sphorium WebDAV
 - Fuseki (FMA ontology)

VSD Uploader



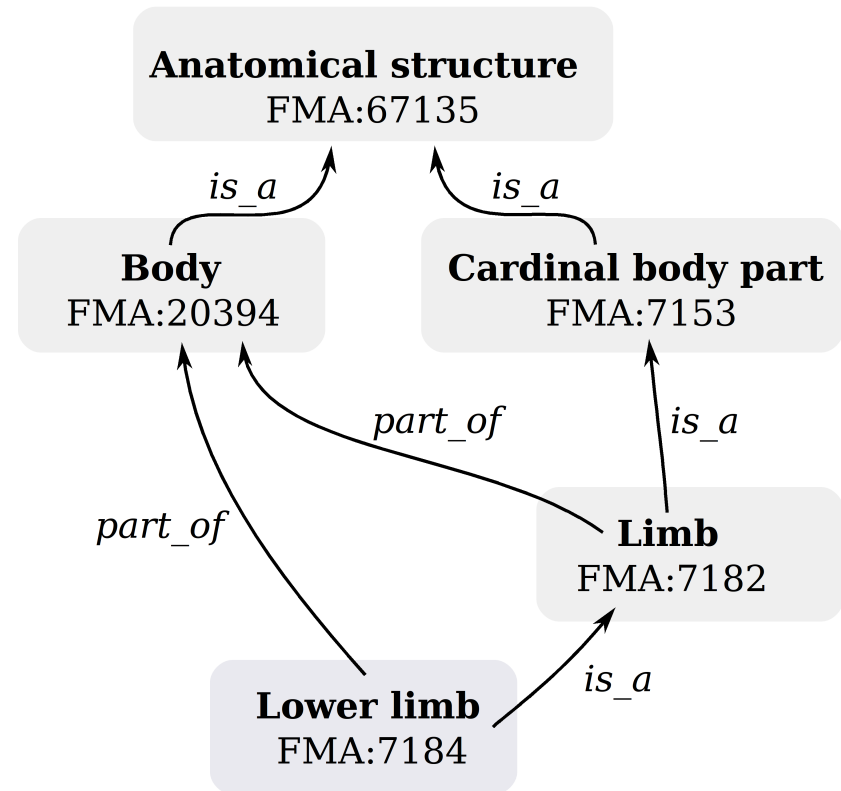
VSD Ontology

- > Foundational Model of Anatomy
 - 75,000 anatomical classes
 - 450,000 class relations
- > Retrieve anatomical tree
 - FUSEKI server and SPARQL to query the ontology and use the semantics of the ontology
- > Example: Lower limb
 - Lower limb
 - Limb
 - Body
 - Anatomical structure



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VSD Discussion



- Known software components
- Fit in curriculum
- Flexibility
- Specific requirements



- Longer initial development
- Less content
- Not as tested
- Code not shared with the community

> Outlook

- More content
- REST api
- Additional object types
(landmarks, surface model,
FE model)

> VSD

- Tailored solution for images
and statistical models
- Flexible concepts - BRATS
- Lack of impressive content
(Full body scanned)

VSD Contributors




- > BFH - M. Pfahrer, N. Biedermann, R. Niklaus, V. Tomas, R. Mitra
- > Stalismo - PhD M. Luethi
- > Forensic Institute - Prof. M. Thali, PhD L. Ebert

- > NCCR – CO-ME Research Network
- > SiCAS Foundation

VSD: www.virtualskeleton.ch
VSD demo: vsddemo.bfh.ch/website



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-  MyProjects

SharedFolders

Page Navigation

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








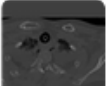











Organizer

- shared
- collaboration
- personal

VSD »

Browse/Results

Actions ▾ Manage selected ▾ Display selected ▾

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VSD name: identifier

- VSDID
- anatomical region
- age
- modality

Details

- sharing
- comments
- versions
- related data
- previews