



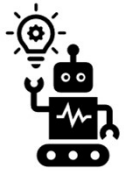
## AI/ML Imaging Tool Deployment in clinical IT infrastructure



# Motivation



i2lab is developing different AI models for imaging radiology – with national and international partners



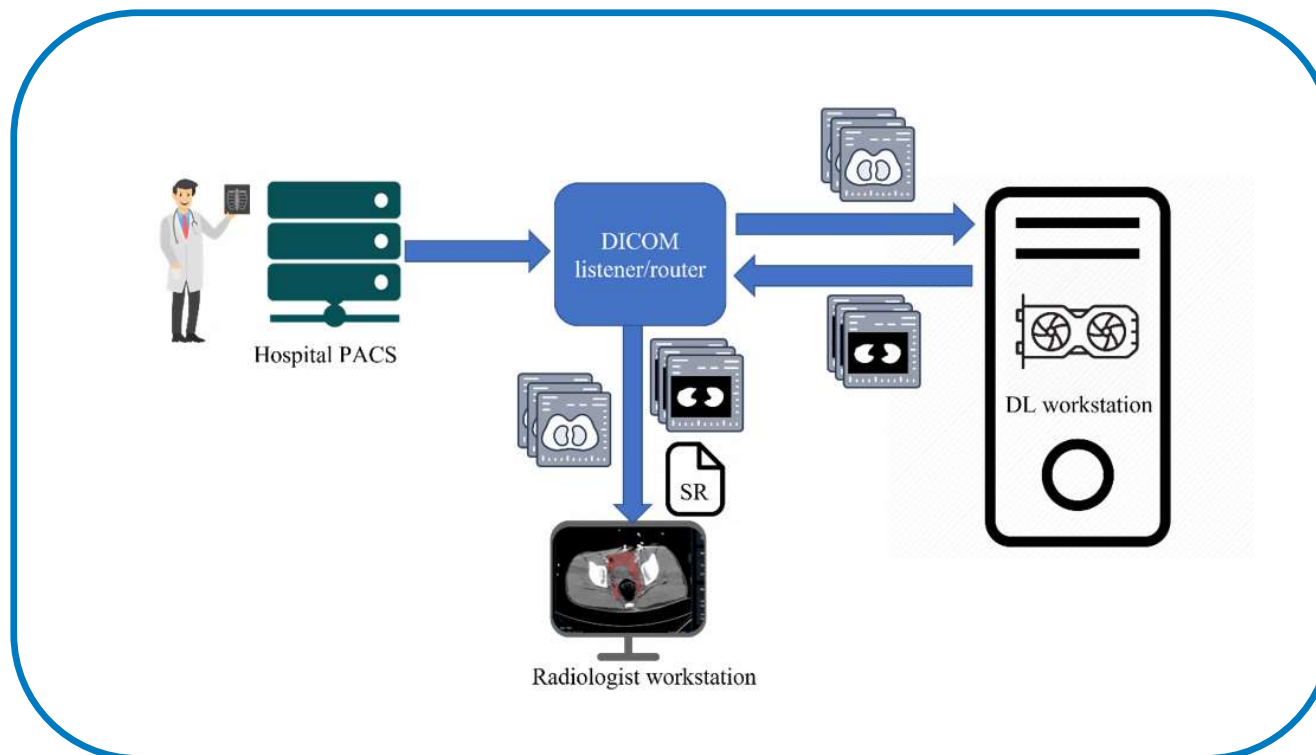
Our AI models can detect caries or severity of vertebral fractures to support clinicians



There are many different AI models for medical applications – getting it into the clinic is the challenge we want to tackle

# Our starting point

Inspired from a recent journal article on deploying AI in clinical workflow.



*A vendor-agnostic, PACS integrated, and DICOM-compatible software-server pipeline for testing segmentation algorithms within the clinical radiology workflow.*

# Creating a copy of a PACS user interface

Picture archiving and communication system (PACS) are primarily used in healthcare organizations to securely store images and clinically-relevant reports.

The image shows a development environment with a terminal window on the left displaying a Dockerfile and a web browser on the right showing the Orthanc web interface.

**Dockerfile:**

```
1 version: 3.8
2 services:
3   orthanc:
4     build: .
5     ports:
6       - 8042:8042
7     volumes:
8       - ./data:/data
9     depends_on:
10       - orthanc-postgres
11     restart: always
12     healthcheck:
13       test: curl -f http://localhost:8042/
14       interval: 30s
15       timeout: 10s
16       retries: 3
17     environment:
18       - ORTHANC_HOST=0.0.0.0
19       - ORTHANC_PORT=8042
20       - ORTHANC_DATA_PATH=/data
21       - ORTHANC_LOG_PATH=/data/orthanc.log
22       - ORTHANC_CONFIG_PATH=/data/orthanc.conf
23       - ORTHANC_PLUGINS_PATH=/data/plugins
24       - ORTHANC_PLUGINS_ENABLED="DICOMWeb,OrthancExplorer,OrthancExplorer2,DICOMWebClient"
25       - ORTHANC_DEFAULT_USERNAME=admin
26       - ORTHANC_DEFAULT_PASSWORD=admin
27       - ORTHANC_DEFAULT_USERNAME_2=admin
28       - ORTHANC_DEFAULT_PASSWORD_2=admin
29       - ORTHANC_AUTHENTICATOR_ENABLED="false"
30       - ORTHANC_POSTGRES_HOST=orthanc-postgres
31       - ORTHANC_POSTGRES_PORT=5432
32       - ORTHANC_POSTGRES_DB=orthanc
33       - ORTHANC_POSTGRES_USER=admin
34       - ORTHANC_POSTGRES_PASSWORD=admin
35       - ORTHANC_POSTGRES_SCHEMA=public
36       - ORTHANC_POSTGRES_TABLE=orthanc
37       - ORTHANC_POSTGRES_SEQUENCE=orthanc_seq
38       - ORTHANC_POSTGRES_SCHEMA_SEQUENCE=public.orthanc_seq
39       - ORTHANC_POSTGRES_SCHEMA_TABLE=public.orthanc
40       - ORTHANC_POSTGRES_SCHEMA_SEQUENCE_TABLE=public.orthanc_seq
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```

**Orthanc Web Interface:**

The web interface shows an "Insecure setup" warning: "Your Orthanc server is accepting remote connections, but is using the default username and password, or has user authentication explicitly turned off. Please carefully read your logs and review your configuration, especially options RemoteAccessAllowed, AuthenticationEnabled, and RegisteredUsers."

The Orthanc logo is displayed prominently.

Form fields for search and navigation:

- Patient ID:
- Patient Name:
- Accession Number:
- Study Description:
- Labels:
- Study Date:

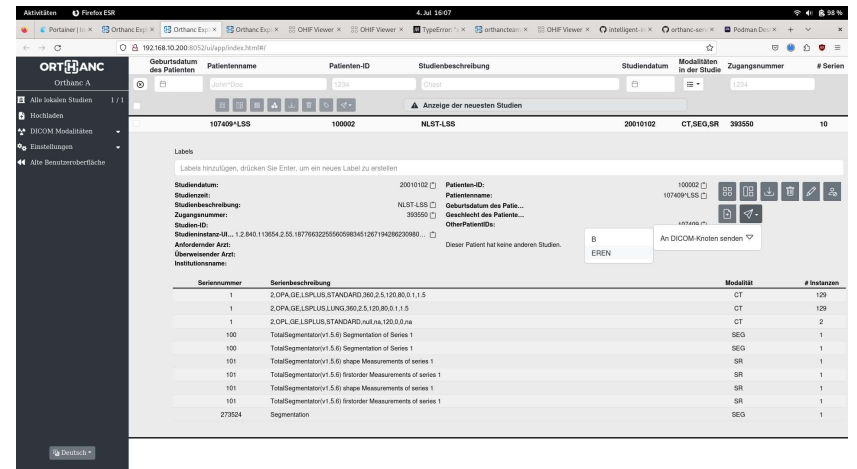
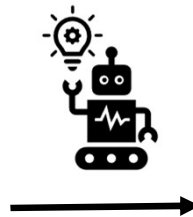
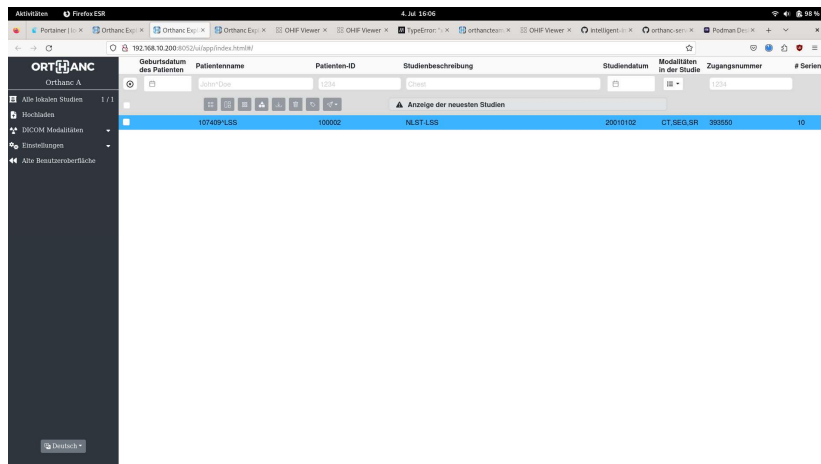
Buttons for navigation and actions:

- All patients
- All studies
- Do lookup
- Open Orthanc Explorer 2
- Open DICOMweb client

The footer of the web interface displays the URL: [www.orthanc-server.com](http://www.orthanc-server.com)

# Selecting patient study and data

## PACS web-interface in Explorer 2

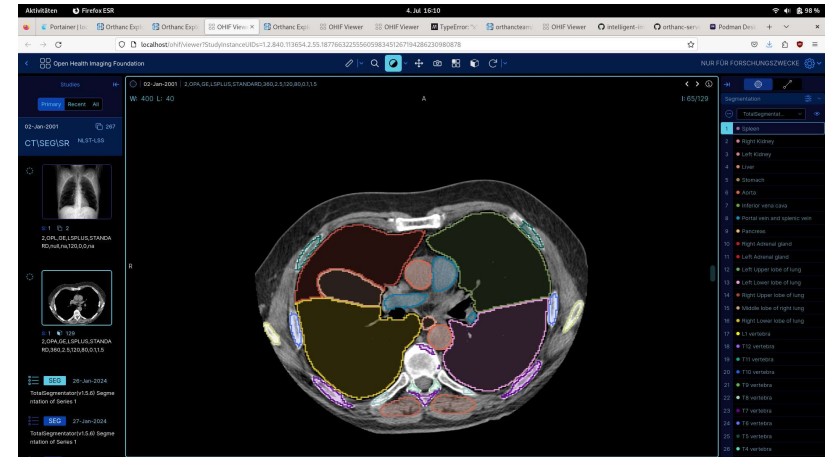
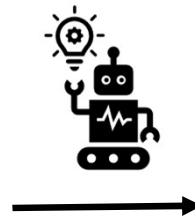
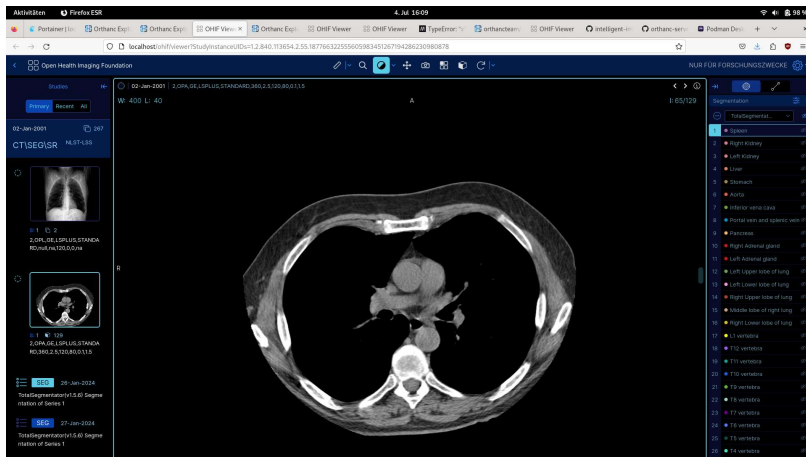


Patient data without segmentation

Patient data without segmentation

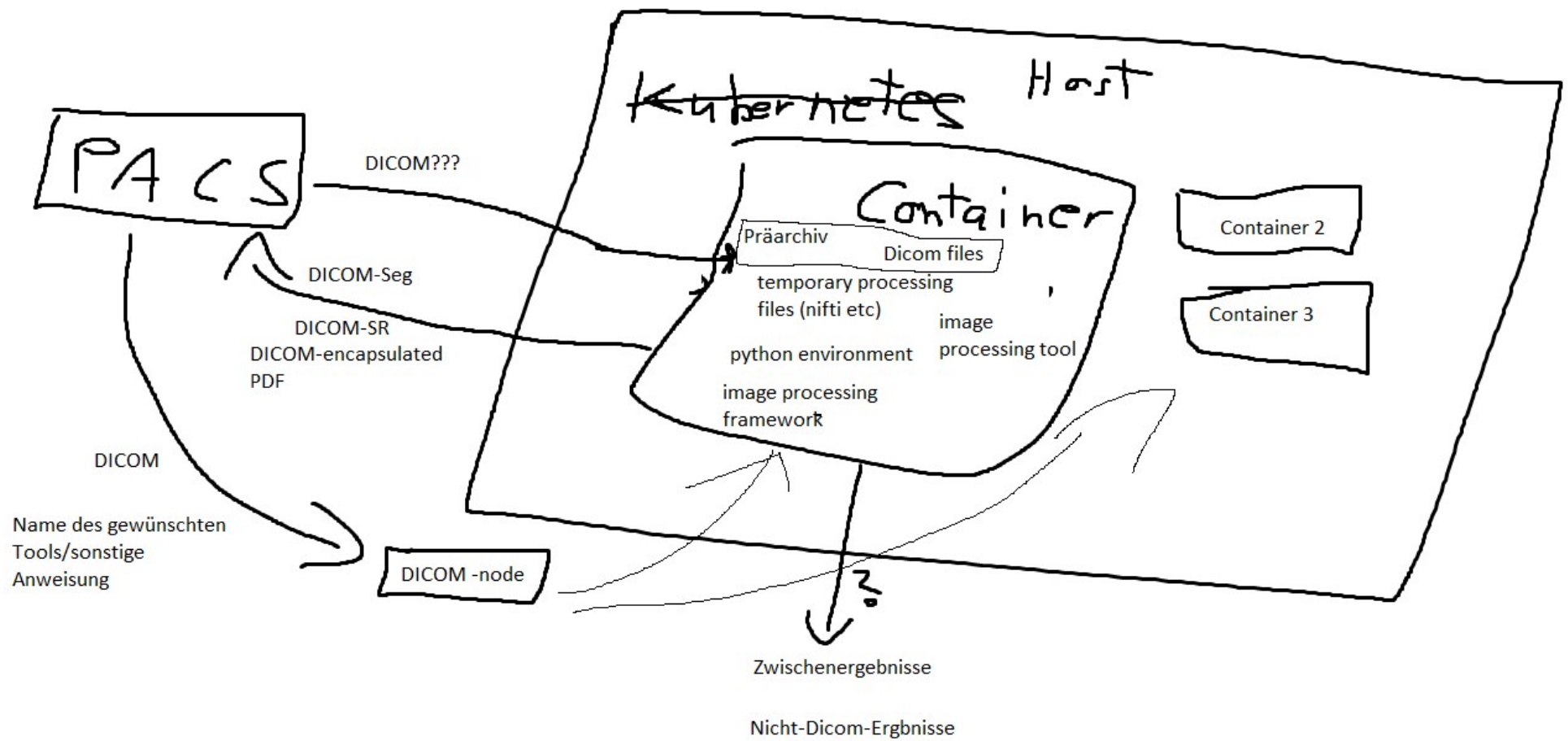
# Image data

Visualization of the patient's image data in the *OHIF Viewer*, startet via the PACS web-interface



3D volume without segmentation

3D volume with segmentation



# AI tool integration

## ImageProcessingTool



can\_process\_image()



description()



process()



version\_id()

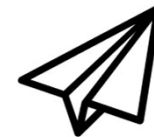
## ProcessingResult



metadata



tool\_name



to\_dicom()



# Outlook and Challenges



Successful deployment of AI into our test environment



Converting AI outputs into DICOM data format



Test in clinic / PDF to DICOM / Integrate more AI models