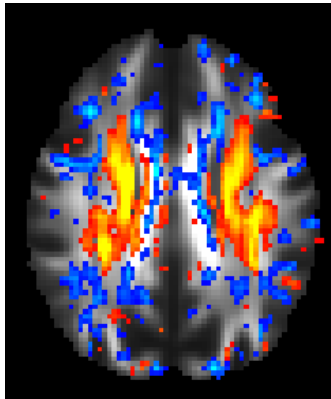


Plan of Approach Phase 2

Medical Imaging Classification



FICHe
Future Internet Challenge eHealth

 **FI-WARE**
Open APIs for Open Minds

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Plan of Approach Phase 2

Goal

Currently the Scyfer Deep Learning toolkit for medical image classification consists of a training algorithm and a standalone classification module which can only be run programmatically by developers. The overall goal for Phase 2 is to turn the classification module into a proof-of-concept API which can be deployed on cloud and private infrastructure for implementations with hospital information systems, diagnostic systems or professional medical devices.

The aim is to integrate the prototype at one launching customer right after Phase 2. This implementation will most probably still require manual configuration and adaptation to external systems. During Phase 2 further research will be performed to analyse compliance and security requirements (e.g. HIPAA), and data standards (e.g. HL7, DICOM) which should make it easier to connect the API with external systems of customers in the future.

Basic requirements *DxClassification* API:

- APIserver: The API server provides closed and secured RESTful endpoints which can be implemented with external systems;
 - OAuth2 identification through FI-WARE KeyRock and PEP Proxy;
 - Supporting requests with (collections of) images and meta data;
 - Supporting request results returning (collections of) classified images and meta data;
 - Clear documentation;
 - Gracefully handle server and request errors;
- IdentityManagement: The IdentityManagement module should allow Scyfer to administer customers, users and systems through a simple user interface;
 - CRUD of customers, users and systems;
 - Define rights to access the API;
 - Keep track of requests and collect billing information for API usage;
- ClassificationHandling: Internal logic tying the individual modules together to handle classification requests and results;
 - Receives, normalises and stores images in the PACS;
 - Sends images and meta data to ClassificationModule;
 - Accepts results from ClassificationModule and returns results to APIserver;
 - Registers classification requests in the IdentityManagement module and reports about customer API usage for billing;
 - Builds archive of classification requests for compliance requirements;
 - Error logging and informing Scyfer and customer of problems;
- PACS: Image archive for saving and retrieving medical images used for classification requests;
 - Store and retrieve images based on classification requests;

- ClassificationModule: A standalone internal CLI or API accepting 3D MRI images and metadata for classification;
 - Returns (a collection of) images and meta data with disease classification;
- Deployment: A script to deploy and run the complete API on a local machine and/or a cloud provider.

Roadmap

Deliverable	Planning	Budget
APIServer <ul style="list-style-type: none"> ● RESTful endpoints ● Documentation 	week 1 (40 hrs)	
IdentityManagement setup & standardisation	week 2 (40 hrs)	
PACS setup & standardisation	week 3 - 4 (80 hrs)	
ClassificationModule <ul style="list-style-type: none"> ● CLI / API endpoints ● Standalone deployment 	week 5 - 6 (80 hrs)	
ClassificationHandler <ul style="list-style-type: none"> ● APIServer integration ● Image handling ● ClassificationModule integration ● Request registration and billing 	week 7 - 10 (160 hrs)	
Deployment script <ul style="list-style-type: none"> ● Cloud infrastructure ● Local infrastructure 	week 11 - 12 (80hrs)	
Standards and compliance research (HIPAA, HL7, DICOM, etc)	week 1 - 12 (80 hrs)	
Biz dev to develop partnerships with launching customer(s).	week 1 - 12 (80 hrs)	
Integration & roll-out with 1 launching customer	week 13 - 16 (after Phase 2) (80 hrs)	