DATA INFRASTRUCTURE: CHALLENGES FRAMEWORK

TECHNOLOGY SPECIFIC REVIEW CRITERIA FOR EURO-BIOIMAGING NODES

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Introduction

The Euro-BioImaging survey indicated a large user need for standardized and validated image analysis tools, and a web repository of (validated) image analysis tools organized by task. Based on workshops organized as part of WP11, and a MICCAI 2012 workshop which was part of Euro-Bioimaging WP11 activities it was concluded that a framework which supports (i) the standardized validation of image analysis algorithms, and (ii) making these validated algorithms and reference data available ("challenges framework") would be an important step to achieve this.

A Euro-Bioimaging Node for the Challenges Framework will thus (i) support organizers of a challenge to set up and run a challenge in a standardized fashion, (ii) algorithm developers to participate in challenges to have their algorithm validated in a standardized fashion, (iii) making standardized and validated image analysis software available to the Euro-BioImaging users, e.g. through virtual machines.

Technology Review Criteria for Challenges Framework Euro-BioImaging Nodes

Data Infrastructure: Challenges Framework

Also, based on the output of the same workshops and the feasibility study documented in the Challenges Framework, the following criteria, in addition to the general eligibility criteria, have been identified to be critical for providing efficient access to such Nodes "Challenges Framework".

1. The Node should facilitate storage and sharing of anonymised imaging data and derived data, to be used for algorithm development and validation. This could e.g. be original imaging data, and manually annotated data (reference standard). Thus, the framework should support Euro-BioImaging Users to collect training data to develop and/or optimize task-based algorithms.

2. The Node should allow the definition of particular image analysis tasks for these datasets, which are relevant to a group of end users. The Node should allow the inclusion of software modules to enable the objective measurement of algorithm performance with respect to these image analysis tasks. The framework should allow algorithm developers to upload results of their software and/or make the software available through the framework, to facilitate objective measurement of algorithm performance by these modules.

3. The performance of the algorithms should be made available to the possible end users of the evaluated software modules, such that they can make a conscientious decision what algorithm or module to use for a specific task. Developers will have the option to choose a license that determines the conditions for other users to use the algorithms. Thus the platform should be supporting multiple distribution models (free, open source, commercial).

4. Euro-BioImaging users should be able to acquire the validated algorithms according to the developers license and/or be able to upload their own data and obtain the results of the available algorithms (e.g. through cloud computing). This may include options to combine the output of algorithms. Data and algorithm results should be easily available, e.g. through visualization in a highly effective web-based manner.

5. The Node needs to be able to support multiple users, and needs to respond quickly to questions of both algorithm developers and users. The Node will therefore need dedicated staff who support users of the framework. The framework that the Node provides should be user-friendly, intuitive, and contain good online training and help tools.

Overview of Technology Review Criteria Challenges Framework Euro-BioImaging Nodes

Type of Node		Modality	Facilities		Training		
Multi-modal	Flagship		1. Workstations - Desk, ICT access	2. Data Storage - images	3. Methodological set up	4. Image processing and analysis	5. Project planning
			Priority				
	Yes	**Challenges Framework**	High	High	High	High	High