

Programmer's introduction to

ImgLib2 and BigDataViewer

Vladimír Ulman, Tobias Pietzsch

CEITEC MUNI, Brno, CZE
Oct 2023



ImgLib2

- Java library to hold and manipulate n -dimensional data, preferably image data
- Backbone of the ImageJ2/Fiji projects
- Primary features:
 - Strong decoupling of (image processing) algorithms development and data management
 - Lazy (evaluation) paradigm

ImgLib2

- Offers
 - High-level, front-end programming interfaces
 - Low-level, back-end various storage strategies
- Designed
 - For high-performance
 - To be extensible
- More in the course sources and notebooks

ImgLib2

- Layers: Interfaces, Abstract Classes, Implementations
- Hierarchy of types, “responsibility layers”
- Breaks problems into atoms, plus various points of views
- Represents “grid-organized data” in computer memory
- Doesn’t do I/O (not even showing on the screen)
- But offers several data storage strategies
 - Several grid configurations & data marshaling
 - Lazy (Late) access to data
- Offers:
 - Grid manipulation → Views
 - Data manipulation → Converters
 - Basic Image processing → ImgLib2-* family of libraries

BigDataViewer

- Java application and library to display n -dimensional image data
- Available by default in the ImageJ2/Fiji projects
- Primary features:
 - Flexible API
 - Central viewer in several other applications (e.g., BigStitcher, Labkit, Mastodon)
 - Tiles (aka Chunks, Blocks) and (Resolution) Pyramids

BigDataViewer

- Offers
 - Displaying several images in the same window
 - GUI to control the display regimes
- Designed
 - To show images of different orientation & resolution
 - To load only necessary data, to load in the background
- More in the course sources and notebooks