Visualization and logical binding of hyperspectral data using QuickViz and SAADA

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- Hyperspectral observations (2D + λ) and their related parameters (variances, PSF, metadata…) are large data whose visualization, analysis and handling are crucial for observational sciences in astronomy but can no longer be tackled by existing softwares. Indeed, the size, the complexity and the heterogeneity of such image cubes require new tools for data exploration and understanding.
- We then propose a new cross-platform visualization and analysis software named QuickViz based on the Aladin software (developed at the CDS, Strasbourg) providing a set of basic and advanced features that ease the exploration of hyperspectral data cubes.
- Moreover, complex relationships between data cubes, parameters and metadata can be managed using the SAADA strategy to build up relational astronomical databases automatically generated and populated from FITS files. Queries on the database can thus be executed in a user-friendly manner for dataset exploration and interpretation, despite the huge size of data and high number of logical links.

Logical binding with SAADA

The SAADA application helps to easily build databases for heterogeneous data collections, with the ability to create and maintain logical bindings between various classes of datasets, for instance observations, metadata, calibration files, source catalogs, etc..

Besides an appropriate web interface, it offers a framework compatible to the Virtual Observatory interoperability tools. SAADA will support database queries, interface to services like Obs/TAP, SEAP, SSA or CS, and pass the visualizing task to VO tools, like Aladin (with QuickViz plugin compatibility), TopCat, VOSpec, etc..

Here is an example of a database setting for supporting IFU simulated data cubes (MUSE) with their associated parameters and bindings.

QuickViz Design

- Written in Java for portability
- Plugin architecture docked on Aladin platform : VO interaction, image and catalog handling inherited
- Extensible classes for new algorithms and visualization modes

QuickViz Design

Development Perspectives

- An interactive map representing the variance in the data cube is currently implemented. Various local PSF representation are being tested for a future release.
- Interoperability: the finer astronomical analysis of spectra will be delegated to other VO tools (like SPLAT or VOSpec) thanks to the implementation of the SAMP protocol.
- Finer interaction between SAADA, Aladin and QuickViz to automatically search through the SAADA repository from these visualization tools.

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SAADA’s website: http://saada.u-strasbg.fr

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