Mem. S.A.It. Suppl. Vol. 9, 463

Memorie della
Supplementi

DRAGO

Data Reduction and Analysis Graphical Organizer

L. Paioro, P. Franzetti, M. Fumana, B. Garilli, and M. Scodeggio

Istituto Nazionale di Astrofisica – Istituto di Astrofisica Spaziale e Fisica cosmica, Sezione di Milano – Via Bassini 15 I-20133 Milano, Italy – e-mail: luigi@mi.iasf.cnr.it

Abstract. Astronomical surveys performed using the most recent instruments provide an amout of scientific information that was impossible to obtain only a few years ago, and the data acquisition rate and data set complexity keeps increasing. The reduction and analysis of such data implies many elaborations involving different software instruments: visualization tools, reduction procedures, data analysis programs and so on. Two practical needs arise:
1) organize and classify in a customized and intuitive visual way the huge amount of data otherwise difficult to handle;
2) join together, in a unique framework, different software packages, so that the ideal pipeline from raw data reduction to final data analysis works as an unified global system.
This global framework must be able to handle different the data models and parameter parsing syntax of the different tools.
DRAGO (Data Reduction and Analysis Graphical Organizer) attempts to satisfy these requirements providing:
1) a user customizable graphical organizer software for astronomical data;
2) a global intercomunicating framework that provides a suite of generic reduction and analysis software. It provides a plug-in system to add new user's programs too.

See http://cosmos.mi.iasf.cnr.it/pandora .

Key words. Data reduction tool – Graphical interface – File manager – Tool for astronomers – Global framework - Plug in – Data organizer

1. Introduction

The number of large telescopes available to the astronomical community, coupled with the rapid increase in the multiplexing capabilities of the instruments attached to those telescopes, have lead to the development of new techniques for optimizing the astronomer work.

In fact, while a normal long-slit spectrograph on a 4-meter class telescope could produce a few tens of spectra per night of observation, today a spectrograph like VIMOS at the VLT can obtain several thousands spectra per night. It is clearly necessary to automatize as much as possible the data reduction and analysis pipelines, to increase the speed with which

Send offprint requests to: L. Paioro

they can be carried out, but without loss of data quality control capability.

The purpose of DRAGO is to have an open environment specifically built to handle relatively large datasets, in the most complete and flexible way. The DRAGO software package must include pipelines for data reduction to be carried out in a semi-automatic fashion, tools for data visualization, and data analysis programs that can be used efficiently for standard or ad-hoc analysis of the available data (Paioro et al. 2004).

2. How DRAGO works

Considering the DRAGO framework requirements with a broad perspective, we can identify three main tasks (Paioro et al. 2004) that it must be able to carry out:
a) data organization;
b) data reduction and analysis;
c) results storing.

Each functionality the package offers, is wrapped in a plug-in software module, and it is possible to add further plug-in modules following a very simple procedure.

All plug-ins activity is controlled by a Central Communication Server that is at the core of the DRAGO framework. Communication between plug-ins is performed using a standard protocol that is interpreted by the server. The inner technology that supports all the plug-ins is invisible to the user.

The core DRAGO functions are being developed using Python. Further plug-ins can be coded using any language and require a small Python wrapper that can be easely created with a wizard tool (Fig. 1).

In the next paragraphs we will illustrate three plug-ins included in the DRAGO suite, in order to show how the package is able to comply with the requirements discussed above.

3. File Browser

The File Browser is a file classification and browsing tool which allows the user to define arbitrarily complex classification schemes using an easy to use interface. It allows to graphically define the input list to be used by the other plug-ins (Fig. 2).

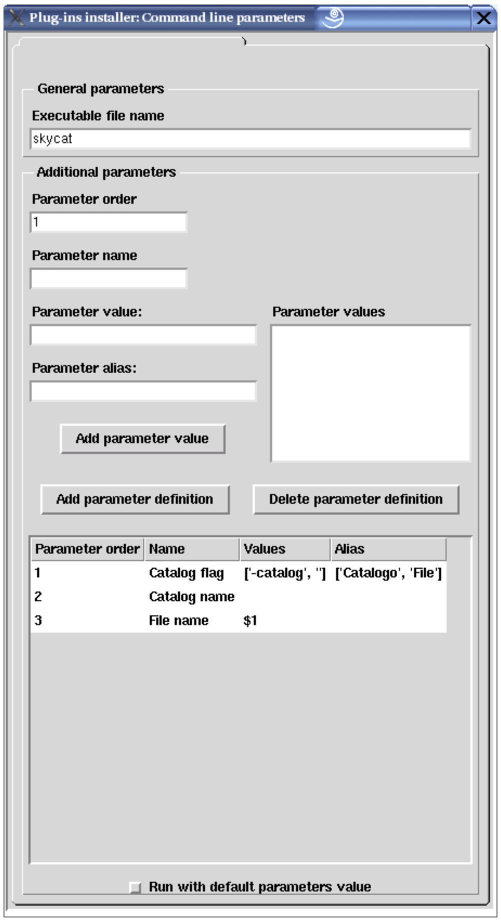

Fig. 1. The Plug-in Installer. This is an example of parameter configuration to install the well known Skycat software.

4. SGNAPS

SGNAPS (Software for Graphical Navigation, Analysis and Plotting of Spectra) is an example of plug-in provided with DRAGO (Fig. 3). It allows to visualize and elaborate 1D spectra and optionally to display the related 2D spectra and 1D sky spectra too. Furthermore it provides a redshift evaluation tool. SGNAPS is available stand-alone (1.1.1

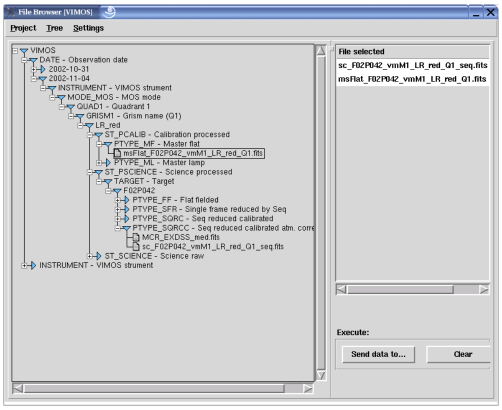

Fig. 2. The File Browser. This is an example of file categorization and ordering with the standard VIMOS tree.

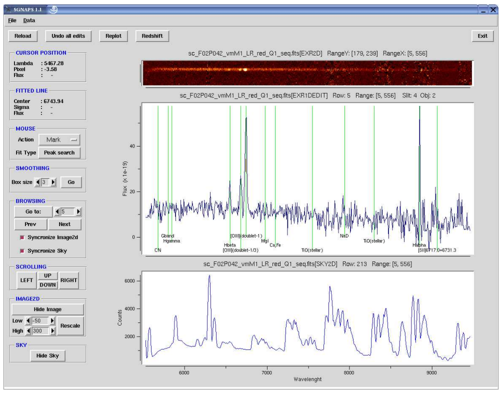

Fig. 3. SGNAPS. An example of redshift analysis on a VIMOS spectrum.

version) with other astronomical software (visit http://cosmos.mi.iasf.cnr.it/pandora).

5. Data storing

DBbrowser is a plug-in we will provide within DRAGO. It is an easy-to-use interface to MySQL database.

It is designed to be a quick analysis tool for scientists who have their data stored in tables within a MySQL database. It provides simple and easy to use statistical and plotting facilities, like:

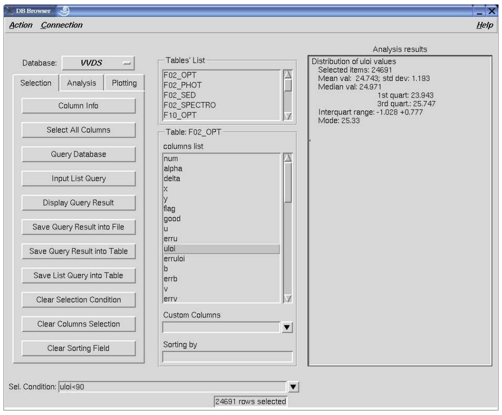

Fig. 4. DBbrowser. An example of database inquiring. Here we have a statistic on the selection performed.

- plot data value distributions or correlations;
- get measurements for a distribution mean, median, and spread;
- measure the degree of correlation and derive the linear correlation coefficients between two sets of data values (see Figure 4).

DBbrowser is available stand-alone (release 0.6), and we are now implementing the DBbrowser embedding within DRAGO. It will automatize the requirement of extracting the data from the database and passing them to some external package for analysis.

Once incorporated in the DRAGO plug-in suite, it will be possible to complete the DRAGO philosophy, having a global framework that satisfies the three requirements of data organization, data reduction and analysis and storing of results.

Acknowledgements. This project has been partially supported by FIRB LBT.

References

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