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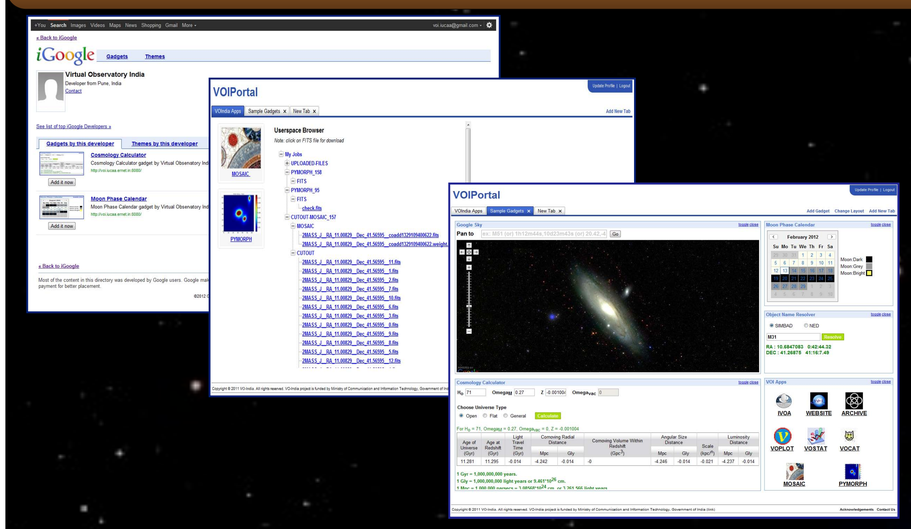
VIRTUAL OBSERVATORY INDIA

A COLLABORATION BETWEEN IUCAA AND PERSISTENT SYSTEMS LTD.
SUPPORTED BY MINISTRY OF COMMUNICATION AND INFORMATION TECHNOLOGY.

VO-I provides platforms for storing vast quantities of data generated by observatories in India and other countries. It undertakes development of VO tools and uses those for doing science. VO-I brings together astronomers, data mining experts and software professionals from India and abroad to work on the exciting frontiers of the Virtual Observatory. VO-I provides access to VO tools and vast quantities of data to the Indian and international astronomy community and these are being widely used for conducting scientific research. The tools being developed by VO-I adhere to the protocols set by the International Virtual Observatory Alliance.

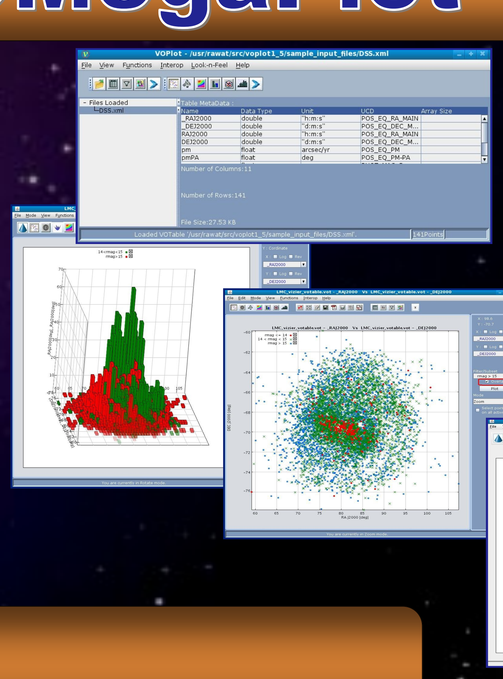
VOIPortal



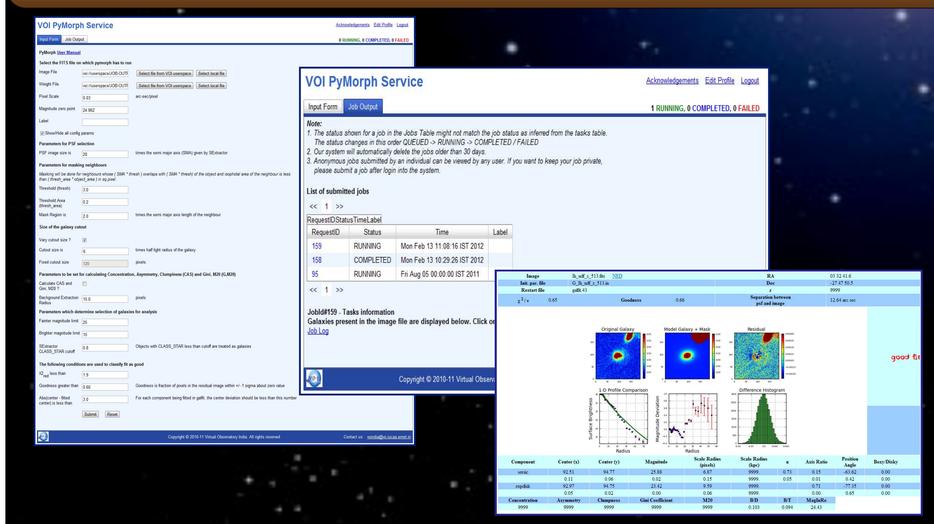
To ease the adoption of VO technology by end users, it was essential to develop and maintain a high end portal, which will provide easy access to different VO sites and VO facilities in a unified manner. VOIPortal is an entry point to all VOI web services. Core packages such as Mosaic Service and Galaxy Morphology service are integrated into the VOI Portal. User space with IVOA recommended VOSpace interface is provided with different options of applications. The user is given the option to customize the pages to suit their requirements. It has incorporated VO protocols to ensure interoperability and easy data portability from one tool to another. It also hosts few open social gadgets using Apache Shindig framework and can be integrated with iGoogle gadgets.

VOPlot & VOMegaPlot

VOPlot is a tool for visualizing astronomical data. VOPlot is developed in JAVA, and acts on data available in the VOTable format. VOPlot is available as a standalone version, which is to be installed on the user's machine, or as a web-based version. VOPlot has been further enhanced keeping in mind the suggestion made by the user community. New features such as 2D/3D plots, density plots and SAMP interoperability have been added.
VOMegaPlot shares certain common functionality with VOPlot, but it is optimized for handling large number of points (in the range of millions). VOMegaPlot uses certain preprocessing algorithms to create data-structures which are then serialized on the disk in a plot-friendly format. During the actual plotting operations, only the relevant data necessary for plotting is loaded. This significantly reduces the memory requirements and allows plotting of large amount of data.



VOI PyMorph Service



It is Galaxy Morphology Service which allows users to derive morphological parameters for galaxy images. Users can provide the output FITS files generated by VOI Mosaic Service. This PyMorph service also provides the facility of uploading FITS files from individual machines. It is a software pipeline which computes non-parametric and parametric morphological parameters of galaxies. It uses **GALFIT** (for bulge disk decomposition of galaxy) and **SExtractor** (for determining the initial values), with the help of its own module to calculate Concentration index, Asymmetry, Clumpness, Gini Coefficient, etc. This service exists as a separate web application as well as it is integrated to the VOIPortal gadgets.

VOI Android Apps

VOI Android apps include ***Name Resolver*** and ***Cosmology Calculator***. These are the Android 2.2 smart phone stand-alone applications, which are published on android market. They are freely downloadable in *.apk format and installed locally on users Android 2.2 or higher mobile device.
Name Resolver allows user to input name of celestial object and returns basic information associated with object such as RA/DEC, redshift, proper motion, parallax etc. It makes use of the name resolver service provided by **NED** and **SIMBAD**.
Cosmology Calculator allows user to input values of Hubble constant, Omega (matter), Omega (vacuum) and redshift, and it returns value for co-moving radial distance and volume, angular-size distance, luminosity distance etc. One may also choose between a flat and open universe. The Cosmological Calculator has been adapted from **Ned Wright's Cosmology Calculator**.