INTERACTIVE POSSIBILITY OF WORKING WITH A DIGITAL VERSION OF THE JOURNAL "IZVESTIA OF THE CRAO"

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ABSTRACT. The main problem that arises when working with a scanned version of any published scientific journal related to the presentation of digital information displayed. In this paper, we consider the statistics, which represents the journal "Izvestia of the Crimean Astrophysical Observatory" in the SAO/NASA ADS. As the example of articles from the print version of the journal we consider the possibility to access the world's astronomical databases for obtaining additional information about the investigated objects. We describe briefly on-line virtual applications for the graphical information display.

Key words: database, virtual observatory, e-library

1. Introduction

Since the establishment of the "Izvestiya of the Crimean Astrophysical Observatory" journal (CrAO) in 1947, the 108 volumes have been printed, including original articles and 13 volumes of conferences materials which were held at the CrAO. Starting with the volume 99, the archive of "Izvestiya CrAO" in PDF format is available on the website of the National Library of Ukraine(http://archive.nbuv.gov.ua/portal/natural/IKAO). Access to the content of all volumes, including the conference proceedings, is provided in PDF format on the website of the CrAO (http://crao.crimea.ua).

For ensure remote work with the information published in "Izvestiya CrAO", it is needed online access to the original articles. The most representative astronomical publication's database is a portal of digital library of the Smithsonian Astrophysical Observatory, supported by grants from NASA (SAO/NASA Astrophysics Data System - ADS) (http://adsabs.harvard.edu/index.html). Till mid-2013 the ADS search system provided a gateway to the information on 1,283 articles published in the "Izvestiya CrAO". Here we look at the completeness of presentation of this journal in ADS, taking into account that 99 volumes are available on-line.

The histograms shown in Figure 1, illustrate the number of publications per the number of volumes presented in ADS. Note that during the last six years (Shlyapnikov, 2007), the number of links to the "Izvestiya CrAO" has enlarged by 406 publications; however, it is only 57% of the entire list of publications. The main suppliers of information for ADS are as follows: a program of scientific and technical information NASA (http://www.sti.nasa.gov/) (609 publications); Astronomical Center of the University of Heidelberg (Germany) (http://ari.uni-heidel berg.de/) (491 publications), and the Astronomical Data Center in Strasbourg (France) (http://simbad.u-strasbg.fr/ Simbad) (136 publications). The interest of various organizations to this journal is due to the information contained in the articles, including the observational results. However, the main problem is still unavailability to access original publications and, in some cases, their abstracts. So, to improve this situation, we have undertaken a work on the digitization of articles in the "Izvestia CrAO".
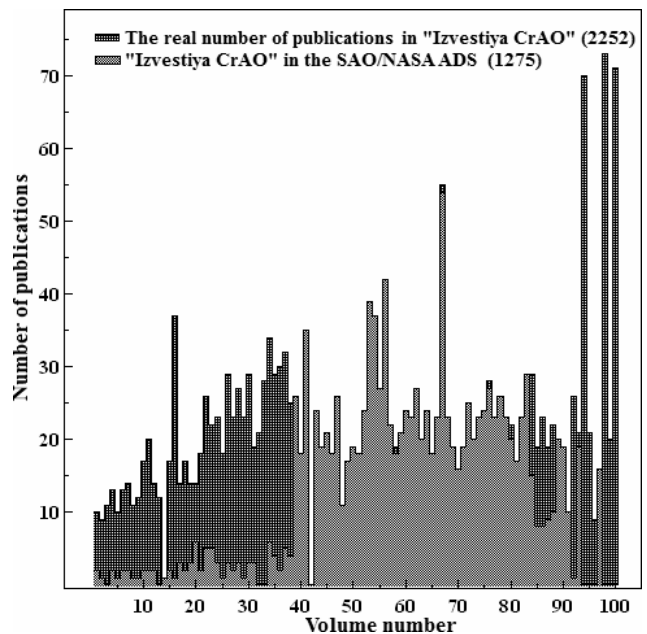

Figure 1: Number of publications in the original edition of "Izvestiya CrAO" and as they are represented in ADS

2. "Izvestiya CrAO": digital version

2.1. Scan and presenting of journals

Working on a digitized version of "Izvestiya CrAO" we understood that it should be in the formats similar to the representation of articles in the ADS. Figure 2 illustrates a simplified HTML version of the paper by Bondar (2001) containing thumbnails of pages in JPG format (size ~ 4 kB) as the example for general viewing and navigating in our article, and a full-scale GIF image (size ~ 100 kB), designed for reading and printing. The page is scanned and saved in GIF format in 8-color palette for the smooth transfer of polygraphic text and print quality.
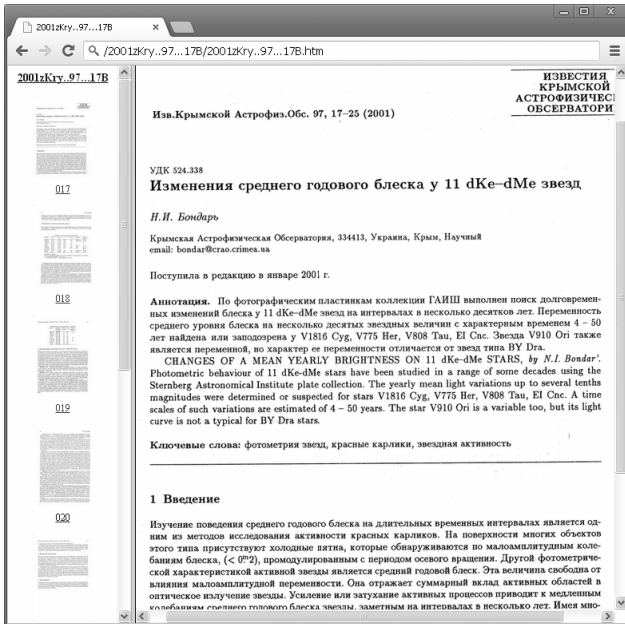
Figure 2: The version of the submission article of "Izvestiya CrAO" in a format similar to ADS

The main disadvantage of this submitting articles is impossibility to transfer it to another data sources and to use tools for work with the published information without further modification of HTML code.

When we convert the scanned article in PDF format we have a more opportunities for its interactive use. In figure 3 a fragment of Table 1 from paper by Bondar (2001) is shown, where hyperlinks to the object to the database SIMBAD in the second information layer in the main text of the printed version were added. This provides access to bibliographies in ADS and other resources of the Astronomical Data Center in Strasbourg.

Figure 3: Fragment of articles from "Izvestiya CrAO" in PDF format with links to the SIMBAD database

Obviously, the best option for providing information published in the "Izvestiya CrAO" would be a digital version. However, the procedure for recognition of text and

further edition is a quite time-consuming and not always justified process.

2.2. Abstracts and tables

The first priority in creating a digital version of "Izvestiya CrAO" is the addition of ADS titles of missing articles in order to eliminate discrepancies between the actual numbers of publications and those that are presented in the ADS (see Figure 1). The next step is to add abstracts. For many journals published in the last century, as we see, the ADS provides the scanned abstracts, which simplify the process of adding abstracts of "Izvestiya CrAO". However, the most important information that enables communication with ADS and SIMBAD, must be submitted in digital format. First of all, we say about the list of celestial objects, which were described or presented in articles. We should take into account that astronomical articles contain references to stars with letters of the Greek alphabet as well as specific catalogue identifiers for stars and extragalactic sources. So, we need to put the names of the objects from their basic designations in SIMBAD. The HTML page with a list of objects that are discussed in this article, make it easier for access to relevant digital version of "Izvestiya CrAO".
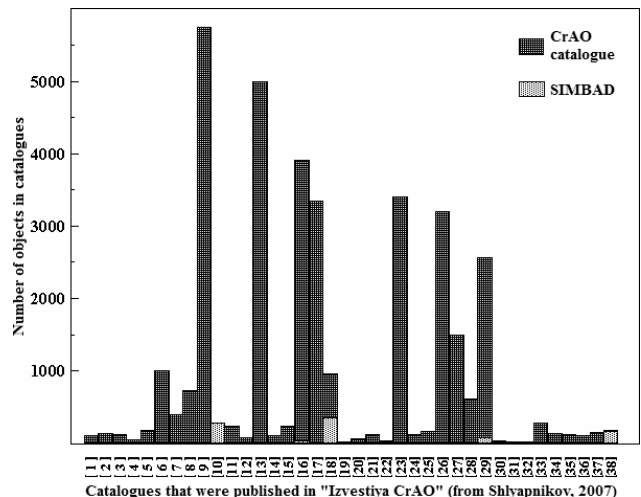

Figure 4: (see comments in text)

Figure 4 gives the example of 38 catalogues published in the "Izvestiya CrAO". It is shown how are by the number of objects in a real publications represented and how it is displayed in SIMBAD. Analysis of the histogram shows that the most of the observational data for celestial objects, obtained at the CrAO and published in catalogues in the "Izvestiya CrAO", are unknown for the world astronomical community.

The same situation with a representation of the tables in articles published in the "Izvestiya CrAO". It requires also the form of HTML pages, or IVOA formats with links to data files placed on HTML pages. The first step is the reation of digital versions of the tables or observation journals of objects, described in the articles. It will allow cross-matching the list of objects with the list published in the "Izvestiya CrAO", and searching time correlation of observations. We note also that the existence of such a list

in a format supported by the Aladin application (Bonnarel, 2000) provides access to search maps, SIMBAD, ADS, and other resources and databases..

The second and more urgent as well as time-consuming step is to represent the observed and/or modeled parameters of the objects from tables in a digital format. There may be the light curves, the data analysis of the color indices, the distribution of flux density or radial velocity in the spectra, periodic characteristics, etc. When transferring these data to digital format, they should be satisfied also to requirements of the aforementioned databases.

2.3. Figures and graphics

The illustrations in the printed version of "Izvestiya CrAO" can be a good quality after scanning process and contain clear information for their further use. The first category can be referred to the conventional illustrations without of interest for interactive use.
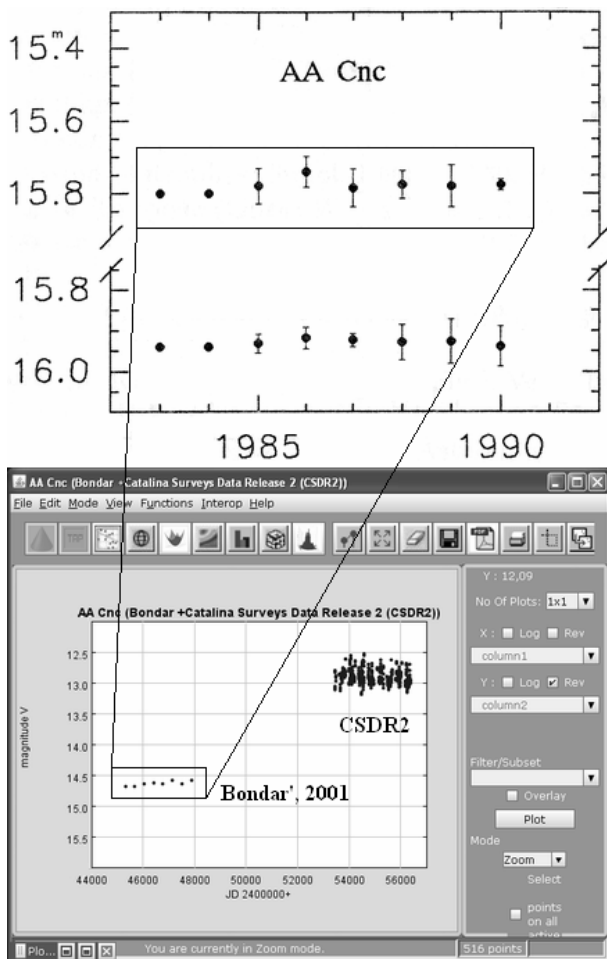

Figure 5: Observations AA Cnc according to the paper by Bondar (2001) and a review of CSDR (Drake, 2009) presented in VOPlot.

The second category may contain a finder chart for the identification of the described objects and graphics, which characterize their parameter. The finding charts are particularly relevant for the catalogues of objects that are not present in VizieR (Ochsenbein, 2000) or do not meet basic names in SIMBAD.

When such illustrations are preparing in the IVOA formats, they can be used in Aladin for identification simplicity.

Graphics, which accompany tabular information in printed articles, being converted into a digital format, allow to apply for their visualization and analysis by interactive applications tools. Figure 5 shows the light curve of AA Cnc. Top panel is the image from the original article (Figure 2, (Бондарь, 2001)); down panel is its representation in an interactive application of IVOA – Virtual Observations Plot (http://vo.iucaa.ernet.in/~voi/voplot.htm) with the additional data from Catalina Real-time Transient Survey (Drake, 2009).

3. Conclusion

We considered the possibility of interactive use and process of creation of the digital version of "Izvestia CrAO", which we conduct to add the missing articles to the ADS as well as the data on observational celestial objects to the SIMBAD and other databases. They do not limit to the examples given in the article. First of all, it is needed to add the missing titles and abstracts of articles in the ADS in order to eliminate discrepancies between their actual number and available on-line. Creation of a digital version of such printed volumes of the "Izvestiya CrAO" must be accompanied by the data storage in formats that are supported by IVOA.

This work is a part of the UkrVO project (Vavilova et al., 2012a, 2012b) aimed on the support of e-libraries and heritage of the observational data, which were presented only in the printed format and are still unknown for the astronomical community.

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