ISYA 2012

Exercise 6 - NASA/IPAC Infrared Science Archive (IRSA)

Summary

In this activity you will make use of an online database GATOR which is a web interface that allows users to build queries that retrieve data from astronomical catalogs archived at the NASA/IPAC Infrared Science Archive (IRSA). This exercise help you to learn how to build queries with GATOR.

Activity 1

Perform a cone search of all measurements within **1 degree** of **M51** in the **2MASS Second Incremental Release Point Source Catalog** and return ra, dec, J, H and K magnitudes, with output records ordered by K magnitude.

To query the catalog for specific properties of all sources lying within a given area on the sky, one would utilize the **Cone Search** feature of **VO**. This allows the user to conduct a search of a specified radius (in arcseconds, arcminutes, or degrees) around a location on the sky corresponding to the set of coordinates (equatorial or Galactic) entered which form a cone.

1. Start up your web browser and connect to the Internet.

2. Go to the GATOR homepage for Catalog Search at

    http://irsa.ipac.caltech.edu/applications/Gator/

3. At this page you will see list of **IRSA** catalogs. Choose the **2MASS** and   Click '**Select**' to bring up the page that gives information about the number of catalogs in the **2MASS** database.

    How many catalogs are in 2MASS database? How many objects in each catalog?

4. Choose the *2MASS Second Incremental Release Point Source Catalog,* which is 8th from bottom of the page, by clicking the selection button for that catalog. Click **Select** to bring up the query builder window for that catalog.

5. This will take you to a new page headed **GATOR - 2MASS First Incremental Release Point Source Catalog (PSC)**. In the box labeled **SPATIAL CONSTRAINTS**, Select **Single Object Search** and enter M51. Select **Cone**, and enter **radius = 1 degree** for radial search (PA and axial ratio can be left blank for circular searches).

6. In the box labeled **OPTIONS**, default is table output which we are going to use. The other boxes should be left as it is.

7. In the box labeled **COLUMN CONSTRAINTS**, check the box in the **Sel** column for ra, dec, j_m, h_m and k_m; **uncheck** the **Sel** column for other columns.

8. In the box labeled **ADDITIONAL CONSTRAINTS** clear out any constraints typed in this space.

9. Click **Run Query**.

10. The Process Monitor window is brought up. Click **Check Query Status** to bring up the processing log for the job. **Elapse** shows the elapsed time since the query was submitted, and the field to the right specifies whether this was submitted to the **DBMS** as a foreground or background job. Upon completion, this field changes to **Job finished**, in which case the user can view the results file using the link provided under **Query Results** The user can abort a job in process by clicking the **Stop Process** button. It may take a few minutes for the page to finish.

11. You will now get a page of your **Cone Search Result**. Information about all measurements within 1 degree of M51 is shown. There will be ~**2954** sources found within 1 degree of **M51**. The large table you now see at bottom gives information about each of the objects in the **2MASS** database. You can explore the Links in this page that will take you to different kinds of information about images and catalog data. You can also plot the output table data by clicking on **PLOT DATA**.

Activity 2

Simple query on the **2MASS Second Incremental Release Point Source catalog** to retrieve all columns for all point sources fainter than **15th** magnitude and confined to a strip of sky between declinations **17** and **18 degrees**.

1. Start up your web browser and connect to the Internet.

2. Go to the **GATOR** homepage for Catalog Search at
   http://irsa.ipac.caltech.edu/applications/Gator/

3. At this page you will see list of **IRSA** catalogs. Choose the **2MASS** and Click **Select** to bring up the page that gives information about the number of catalogs in the **2MASS** database.

4. How many catalogs are in **2MASS** database? How many objects in each catalog?

5. Choose the ***2MASS Second Incremental Release Point Source Catalog***, which is 8th from bottom of the page, by clicking the selection button for that catalog. Click **Select** to bring up the query builder window for that catalog.

6. This will take you to a new page headed **GATOR - 2MASS First Incremental Release Point Source Catalog (PSC)**. In the box labeled **SPATIAL CONSTRAINTS**, select **All-Sky Search** to search the entire catalog without spatial constraints.

7. In the box labeled **OPTIONS**, default is table output which we are going to use. The other boxes should be left as it is.

8. In the box labeled **COLUMN CONSTRAINTS** click on Long Form.

9. In the box labeled **ADDITIONAL CONSTRAINTS**, clear out any constraints typed in the space and type **(j_m > 15)** and **(h_m > 15)** and **(k_m > 15)** and **(dec between 17 and 18)**.

10. Click **Run Query**.

11. Same as **Step 10** and **11** in **activity 1** above.