

Earth Sciences Summer Student Program:

Indexing the sky: improving queries in Astronomical Databases

Supervisors:

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Project description:

Modern Astronomy relies on access to gigantic telescopes that are producing images and other data in such a large amount that Astronomers cannot deal with it in the same way they used to do. To face this avalanche of data, Astronomers have to unite with computer scientists, and built Data centers that will facilitate the access and the analysis of the data. Based at the National Taiwan Normal University Department of Earth Sciences, the Taiwan Extragalactic Astronomical Data Center is one of such new facilities and has for goal to propose access to up-to 1Pb of data dedicated to extragalactic astronomy by 2015.

The main functionality of an astronomical data center is to provide access to gigantic catalogues spanning the whole sky and whole wavelength ranges. In order to make a full use of such extensive datasets, cross-matching between catalogues is essential, and therefore very fast queries are vital. One of the most recent solutions is the use of hierarchical subdivision of the celestial sphere using spherical triangles. This kind of algorithms, based on quadtree algorithm, is nowadays widely used to query in astronomical database.

The final goal of this project is the implementation of a Hierarchical Triangular Mesh (HTM) algorithm in our database. We propose to a student to contribute of several fundamental steps of this implementation during the summer. He/she will join a team of motivated students and astronomers and make an essential contribution to the development of the Taiwan Extragalactic Astronomical Data Center.

Preferred background of student candidates:

- Senior or Junior students with good English skills are both welcome.
- Strong knowledge/experience in computers (linux system) is essential.
- Good programming skills (C, C++) is required.
- No background knowledge in astronomy is necessary.