STARBASE: Database Software for the Automated Plate Scanner

S.C. Odewahn, R.M. Humphreys, and P. Thurmes
The University of Minnesota

The Automated Plate Scanner (APS) of the University of Minnesota, a unique high speed "flying spot" laser scanner, is currently being used to scan and digitize the 936 O and E plate pairs of the first epoch Palomar Sky Survey. The resultant database will be used to produce a catalog of approximately a billion stars and several million galaxies. We describe the ongoing development of a dedicated APS database management system which will be made available to the astronomical community via INTERNET.

A specialized DBMS called STARBASE has been written to provide fast access to the hundreds of millions of images collected by the APS. This system provides an initial reduction mode for parameterizing APS images and classifying image types using a novel set of neural network image classifiers. A second analysis mode, which will be that commonly used by the general user, provides for searches of the database which may be constrained by any combination of physical and positional parameters. Through the use of pointer hash trees, the system has been optimized for extremely fast positional searches using either right ascension and declination on the sky or linear X and Y positions on the POSS field. In addition to fast data retrieval, the system provides a graphical interface for displaying scatter plots or histograms of the collected data. In addition, a specialized image display system is being developed to allow the user to view densitometric data for all objects classified as extended by the neural network system. Finally, STARBASE has a flexible programmable interface which allows other programs to access information in the database. This allows users to write applications suited to their particular needs to process APS data.