The Query By Image Content (QBIC) System

Jonathan Ashley, Myron Flickner, James Hafner,
Denis Lee, Wayne Niblack, Dragutin Petkovic

IBM Almaden Research Center, 650 Harry Road, San Jose, CA 95120

QBIC (Query By Image Content) is a prototype software system for image retrieval developed at the IBM Almaden Research Center. It allows a user to query an image collection using features of image content – colors, textures, shapes, locations, and layout of images and image objects. For example, a user can query for images with a green background that contain a round red object in the upper left. The queries are formed graphically – a query for red objects can be specified by selecting the color red from a color wheel, a texture query can be specified by selecting from a palette of textures, a query for a shape can be specified by drawing the shape on a "blackboard", and so on. Retrievals are based on similarity, not exact match, computed from numeric features vectors describing the properties of image content. The feature vectors are often of high dimension, say 64, and several filtering approaches are used to increase query efficiency. The queries can also include standard SQL and text/keyword predicates.

The system has a graphical user interface that lets a user build the queries, display multiple results, requery based on returned images, and modify and resubmit queries. QBIC runs on an RS 6000 with AIX with an X/Motif user interface. The current image database used for testing and development has over 2300 images.

Two examples, one a query by color histogram (percentage of given colors), and one by approximate color "painting" are shown in Figure 1.
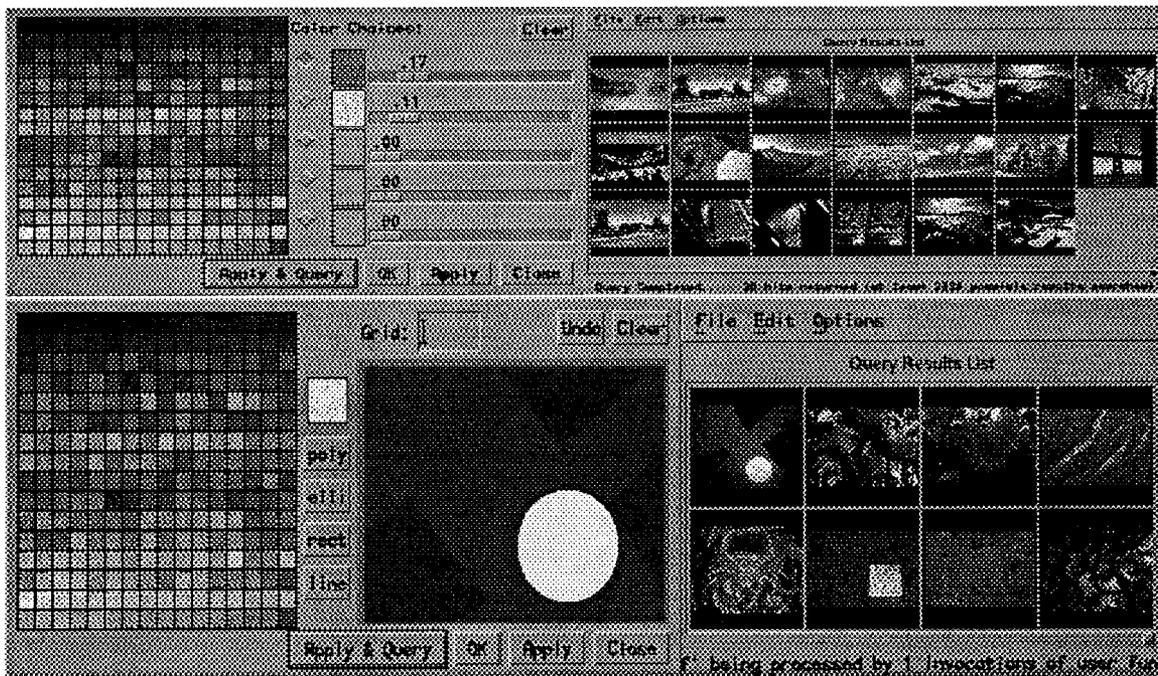

Figure 1: Top: Query by color histogram: Query specification on left. Best 20 results on right. Bottom: Query by "painting". User painting on the left. Best 8 results on right.