Problem Statement

The purpose of this proposal is to illustrate the possibility of creating an infinite panorama through using a Matlab program to search through an image database containing approximately 5 million images. This project will attempt to complete the infinite panorama by using the following methods:

- Allow the user to provide an input image
- Perform a search function to match a new image to a portion of the input image
- Use a blending, morphing and/or seam carving methods to composite the images
- Allow the user to pan to the right or left of the input image

Introduction/Background:

In the traditional methods of composing a panorama, a lot of time and effort are required to first capture the necessary images and then composite the images together in a photo-editing program. However, the composition of the panorama must have been pre-meditated prior to image capture. Now, if the desire to view a panorama occurs post-image-capture, there is only one true option; go to the original location and recapture the images required. As you can see, this solution can not only be time and monetarily consuming, but logistically impossible since the mise en scene or plenoptic function will be different. This project will be able to provide a solution to the user by creating a virtual world of what could have been to the left or right of the input image. Also, in reality, the maximum size of a panorama that can be capture is a 360° panorama. The result of this project will be an artistic infinite panorama that will still look as aesthetically pleasing as real panoramas.

Methods:

Design of this project can be divided into three foci:

- Searching through the image database;
- Compositing input and searched images;
- Providing user interaction.

James Hays’s codes will be used to search through the image database. Feature descriptors were created for all the images in the database. The search function then uses a mask to match only half of the input image to the database. A distance function
will measure the distance between the input image and the database images. The top 200 images with the closest distances to the input image will then be kept. The input image can then be subdivided into more quadrants to refine the match. The top match out of the 200 matches will then be kept as the neighbor image to the input image. To composite the searched and input images together, blending, seam carving, and morphing methods will be imposed to create a smooth transition. To allow user input, a gui will be created to allow the user to input their images and pan to the left or right of the image. A demonstration of the methods that will be used in this project is shown below.

Figure 1: Input image.

Figure 2: Sample of results output from the search function.
**Timeline and Goals:**

The search function for each image requires about 10min of processing time on the unix cluster machines to obtain the top 200 matches. The challenge will then be to refine the search and composite the images. Since previous codes have already been developed on compositing images, the project should be completed on or before December 6, 2007.
Conclusions/Recommendations:

The result of this project will be able to provide the user the possibility to view the scenes that might exist to the left or right of an input image. The presentation of this project will occur in the form of a video demonstration. The demonstration, which will be submitted December 6, 2007, will provide detailed methods and example results that will show how viable this solution is in creating an artistic infinite panorama.

References